

# National Workshop on Human Resource Innovations in Shipbuilding / Ship Repairs

U.S. DEPARTMENT OF TRANSPORTATION  
Maritime Administration and the U.S. Navy

in cooperation with

National Steel and Shipbuilding Company  
San Diego, California

# Report Documentation Page

Form Approved  
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>JUN 1991</b>		2. REPORT TYPE <b>N/A</b>		3. DATES COVERED <b>-</b>	
4. TITLE AND SUBTITLE <b>National Workshop on Human Resource Innovations in Shipbuilding/Ship Repairs</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Naval Surface Warfare Center CD Code 2230-Design Integration Tools Bldg 192, Room 128 9500 MacArthur Blvd, Bethesda, MD 20817-5700</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release, distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>SAR</b>	18. NUMBER OF PAGES <b>236</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

## DISCLAIMER

These reports were prepared as an account of government-sponsored work. Neither the United States, nor the Maritime Administration, nor any person acting on behalf of the Maritime Administration, (A) makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness or usefulness of the information contained in this report/manual, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or (B) assumes any liabilities with respect to the use of or for damages resulting from the use of any information, apparatus, method, or process disclosed in the report. As used in the above, "Persons acting on behalf of the Maritime Administration" includes any employee, contractor, or subcontractor to the contractor of the Maritime Administration to the extent that such employee, contractor, or subcontractor to the contractor prepares, handles, or distributes, or provides access to any information pursuant to his employment or contract or subcontract to the contractor with the Maritime Administration. ANY POSSIBLE IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR PURPOSE ARE SPECIFICALLY DISCLAIMED.

Human Resource Innovation  
in Shipbuilding and Ship Repair

o o WORKSHOP PROCEEDINGS o o

Sponsored by Panel SP-5,  
Human Resource Innovation,  
of the  
Ship Production Committee  
of the  
Society of Naval Architects and Engineers

MARCH 1991

David Taylor Research Center Contract No. N00167-89-D-0071  
with

National Steel and Shipbuilding Company  
San Diego, California

and

Subcontract No. MU142007

with  
Win/Win Strategies  
Bethlehem, Pennsylvania

## **FOREWORD**

This publication is a deliverable of a project managed by Win/Win Strategies of Bethlehem, Pennsylvania, for the National Shipbuilding Research Program (NSRP), under David Taylor Research Center Contract No. N00167-89-D-0071, with National Steel and Shipbuilding Company (NASSCO) and Subcontract No. MU142007 between NASSCO and Win/Win Strategies.

The project was performed under the auspices of Panel SP-5, Human Resource Innovation, of the Ship Production Committee of the Society of Naval Architects and Marine Engineers.

The overall objective of the Workshop was to bring the attention of a more diverse audience than is normally reached by Panel SP-5 the activities and importance of the National Shipbuilding Research Program, to examine both the content and process of human resource innovation as it is practiced in this country today and to disseminate new managerial practices and organizational concepts developed for implementation within United States shipyards.

It is also intended that the range of topics, the manner of presentation and discussion, and the quality of the speakers will heighten interest in human resource innovation, in both experienced practitioners and in those who are testing the waters. Attendance at the Workshop, from the standpoint of organizations represented and the positions held by attendees in those organizations, can be used to gauge the current state of the art and interest in human resource innovation.

The Workshop was held on October 16, 17 and 18, 1990, at the Maritime Institute of Technology in Linthicum Heights, Maryland. Participants included representatives of private and public shipbuilding and repair organizations, organizations in related industries, labor unions, universities, the U.S. Navy,

MARAD and other U.S. government agencies.

Frank Long, principal consultant of Win/Win Strategies, was the Workshop Project Manager. He was also responsible for audiotaping the proceedings, transcribing the tapes and editing the transcription to produce these Proceedings.

Special thanks are in order for Steve Workman, from NASSCO, for his assistance in tape-recording the presentations under the less-than-ideal taping conditions that prevailed throughout the Workshop sessions, and to Lynn Deppe who worked wonders in bringing order out of the chaos contained, to a greater or lesser extent, in all of the tapes, and for her overall dedication to this project.

Editor's Note: Because of technical difficulties encountered in the operation of the tape recorder's volume control and microphones, and from electronic interference from BWI Airport, all of the tapes had blank and garbled sections. Where it was not possible to capture the spoken material as originally presented, every effort was made to preserve the gist and intent of the message. The presenters' indulgence is requested in those instances where we failed.

Additionally, an attempt to capture the question-and-answer sessions was abandoned early on because the microphones could not pick up the questions from the audience, the questioners did not identify themselves and the presenters did not repeat the questions before responding.

## CONTENTS

AGENDA .....	1
PRESENTERS .....	4
PARTICIPANTS .....	6
WELCOME .....	9
The NSRP and DTRC Role in NSRP Management	
Dale Rome .....	14
Admiral Donohue .....	19
PRESENTATIONS .....	27
The Future of Shipbuilding from an International Perspective	
John Stocker .....	27
David Klinges .....	42
Operation Desert Shield and maritime Policy	
Captain Leback .....	55
Department of Labor, Bureau of Labor Management Relation8 and Cooperative Programs	
Charles Spring .....	65
Department of Labor, Office of Consultative Programs, OSHA	
Joseph Collier .....	75
Employee Involvement/Safety at Electric Boat--Groton	
Charles Rupy .....	84
Employee Stock Ownership Plans	
Len Beauchamp . . . . .	100
Congressional Insights	
Congresswoman Bentley .....	116
Employee Involvement and the New Manufacturing	
Dr. Gaffney .....	125

The Impact of Multi-skilling on Productivity	
Dr. Klein.....	145
TQL in the Navy	
Admiral Tuttle.....	157
Total Quality Management	
Bruce Worden.....	168
Thomas Sotir.....	172
Captain Felton.....	178
Individual Pursuit of Continuous Improvement: The Key to Successful TQM	
Professor Bunch.....	185
Gainsharing Plans in Naval Shipyards	
Kurt Doehnert.....	197
Employee Involvement/White-Collar Productivity at Peterson Builders, Inc.	
Rodney Robinson.....	209
REPORTS OF BREAKOUT SESSIONS.....	215
Dr. Gaffney.....	215
Dr. Klein.....	221
Mr. Sotir.....	225



AGENDA

Tuesday, October 16, 1990

A.M.

- 9:00 Steve Sullivan, Chairman, Panel SP-5 and Lyn Haumschilt, NSRP  
Program Manager  
Introductions, Agenda Review and Housekeeping
- 9:20 Dave Donohue and Dale Rome  
The NSRP and DTNRC Role in NSRP Management
- 9:50 David Klinges and John Stocker  
The Future of Shipbuilding from an International Perspective
- 11:00 BREAK
- 11:15 Captain Leback  
Operation Desert Shield and Maritime Policy
- 11:45 Charles Spring  
DOL's Bureau of Labor-Management Relations and Cooperative  
Programs

P.M.

- 12:15 Joseph Collier  
OSHA's Office of Consultation Programs
- 12:45 LUNCH
- 2:00 Chuck Rupy  
Employee Involvement/Safety at Electric Boat--Groton
- 3:00 Len Beauchamp  
Employee Stock Ownership Plans
- 3:45 BREAK
- 4:00 Tour of MITAGS Academic Facilities - Group 1
- 5:30-6:30 Hosted Reception

Wednesday, October 17, 1990

A.M.

- 8:20 Panel Chairman/Program Manager  
Agenda Review and Housekeeping
- 8:30 Congresswoman Helen Delich Bentley  
Welcome and General Remarks
- 9:00 Dr. Gaffney  
Employee Involvement and the New Manufacturing  
(Breakout in P.M.)
- 9:45 Dr. Klein  
The Impact of Multi-skilling on Productivity  
(Breakout in P.M.)
- 10:30 Admiral Tuttle  
Total Quality Leadership (TQL) in the Navy
- 11:15 Break
- 11:30 Tom Sotir, Capt. Lew Felton and Bruce Worden  
Total Quality Management  
(Breakout in P.M.)

P.M.

- 12:15 Professor Bunch  
Individual Pursuit of Continuous Improvement:  
The Key to Successful TQM  
(Breakout in P.M.)
- 1:00 LUNCH
- 2:15 Kurt Doehnert  
Gainsharing Plans in N Shipyards  
(Breakout after Presentation)
- 3:00 Breakout Sessions  
(Gaffney, Klein, Sotir et al., Bunch and Doehnert)
- 4:15 Tour of MITAGS Facilities - Group 2

Thursday, October 18, 1990

A.M.

8:20 Panel Chairman/Program Manager  
Review Agenda and Housekeeping

8:30 Rodney Robinson  
Employee Involvement/White-Collar Productivity at Peterson  
Builders, Inc.

REPORT8 OF BREAKOUT SESSIONS

9:00 Dr. Gaffney

9:30 Dr. Klein

10:00 Mr. Sotir

10:30 BREAK

10:45 Professor Bunch

11:15 Mr. Doehnert

11:45 Panel Chairman/Program Manager  
Conclusional Remarks

12:00 Tour of MITAGS Facilities - Group 3

12:45 Adjourn

**PRESENTERS**

(In Order of Appearance on Agenda)

- Nancy Harris - Member, Panel SP-5, and Defense Logistics Liaison Officer for Maritime Affairs, Navy Department and Maritime Administration, Washington, D.C.
- Lyn Haumschilt - NSRP Program Manager for Panels SP-1, SP-5 and SP-9, National Steel and Shipbuilding Company, San Diego, California
- RADM David P. Donohue USN (Ret.) - Chairman, Ship Production Committee, SNAME, and The Jonathan Corporation, Norfolk, Virginia
- Dale Rome - Program Manager, National Shipbuilding Research Program, David Taylor Research Center, Bethesda, Maryland
- David H. Klinges - Chairman, Shipbuilders Council of America and Vice President, Maritime Affairs, Bethlehem Steel Corporation, Bethlehem, Pennsylvania
- John Stocker - President, Shipbuilders Council of America, Washington, D.C.
- Captain Warren Leback - Maritime Administrator, DOT - Maritime Administration, Washington, D.C.
- H. Charles Spring - Acting Deputy Under Secretary of Labor, Bureau of Labor-Management Relations and Cooperative Programs, Washington, D.C.
- Joseph Collier - Director, Office of Consultation Programs, OSHA, Washington, D.C.
- Charles Rupy - Member, Panel SP-5, and Special Assistant to Division Vice President-Operations, General Dynamics, Electric Boat Division, Groton, Connecticut

Len Beauchamp - Member, Panel SP-5, and Director, Research and Collective Bargaining, International Brotherhood of Boilermakers, Blacksmiths, Iron Shipbuilders, Forgers and Helpers, Kansas City, Kansas

Congresswoman Helen Delich Bentley - Member, United States House of Representatives, Washington, D.C.

Dr. Michael Gaffney - Director of PEWS, New York State School of Industrial and Labor Relations, Cornell University, Ithaca, New York

Dr. Jan Klein - Assistant Professor, Harvard Graduate School of Business Administration, Harvard University, Boston, Massachusetts

VADM Jerry O. Tuttle - Director, Space and Electronic Warfare, Department of the Navy, Washington, D.C.

Bruce Worden - TQM Consultant, Office of the Chief of Naval Operations, Department of the Navy, Washington, D.C.

Tom Sotir - Member, Panel SP-5, and Director, Total Quality Management, General Dynamics Corporation - Electric Boat Division, Groton, Connecticut

Captain Lew Felton - Commander, Portsmouth Naval Shipyard, Portsmouth, New Hampshire

Professor Howard Bunch - Chairman, Panel SP-9, and Associate Professor, Department of Naval Architecture and Marine Engineering, University of Michigan, Ann Arbor, Michigan

Kurt Doehnert - Member, Panel SP-8, and Industrial Engineering Branch Head, Naval Sea Systems Command, NAVSEA, Washington, D.C.

Rodney Robinson - Vice President, Robinson-Page-McDonough and Associates, Greenland, New Hampshire

## **PARTICIPANTS**

Adams	Mike	Director of Human Resources Southwest Marine, San Diego, CA
Algiere	John	Carpenter Electric Boat, Groton, CT
Bartholomew	Larry	Head, Employee Relations Division Mare Island NSY, Vallejo, CA
Bass	John	General Superintendent Bethlehem/Sparrows Point, Sparrows Point, MD
Beauchamp	Leonard	Director, Research and Collective Bargaining Boilermakers, Kansas City, KS
Cain	Charles D.	Public Works Superintendent Charleston Naval Shipyard, Charleston, SC
Clark	Arthur D.	Commander Philadelphia Naval Shipyard, Philadelphia, PA
Cottingham	Richard R.	Chief, G-AQA U. S. Coast Guard, Washington, DC
Danahy	Michael	Quality Improvement Staff Newport News Shipbuilding, Newport News, VA
Davidson	James	Insulator Shop Superintendent Puget Sound Naval Shipyard, Bremerton, WA
Davies	Ronald	Safety and Occupational Health Specialist DOL - OSHA, Washington, DC
Dawley	Roger	Special Representative Metal Trades Council, Plainfield, CT
Flood, Jr.	Henry G.	Manager, Employee Relations Newport News Shipbuilding, Newport News, VA
<b>Flynn</b>	James	Operations Manager SupShip San Diego Det., Pearl Harbor, HI
Garvey	John J.	Marine Consultant
Gicz	Adam	Engineering Manager Newport News Shipbuilding, Newport News, VA
Guerin	William	Manager, Labor Relations Newport News Shipbuilding, Newport News, VA

Harris	Nancy	Defense Logistics Liaison Officer for Maritime Affairs MARAD and U.S. Navy, Washington, DC
Haumschilt	Lyn	NSRP Program Manager NASSCO, San Diego, CA
Hawkins	Thomas	Senior Engineering Analyst Newport News Shipbuilding, Newport News, VA
Humphries	Gary	Supervisor, Employee Relations Newport News Shipbuilding, Newport News, VA
James	Andrew	Director, Industrial Relations Norfolk Naval Shipyard, Norfolk, VA
Johnson	Ronald D.	Director of Human Resources J.J. McMullen Associates, New York, NY
Kerley	Thomas O.	Vice President/General Manager Peterson Builders, Inc., Sturgeon Bay, WI
Laird	Travis	Director, Surface Ship Overhaul Ingalls Shipbuilding, Pascagoula, MS
Lakowsky	Roger	Painter Electric Boat, Groton, CT
Lamb	John	Engineering Manager Newport News Shipbuilding, Newport News, VA
Lang	George	Senior Human Resource Representative Bethlehem/Sparrows Point, Sparrows Point, MD
Lewis	Gary	Manager, Labor Relations Newport News Shipbuilding, Newport News, VA
Liberatore	Lawrence L.	Director, Maritime Standards DOL - OSHA, Washington, DC
McCarthy	David	Portsmouth Naval Shipyard, Portsmouth, NH
McCombs	Richard	MTC Safety Representative Electric Boat, Groton, CT
McFarlane	James	Quality improvement Coordinator Philadelphia Naval Shipyard, Philadelphia, PA
McIntyre	Billie D.	Production Superintendent Norfolk Naval Shipyard, Norfolk, VA
Messier	Joseph	President Metal Trades Council, Groton, CT

Peccini	Wayne	Pipefitter Electric Boat, Groton, CT
Rankin	David C.	Manager of Labor Relations Bath Iron Works, Bath, ME
Rinehart	Virgil	Senior Advisor for Shipbuilding DOT - MARAD, Washington, DC
Robinson	Rodney A.	Vice President Robinson-Page-McDonough, Greenland, NH
Rome	Dale P.	Program Manager, NSRP David Taylor Research Center, Bethesda, MD
Rossi	Paul	Safety and Occupational Health Specialist DOL - OSHA, Washington, DC
Rupy	Charles F.	Assistant to Division Vice President, Operations Electric Boat, Groton, CT
Saludes	Juan	Chief Steward; Painters and Allied Trades NASSCO, San Diego, CA
Seidman	Dan	Industrial Specialist (Shipbuilding) DOT - MARAD, Washington, DC
Smith	Norman	Manager, Total Quality Management Bethlehem/Sparrows Point, Sparrows Point, MD
Sotir	Tom	Director, Total Quality Management Electric Boat, Groton, CT
Stein	Saul S.	Research and Education Director Metal Trades Department, AFL-CIO, Washington, DC
Stephan	Oren	Naval Architect David Taylor Research Center, Bethesda, MD
Surprenant	Richard H.	Director, Quality Systems Electric Boat, Groton, CT
Teresinski	Michael	Safety and Occupational Health Specialist DOL - OSHA, Washington, DC
White	Leola	Employee Benefits Manager J.J. McMullen Associates, New York, NY
Workman	Steve	Employment Representative NASSCO, San Diego, CA



## WELCOME

Frank Long Good morning. I'm Frank Long, the Project Manager for this Workshop. It's my pleasure to welcome you to the Third National Workshop on Human Resource Innovation, sponsored by Panel SP-5 of the Ship Production Committee of the Society of Naval Architects and Marine Engineers, under the auspices of the National Shipbuilding Research Program. I'm going to repeat that, but with a little different twist. Welcome to the Third National Workshop, sponsored by Panel SP-5, Human Resource Innovation, of the Ship Production Committee of the Society of Naval Architects and Marine Engineers, under the auspices of the National Shipbuilding Research Program (NSRP). The genealogy that I mentioned will be described in much greater detail by Admiral Donohue and Dale Rome in their presentations.

I now would like to call your attention to three items in your folder. The first and most obvious item is your name-tag. Please wear it at all times because if we see you without one, we will think that you haven't paid your registration fee and we'll probably try to collect it again. The second one is the Agenda, in which there are a couple of changes. The first involves Steve Sullivan, the Chairman of Panel SP-5. Steve had a death in the family and is in Boston making arrangements for and attending the funeral. Hopefully, he will be joining us on Thursday. Secondly, there is a change in Thursday's schedule. A Breakout session scheduled for Howard Bunch has been cancelled. At this moment we intend to let time heal the gap in there on its own. The third item is a list of the Workshop attendees. We tried to identify for those you of who are not members of any of the panels the individuals in attendance here who are members of Panels SP-5, SP-9 and SP-8. You will have an opportunity, if you're interested in pursuing the matter further, to discuss with those panel members

just what those panels do and what they're all about.

When we learned that Steve Sullivan was not going to be here, we had to press another panel member into service to take his place. Fortunately, we didn't have to look very far. One of the charter members of Panel SP-5 is Nancy Harris. In real life, Nancy is a card-carrying member of the Maritime administration and the U.S. Navy. Her title is Defense Logistics Liaison Officer for Maritime Affairs. And Nancy, would you please stand up so the attendees can recognize you? Nancy will be doing some of the introductions.

Also involved in some of the introductions is Lyn Haumschilt. Lyn is the Program Manager for Panels SP-3, SP-5 and SP-9. Lyn is responsible for all research and development under the auspices of the National Shipbuilding Research Program and for all environmental affairs for National Steel and Shipbuilding Company. He has 30 years of manufacturing experience, the last 15 years in progressively more responsible positions at NASSCO. His previous positions in aerospace electronics, pollution control and automotive manufacturing concern include Director of Business Development, Chief Industrial Engineer, as well as Manager of Production and Inventory Control. Mr. Haumschilt is also a Registered Professional Engineer, licensed in the state of Missouri. He has a Bachelor of Industrial Engineering degree; he is a graduate of the General Motors Institute and has an MBA from St. Louis University. He was awarded the SMARRO Award for Excellence in the Field of Engineering by the Society of Mechanical Engineers in February 1990, in Chicago, Illinois.

One other thing I want to mention is that this entire proceeding is being audiotape-recorded. Once the session is over, we will transcribe and edit the tapes, print the material and distribute it to all of you at no cost.

Something I would like to do before we get into the meat of the

program is to bring in Bob England, the Residence Manager for the Institute here, and to ask him to describe to you just what the Maritime Institute of Technology and Graduate Studies is all about.

Robert England Thank you very much, Frank. It's a pleasure to be working with all of you, and I would like to extend a very warm and cordial welcome to each and every one of you and to assure you that we are going to do our very best to make your stay enjoyable, comfortable and pleasant. And, if it isn't that way, **come** see me. I'm located right there at the front desk area in the main lobby. Come see me or one of my assistants and we'll see that your situation is addressed immediately. The Maritime Institute is a facility of the International Organization of Masters, Mates and Pilots. Through collective bargaining with the steamship companies that they have agreements with, these companies pay so much per man per sailing day. That money is put into a trust fund, known as the MATES Program, which is the Maritime Advancement Training Educational Safety Program and that's what trains all of our members here at the Maritime Institute. Due the reduction of the American flag fleet, contributions have gone down in the past couple of years. This is why we are going outside of our organization for seminars, workshops, and so on and so forth. We have here at the Maritime Institute, for you to enjoy during your stay here or any other time that you can use our service, 74 acres of land located about 4 miles from the BWI airport and about 35 miles from Washington, D.C. We're becoming a very, very active and busy conference center. We have 218 sleeping units here; we have approximately 38 to 40 meeting rooms each with a seating capacity of anywhere from 10 to 250. We have just increased our dining room area another 4,000 square feet, giving us a total of 8,000 square feet of dining area. Because of the demand for it from time to time, we're doing anywhere from 1,000

to 1,200 luncheons a day, and our dinner cycle is extremely heavy as well.

We have many, many simulators. Hopefully, each of you will participate in a tour during your stay here so that you can see these simulators. To a lot of individuals, it is very overwhelming. We have ship-handling simulators, marine-cargo operations simulators, all-weather navigation, ship control systems and so on. You will find it very, very interesting, so don't pass up this opportunity.

Again, we are here to service you in any way we can and you will find that we're very service-oriented--not like a commercial property where you're just a number; here you're a guest. So please feel free to exercise as a guest and take advantage of our entire facility. In this particular building, called the North Tower, we have an indoor swimming pool and a sauna. In the South Tower there is also a sauna, as well as an exercise room on the seventh floor.

If you have any questions at all, please don't hesitate to come to us and ask if you can do this, or do that, or what have you. We have a very fine walk area and, for anybody into jogging, we have a fine facility for that also. From gate to gate, the distance is just about a mile. We have an exercise room on the seventh floor in the South Tower. We have a game room with billiards, Ping-Pong, and so on and so forth also in that area. So again, feel free to use them.

Also, I want to mention to you that your service will be outstanding here and, please, if you feel as though it is and if you're comfortable with it, there is a tip box located on the front desk. Before you check out, we suggest that you just drop a tip of thanks and it will be distributed to all the individuals who service you here while you're on the property, such as the waiters and waitresses, all of the housekeeping personnel, and so on and so forth. Again, welcome, nice to have you and feel free to use our entire

facility. Thank you very much.

Frank Long Thanks, Bob. As far as the tours are concerned, we will be identifying the people in each tour each day, probably simply by doing it alphabetically. However, if there are those of you who want to go on a particular day or who have time on Thursday before flight time, please let me know at the break so we can try to adjust the schedule to accommodate everybody's desires. Now I would like to turn the session over to Lyn Haumschilt.

### **The National Shipbuilding Research Program**

Lyn Haumschilt Good Morning. As Frank indicated, I am the Program Manager for Panel SP-5 plus a couple of other of the NSRP panels under the auspices of David Taylor Research Center. The first speaker this morning to cover the National Shipbuilding Research Program and to help you get acquainted with what that Program is all about will be Dale Rome. Dale is the Head of the Manufacturing Technology Branch at the David Taylor Research Center at Carderock, Maryland, just outside of the Washington, D.C. area. Dale is responsible for all of the research and development under the auspices of the NSRP and for coordinating all of David Taylor Research Center's manufacturing technology efforts. Mr. Rome is the Contracting Officer's Technical Representative for these program8 and also for the Programmable Automated Welding systems Advanced Technology Demonstration Project.

His experience and qualification8 cover 15 years in the design and construction of ships and off shore structures. For the last 4 years he's been in progressively more responsible positions at David Taylor. His previous

positions in private industry include Manager of Hull Construction, Project Engineer and Naval Architect and Marine Engineer for several private firms. He has a B.S. in Naval Architecture from the University of New Orleans and he is currently pursuing a Master's Program at the George Washington University in Washington, D.C.

Dale Rome I would like to welcome you on behalf of all of the sponsors of the National Shipbuilding Research Program to this conference, and I would like to thank Frank Long and all of the volunteers who worked with Frank in making this conference a possibility.

I would like to talk to you today a little bit about the organization of the National Shipbuilding Research Program, but before I do that, some of you may be asking, "Why is David Taylor involved as a manager of the program?" David Taylor is the Navy's lead laboratory for naval vehicles and logistics, and also has in its mission the support of the Maritime Administration and the maritime industry.

Over the last several decades, our focus has been primarily on naval vehicles, and on the naval segment of the industry. However, our new Commanding Officer has dedicated and committed himself and the Center to increasing support for the commercial industrial base. As part of that, we have assumed the responsibility for managing the National Shipbuilding Research Program. The program really has three elements:

- o an industry/government planning element,
- o Navy administration and
- o industry execution and implementation.

I'll go into each one of these in a little more detail.

On the planning side, the Ship Production Committee of the Society of

Naval Architects and Marine Engineers (SNAME) is, at this time, composed of nine technical panels. The panels are composed of industry and government volunteers who prepare project recommendations and submit them to the Ship Production Committee. The panels provide technical advice and guidance to the various lead shipyards who are responsible for overseeing the work of the various projects that have been funded.

Along with this organization is the Ship Production Committee that is composed of senior management and government officials who work and contribute their time on a voluntary basis. These people provide objectives and policy guidance to the various panels and prepare the annual R&D program recommendation to the Navy for funding.

On the administration side, David Taylor has been tasked to provide budget and strategic guidance to the Ship Production Committee and to award cost-sharing contracts to three lead shipyards and also to the University of Michigan Transportation Research Institute, which established and maintains the NSRP's documentation center. It is also a task of David Taylor to stimulate industry-wide involvement in project formulation and dissemination of the technology into the shipyards.

On the execution side, the industry is responsible for conducting the research that has been identified under this program.

The three lead shipyards encompass the areas of design engineering, production processes and resource management. We currently have a contract with Newport News Shipbuilding for the design engineering aspects of the program. Resource management is being handled by Lyn Haumschilt of NASSCO, and we are currently in the process of getting a Cooperative Agreement in place with Peterson Builders for production processes. Peterson has signed the agreement and we're currently waiting approval of it by the Assistant Secretary of the

Navy for Research, Development and Acquisition. Those shipbuilding companies are responsible for managing the assigned R&D projects and for awarding subcontracts for the performance of the various projects. Their task is also to prepare annual technology assessment and project implementation reports. They keep the appropriate panels informed of project status and they also take advice and guidance from the various panels on the direction that each project should go. They assist the yards when asked or as required and they encourage implementation of the project results. Without implementation, even though we may develop the best technology, we haven't gained anything. That, basically, sums up the organization of NSRP and David Taylor and the shipyard's role in it. If you have any questions about that, I'll be happy to entertain them.

Now, I'd like to give you a little bit of an update on a project that we have ongoing at David Taylor called "ISIS", which is the Infrastructure Study In Shipbuilding. What we hope to accomplish with this project is to find all the activities in the interrelationships, along with their required resources and constraints, necessary to accomplish shipbuilding market analysis--the definition of customer requirements, resource planning, ship design, capital acquisition, regulatory approval, procurement of materials, ship construction, testing, delivery and cost-delivery customer support--and to define the various elements that are involved in each one of these tasks. Our focus is on the process, not the product. Our goal is to attain a ship acquisition duration that is superior to our foreign competitors. We're not addressing the areas of cost and price because we feel they are beyond our control. We feel that if the build-cycle time can be reduced, the overall cost to the ship owners will also be reduced.

The project is going to be worked in three phases. We are currently working on Phase 1, which is to model the existing shipbuilding infrastructure



and validate that model with the aid of various industry constituents, including government agencies; we're working with the Departments of Labor and of Transportation and others, including various academic institutions, regulatory bodies, ABS, Coast Guard, Transcom, various ship owners and operators and design firms, as well as the vendors and the shipbuilders themselves. In Phase 2 we will do a survey of domestic and international shipbuilding to try to determine the state of the art that we're going to identify in Phase 1. In Phase 3 we hope to develop a future infrastructure that will surpass the competition on the basis of duration of build cycles.

We're focusing primarily on commercial cargo ships for export. We're looking at all phases of the design and construction of ships and also considering the post-delivery operational support and maintenance during early design. We are also trying to address the supply base by way of critical long lead items. To date, we have identified and defined 205 functions. The team is validating these functions at this time. We are currently working on the Phase 1 report, which is due on the 30th of October. Phase 2 is scheduled to begin in November.

The reason I want to present an update on this project is to make you aware that we at David Taylor envision using the results of this project to help formulate our strategic plan for the National Shipbuilding Research Program. We'll try to identify what the industry's needs are, what the critical elements that the NSRP should be focusing on are and use that information as a global set of guidelines for the panels themselves.

Following the 1989 Ship Production Symposium, Captain Graham, David Taylor's Commanding Officer, took the bull by the horns and said he would be responsible for trying the Institute of Shipbuilding Manufacturing. At that time, there seemed to be a consensus that this was required, but no one else

would step forward and volunteer. For your review and consideration, I would like to see a Shipbuilding Manufacturing Technology Institute that addresses the automation, the supply base and the manufacturing technology, and that goes from the current infrastructure, addresses the problems of the industry and helps us achieve a more competitive technology base so industry can move ahead in the future.

I'll also mention a couple of things that are up on the calendar for this year. On December 12th, 13th and 14th, we're going to have a strategic planning meeting for all of the NSRP leadership--the Ship Production Committee, the Executive Control Board, the Panel Chairmen and Program Managers--to try to develop a plan of action and milestones for the next 5 years for the Program. Dave Donohue will talk a little more about that in just a minute. I would like to invite participants from the Shipbuilders Council and any other interested parties who would like to take part in this strategic planning meeting to please contact me during the conference and we'll see if we can get you involved. Thank you.

Lyn Haumschilt The next speaker, many of you already know, RADM David P. Donohue, who joined the Jonathan Corporation in Norfolk, Virginia, in March of '89, following a career of over 35 years as a Naval Officer. He retired from the Navy as Senior Engineering Duty Officer. RADM Donohue succeeded Jesse Brasher as Chairman for the Ship Production Committee of SNAME, the umbrella organization for the NSRP. He became the Ship Production Committee Chairman in January of 1990.

Admiral Donohue had served in the Navy with the Navy Advisory Group, military ASSistance Group in Vietnam and two Headquarters Staffs. He had four naval shipyard tour8 of duty at a Naval Sea Systems Command Headquarter8 and

also at a Supervisor of Shipbuilding Office. He commanded the naval shipyard in Norfolk, Virginia, from 1980 to 1983. In 1982 Norfolk became the only naval shipyard that won a Navy Unit Commendation Award. Norfolk was awarded the Chief of Naval Material Productivity Excellence Award in the naval shipyard category for fiscal years 1981 and 1982 Specifically in the areas that we are discussing today, relating to human resources management. The shipyard was awarded the Naval Material Command Equal Employment Opportunity Award in the large industrial activity Category for the fiscal years 1981 and 1982 and the Navy's EO and EEO Award in fiscal year 1983. Norfolk was awarded the State of Virginia's Federal Employer of the Handicapped Award for 1982 and again in 1983, and was awarded the Navy's Golden Anchor Award for the advancement and retention of military personnel.

The Navy League of the United States awarded Admiral Donohue the John Paul Jones Award for inspirational leadership in 1983 and also in that year, the Organization of Federally Employed Women awarded him its annual Distinguished Service Award for furthering the advancement of women in the workplace.

RADM David Donohue Good morning ladies and gentlemen. I am very pleased to have the opportunity to speak with you at this Workshop on Human Resource Innovation. I have been looking forward to this opportunity since Frank contacted me last spring. I'd like to break my remarks into two brief subsections.

One, I'd like to quickly update the progress of the Ship Production Committee organization. Recently, the Executive Control Board looked at the organization, specifically at Panel SP-2, Production Aids, and at Panel SP-10, Flexible Automation. We rolled them together into Panel SP-4, all as part of Design/Production Integration. Everyone was in agreement that it all starts in

the drawing room.

The other thing that I want to do is to let you know that our funding for this year is about \$1.7 million. That's from the Navy. We are looking for MARAD funding next year. We don't know how much it's going to be. I think that's probably still on the table in Washington, in the well-publicized issues of trying to get the national debt under control. So we'll see what comes out of that. We had been looking forward to a level of funding of \$3 to \$4 million per year, the level that the NSRP had enjoyed in the early 1980's and late 1970's until we had a decline in MARAD participation and before we had a pickup in Navy participation. Basically, we're looking at these last couple of years and this year as the low points in funding the initiatives that we are trying to undertake among the now nine panels. Rather, I should say eight panels, because, as I'll remind you, we took ten and dropped two, bringing the number of panels down to eight.

I recently sent letters to the CEO's of all major shipyards in the United States and all Naval Shipyard Commanders asking for an indication of their interest in coming together at a convocation to explore the possibility of creating a panel dedicated to total quality management issues. The response has been incredibly proactive. We are looking to put that meeting together in David Taylor in the third week of January to just explore the possibility. Should it be the consensus of the attendees that a TQM Panel is appropriate, we will entitle SP-2 "The TQM Panel" and proceed to give it an appropriate share of the funding, consistent with what the Executive Control Board deems is a valid initiative for it. In terms of the commitment I've asked of the Shipyard Commanders and the CEO's, the members of the panel will be at the right level in their organizations for the importance of its charter. Should it grow into actually being a panel, they would elect their panel chairman from among

themselves and then proceed on in accordance with the procedures of the other panels.

I'd like now to depart a little bit from the details of the NSRP and talk about my views relative to human resource innovation initiatives and the reason why you are here. I would say that I think that, from time to time, we all tend to categorize events, objects and people in a certain fashion--probably a natural offshoot of our behavior. We live in a structured world and we tend to categorize in accordance with some kind of a structure. As to the category of the decade of the 80's, I would categorize, at least from the viewpoint of manufacturing in the United States, as "the decade of the emergence of quality awareness." I'll also add my view that that emergence has been gradual, almost to the point of being too slow. But I look forward to the 90's with the hope that ten years from now, we can be called "the decade of quality execution."

I believe the emergence began with a CBS documentary entitled "If Japan Can, Why Can't We?" featuring Dr. W. Edwards Deming. During the decade of the 80's, a goodly number of successful quality consultants, both personally and professionally, have put great stock into the teachings of Dr. Deming and Dr. Joseph Juran, both of whom spent decades in Japan teaching Japanese managers what managing for quality is about, in effect making Japanese industry the quality giant that it is today. Both Drs. Deming and Juran espouse a common theme. That is, 80 to 85 percent of the responsibility for the quality of goods produced and services rendered lay with management. Their rationale is, after all, "Doesn't management provide the capital and the industrial plant and equipment? Doesn't management design and provide the processes that employees use? Doesn't management specify and provide the raw materials? Doesn't management create the environment in which goods are produced and services rendered? Doesn't management specify the attributes of products produced and

the criteria for their acceptance? And, last and most important, doesn't management recruit, screen, hire and train the people who use the facilities and processes to convert these raw materials into final products?" It's this element of the equation--human resources--that we come to address at this Workshop.

I submit that, as we go about our business of making products for the marketplace, we must be constantly aware that our most valuable, and at the same time, our most frangible resources are people. All other resources remain idle unless activated by human beings. They constitute the linchpin of our national industrial strength. They're not all from the same mold. They don't bring identical levels of skill. In fact, to add to corporate America's national challenge, the United States is still characterized by Lady Liberty with her torch held high--it is still a nation of immigrants. In addition to immigrants, we have our challenges of dealing with literacy problems among two large fractions of our resources. Nevertheless, they represent a major share of our nation's wealth, our human wealth. That wealth must be appreciated for its value and be employed productively. It is human resource innovation. We need to go forward with job creation and task innovation that uses the abilities of our total population. We need to empower our employees so they can create for us products of quality.

And what do I mean by that? Let's take a look, for example, at some of the products that we see around us. A simple word-processing program contains a spell-checker. The employees are empowered to help themselves provide a quality product in that simple area of spell-checking. There are plants now moving ahead with on-line statistical process control measuring and analysis systems in the hands of the employee, thereby enabling the employee to create a product that meets the specifications by energizing the employee's

knowledge of the product being created while it is being created, rather than have the employees come to work in an environment of fear that the inspectors will catch them or the bosses will be displeased with them because we--management--have failed to create a work system in which they are empowered to succeed. We talk about large ship integrations and we talk about combat systems integration. My focus at this Workshop is to have you focus on the individual worker at the individual worksite. Just as Vince Lombardi said, you can't win a game unless you can do the fundamentals: block, pass, run, kick. The play begins with the team empowered with fundamental skills. The huge integrations begin with employees empowered with fundamental power to do their individual jobs the right way. It requires additional capital expense. It requires some risk-taking. It requires the capital investment risk of putting a computer on a lathe and wondering, "Can the lathe operator ever cope with the computer?" In the plants that I've visited, I submit to you that they absolutely can. And despite my comments about the reality levels, despite the comments about yet being a nation of immigrants with open arms to the world, we still have a generation coming up for which there is a great deal of hope. For some reason, and it's no joke, they are getting somewhat computer-literate because Nintendo and arcade games are facilitating that for us. We may laugh, we may scoff, but I submit that the younger people are more computer-literate than most of us in this room were at their age. They have a running start in that regard. We need to innovate environments that enable workers to create products that both management and labor are proud to sign their names to. To those of you in SP-5, I look and say that I've given you my view on where I hope you would focus; where I would hope, from my point of view on the Executive Control Board, you would push for innovative, creative efforts to make the worker an important part of the equation. Push for more than an irrelevant or minor 15 to 20 percent,

but push to make the worker a real critical factor.

I trust that you will have a successful meeting. I've looked at your schedule. I've looked at the speakers. You have some wonderful people to listen to. Hopefully, they will pass on some details that will be of value to you in moving you in the right direction.

I want to talk to the individuals who will represent labor. In the decade of the 90's, I look to a labor/management teamwork approach to getting on with the same empowerment of the employees. I look to enlightened labor leadership, to cooperative partnerships in almost a conspiracy to win, in almost a conspiracy to take America forward in the area of quality products at competitive prices. It is only with management and labor working together that we are ever going to be able to succeed. There will always be issues with regard to job scope. There will always be issues with regard to the individual's ability to do multiple tasks. We'll always have to weave that serpentine border between a multiple-task individual and his individual capabilities and job preservation and guild preservation. It will not be easy; it will not be something that can be dismissed lightly as a challenge. I've been through it in the naval shipyard environment. I've been through it as an observer in private sector shipyards. I'm in it in the company at which I work now. But, a goodwill, management/labor conspiracy to win, I think, is the key to individual company success. It is a key to United States industrial success in the area of quality and cost-competitiveness and a workplace that is other than services-oriented for the generations that follow.

I had the distinct displeasure of coming off an airplane from London a couple of years ago to hear a gentleman behind me saying he had to go to Germany in order to buy some products for his company; they don't make anything in the United States anymore. In the shipbuilding industry there are over 1,000



backlogged ships internationally. Japan has over 500 ships on order, backlogged, Germany over 100, Free China over 100, and Korea upwards of 100. The United States has one.

One of the anecdotes, and it's a true anecdote, that is commonly told to the NSRP involves labor and management again. It is of a Japanese frigate built at IHI. When compared ton for ton with a comparable American frigate, with some adjustments for the complexity of the contents of the combat weapons systems, the Japanese frigate had 45 percent of the labor content of the American frigate. Our wages in the American shipbuilding industry are now below those of Germany and Japan in real world dollars. So it's not a matter of cheap foreign labor. We have a Ms. Carla Hills, the United States Trade Representative (USTR), working very, very diligently to level the playing field with regard to subsidies. But we cannot escape the hard fact and hard responsibility that what labor and management both share in our industry is that we have got to reduce the labor content of our product in order to get competitiveness. Reduction of labor content does not have to convert into loss of jobs. Rather, it converts into creation of jobs. The more product we can give at a competitive price, as a result of removing labor from individual components and individual assemblies and individual final end products, the more we will be able to sell in an international market that is looking for a virtual six-fold increase in new ship buys in the next decade versus the decade of the 80's. The market is there. The question is, Will it be ours? It will be ours only if we humans are able to make it ours. And I turn it over to you, especially to those of you who are part of Panel SP-5, to innovate, to think, to give us this opportunity to invest in the projects that your panel puts together. The United States Navy is prepared to fund and Maritime would like to be prepared to fund in conformity with the budget.

And I wish you the best in your conference these next couple of days.  
And thank you for this fine opportunity to express my thoughts to you.

## PRESENTATIONS

### The Future of Shipbuilding from an International Perspective

Nancy Harris I take pleasure in introducing our next speaker, John J. Stocker. Mr. Stocker is the fifth President of the Shipbuilders Council of America, which is a trade association established in 1923. As I'm sure we are all aware, the Council represents the shipbuilding, ship repair and marine manufacturing industries of the United States.

Mr. Stocker was elected as the Council's President on September 1, 1986. Prior to his present position, he was a Vice President of the Council, where he was primarily responsible for Navy-industry relations. In this capacity, Mr. Stocker represented the Council on issues affecting industry in contracts policy, ship repair, Navy shipbuilding acquisition policies and legislative activity.

Mr. Stocker came to the Council from a position as Assistant Director, Long-Range Planning, Office of the Assistant Secretary of the Navy (Shipbuilding and Logistics). He also held positions with the Congressional Research Service and the Office of the Chief of Naval Operations.

Mr. Stocker is a graduate of Duke University and studied for his Ph.D. at Cornell University.

John Stocker I want to thank you very much for the opportunity to meet with you this morning and to talk to you a little bit about some of the things that the Shipbuilders Council of America is currently engaged in to try to assist the redevelopment or the reinitiation of commercial shipbuilding in the United States. We've organized ourselves this morning so that I'm going to describe

the situation that has led us into mounting an effort to do something about foreign shipbuilding subsidy practices, a little bit about where we see the market going and then Mr. Klinges is going to follow my remarks by talking about some of the conceptual ideas that the industry must adopt in order to become a competitive force in the marketplace.

Let me just make sure we all understand the bottom line. We at the Council believe that the long-term future of the industry is based on the ability of this industry to become a competitive force in the international market. That means the export of ships to commercial clients. We can no longer depend on the Navy as our sole customer and we have the opportunity, given what Dave Donohue mentioned earlier about the increase in demand for new ships, to participate in that growth market. We have to do something that, essentially, we have been unable to do since about the late 1950's.

Some of our problems have to do with problems of perception. I met with a Greek ship owner yesterday who said that he was unaware of the fact that U.S. shipyards were interested in building ships for foreign clients. That's part of our problem. The second problem is that we suffer from a reputation--perhaps deserved, perhaps not--that would suggest that we do not produce quality vessels on time and within the cost constraints the commercial clients are looking for. Overcoming those perceptions is going to be one of our most difficult challenges. It would be our hope that the work that you all are going to engage in for the next 2-1/2 days would lead to some conclusions about what we have to do, particularly in the area of people, in order to offset some of those negative feelings that some of our potential clients may have. Frankly, it's going to be people that lead us out of the wilderness and into the promised land of full shipyards and very long order books. We began a discussion internally about two years ago about what we could do, as an industry, to try to

improve our prospects for the future. We looked at the possibility of a decline in Navy work and saw that as almost an inevitable reality. In fact, Navy shipbuilding budgets have been declining since fiscal year 1985. We knew that, long term, since the business is cyclical, that we would see a good chance of those numbers dropping into the future. As we looked at the potential decline in the Navy market, we asked the question, "What's happening in the commercial market?" And, frankly, ladies and gentlemen, we looked at the U.S. domestic fleet and the U.S. flagged international trading fleet and we concluded that those fleets were too small to sustain the industry. We did not see a substantial growth market from the Jones Act, so we looked at the U.S. flagged international trading fleet. Those operators are operating less than 100 ships right now and, because of their own problems of competitiveness, we don't see them as being a very large component of the shipping market into the future. So we looked at what was happening around the world and we concluded, after a number of discussions with people who are more expert at the international market than we were, that there was change coming in that market. We saw, in fact, a recovery--a very large recovery.

Part of our problem, of course, is that the Reagan administration in 1981 had terminated subsidies to the U.S. industry in merchant shipbuilding and had done so in a unilateral fashion. The fact that we did not get subsidies and that we saw very extensive programs overseas led us to conclude that, unless we did something in the policy arena--that is, to get foreign governments to cut back their subsidies--we would be unable to even begin to think about being competitive. Now some have said to us, "Why didn't you think about getting the U.S. government to reinstitute subsidies here in the United States?" The answer to that question is that anybody who has been reading the newspapers would have to reach the same conclusion that we did: There was a very, very slim prospect

of that happening. And certainly, there would be a slim prospect of seeing those subsidies reinstated in the absence of making any significant and clear argument about what it is that we are facing in the international market. And if nothing else, this debate about what foreign governments are doing has led our policymakers to a clearer understanding of what's going on out there and what the difficulties are in terms of meeting that competition. We saw governments, for example, in the case of Japan and Germany, that began to increase their subsidy practices in ways that were really quite profound. We hadn't seen anything like that in the past and, of course, they were doing that because commercial shipbuilding, world-wide, went through a very serious recession in the mid- to late-1980's. Those governments stepped in to try to ensure that they had a shipbuilding industry that could survive the downturn and last long enough to meet the upturn in demand that usually occurs in a very cyclical fashion in shipbuilding world-wide. Of course, our government didn't help very much when they gave U.S. subsidized operators the right to build overseas and, in essence, had made a decision that it was far cheaper for the U.S. government to rely on foreign construction subsidy programs than it was for them to institute one, or keep one in place, for the U.S. industry.

Now the direct impact on the industry has resulted in both a decline in employment as well as a decline in the number of shipyards operating since 1982. And remember, that during this period we had the largest spending program in the Navy for peacetime revitalization of naval forces that we had seen since World War II. And yet we still watched 112,000 production workers drop to 76,000 and we saw the number of firms that had been identified as either new construction or ship repair firms drop from 110 to 64. Our projections are that, by October of 1991, we're looking for a further decline if nothing else changes, just given the state of where the markets are. In fact, we attribute

that total to the complete collapse of the commercial market in the United States. Admiral Donohue spoke earlier about the one commercial ship that's under construction in the U.S. That is the first ship that has been placed on order in this country since 1984. As a result, despite the feeling of some in the Office of Management and Budget that the Navy would take care of the industry, obviously with the declines mentioned earlier, that was not true.

What kinds of subsidy practices do other governments give their industries in order to give them a competitive edge in the marketplace? We've found a number that were very interesting and very creative, frankly, in the area of special financing.

In a commercial deal, it is the financing package that makes it possible to make the sale because the commercial client, as we all do in our consumer decisions, is looking at the impact of making a capital asset acquisition in such a way that will minimize the impact on cash flow.

Again, talking to my friend the Greek ship owner, yesterday he told me that in Belgium, he could buy a new cruise ship today and he wouldn't lay out a single dime on that contract for 3 years, because the first 3 years would essentially be underwritten by the Belgian government. He could then have an additional 17 years of financing at 2 percent and, in fact, if he had a problem with meeting the interest payments on that debt, he could very easily get that debt reorganized. That's the sort of thing that we're competing against.

In the case of construction subsidy grants, a number of governments were giving direct aid--direct grants for construction. We saw this in the famous case of where American President Lines built 5 container ships in Germany with subsidy grants of nearly 50 percent of the contract value of the package.

In Japan, we've seen a situation where they've used reorganization assistance and investment assistance in order to keep their yards fully modern.

When the industry went through the recession of the mid-1980's, the Japanese government requested that a cartel be formed. The Japanese shipyards then got together and decided who was going to lay up inefficient capacity or old capacity. The government then bought the docks and the land from the yards. The yards were then able to take those funds and reinvest them in existing facilities. It was a nice deal; I wish we could have gotten it.

And, of course, research and development aid. We've all heard about the problems with the NSRP financing over the past few years. I think we can point to a possibility of some growth in this area. In fact, as to the fiscal year 1992 budget request, MARAD's R&D budget will actually go up to about \$7.5 million, of which \$5 million will be dedicated to shipbuilding programs. I'm not sure which portion of that will end up in NSRP, but I think that's good news because what we're beginning to see is a realization on the part of MARAD, as well as the Office of the Secretary of Transportation, that research and development are essential for guaranteeing the future of the shipbuilding industry.

And, of course, tax benefits for the yards and owners, a very common practice, particularly in Europe. In the case of Germany, we saw programs that would allow people to invest in ships where they would get 100 percent tax write-off as well as 100 percent tax credit.

Now, what are we talking about in terms of dollars? Well, what we've done is taken three examples--Germany, Japan and South Korea--and compared them with the United States for 1987-88 (in the case of Korea for 1989) as follows:



**COMPARATIVE SHIPBUILDING SUBSIDIES BY COUNTRY**

(\$ in Millions)

	U.S.		Germany		Japan		S. Korea
	1987	1988	1987	1988	1987	1988	1989
Export Credits	0	0	197.6	139.8	138.3	210.6	264.0
Direct Subsidies	0	0	230.7	414.7	.1	0	0
Investment Aid	0	0	62.5	21.5	22.9	29.5	116.0
Restructuring Aid	0	0	7.0	106.1	562.6	4.1	<b>596.3</b>
Other Indirect Aid	1.4	.3 *	70.9	141.7	484.1	327.6	<b>270.0</b>
	<b>\$ 1.4</b>	<b>.3</b>	<b>568.7</b>	<b>823.8</b>	<b>1208.0</b>	<b>571.8</b>	<b>1246.3</b>

\* NSRP R&D

The numbers are really quite dramatic and far larger than I think any of the people had believed to be the case prior to our research. You can see that in the case of Japan and Germany subsidies amounted to well over \$1.5 billion, almost \$2 billion in the case of Japan. Contrast that with the numbers for the u.s.--\$1.4 million in 1987, and, of course, \$.3 million in 1988. This tends to make an impression on politicians who understand something about budgets and spending. It makes it impossible for a yard, by itself, to get into the business of building commercial ships when their competitors are receiving such extensive programs. And here are some examples of the sorts of programs that we identified when we finally completed our research and drafted our petition for relief to the United States Trade Representative's Office.

## HIGHLIGHTS OF MAJOR SUBSIDIES

### o South Korea

- \$4 billion in loans by KDB in 1989
- Subsidy equals 4 x equity capital
- \$500 million earmarked for R&D

### o Japan

- R&D subsidies averaging tens of millions

### o West German.

- Mostly export construction deal support averaging about \$.5 billion per year
- Entire developmental ship

### o Norway

- Mostly financing support & tax breaks
- 2 percent interest, or 4 percent interest with 3-year grace period

We targeted the four countries that are listed above and some of the principle practices that they had engaged in. We concluded that these practices had damaged our industry to the tune of roughly \$7-1/2 billion over a two-year period and that we were looking for unilateral trade action on the part of the United States government to do something about that. In that event, we were persuaded to withdraw our petition so negotiations could be initiated in the summer of 1989, to see if we could get a trade agreement that, in fact, would define government behavior in the marketplace. We believed there is no point in asking the United States government for any assistance until we could determine a boundary around the problem. We have to know exactly how bad the situation is, and they have to understand more completely and be more convinced that the situation is one of unfairness. The current discussions are slated to end by the end of this year. Just recently, in fact, about ten days ago, Majority

Leader Mitchell and Senators Bentson of Texas and Packwood of Oregon, who represent the principal trade policy decisionmakers in the Senate, wrote Carla Hills a letter to say that if we don't achieve an agreement by December 14 of this year, they will conclude that our foreign trading partners are not interested in reaching an agreement and they will then review our options for unilateral action.

Now why did we even begin this activity? We had mentioned earlier that we had looked at market forecasts and concluded that the market was, in fact, turning around in a way that was very significant. What I'd like to do now is very briefly share a generalized look at the world market, as well as look at a specific area involving cruise vessels, since we think one of the first initial niches for the U.S. industry is probably in the cruise ship area. I'd also add that handy-sized product tankers and self-unloading bulkers look attractive as well.

At a demand level of 60 million deadweight tons in 1975, we were coming off from the boom that we had all seen in the early 1970's until the oil crisis hit and, of course, drove demand down. Almost during the whole ten years of the 1980's, demand was really quite depressed to the point that, in 1987-88, we were only building about 16 million deadweight tons of shipping world-wide. That is insufficient, obviously, to replace the fleet. In fact, in the tanker fleet alone, only 5 percent of the current tankers operating in the world market were built in that time period. Now because of that, and using data that we worked on jointly with a noted shipping economist at Chase Manhattan Bank in London, we concluded that, on replacement needs alone, the demand for the 1990's would peak at pretty close to 60 million deadweight tons by 1997-98. MARAD did a similar analysis in gross tons and again concluded the same thing, although not perhaps as dramatic. But certainly there was a trend that suggested that

there would be increased demand into the year 2000. We then asked the question, "How much capacity is there worldwide to meet such demand?" The answer came back this way: Current throughput was basically enough to satisfy some modest growth in the market; if new labor could be acquired to come into the world shipyards, they could probably double their capacity to well over 30 million tons; and then, based on improvements in productivity and the right sort of product mix, they could probably end up meeting this requirement, if in fact, this requirement does occur. A couple of interesting things to underwrite this particular scenario is that world orders in the second quarter of 1990 were at their highest level in 13 years. So there is a substantial backlog in the world community. In addition, we have downscaled the demand that we projected about a year ago. We see some attempts to dampen that demand because, clearly, the international shipbuilding community doesn't want to build up its capacity to meet this demand, only to have to turn around and flatten it when it gets to the post-2000 timeframe. And so, the real question is, "Will there be enough supply of shipbuilding facilities worldwide to meet the demand that is being projected?" That's a very serious question because a number of countries did, in fact, shut shipyards down during the 1980's. If demand does become overheated, one of our concerns is that some countries that are presently not involved in shipbuilding may be on the verge of getting into the market in a big way. For example, the People's Republic of China will be encouraged to develop their shipbuilding capability even more fully.

If the world market is going to take off and, in fact, if we're going to see a cruise vessel market as a potential niche for U.S. shipyards, how big is that market going to be? The cruise ship operators see the demand for the number of vessels carrying more than 100 passengers that would be built in the timeframe of the 1990's as indicated:

PROJECTION OF CRUISE SHIP MARKET ORDERS PLACED 1990 -1999

Cruise Market	No. of Ships (100+ Passenger)
U.S.	109
Mediterranean	44
Baltic	11
Far East	10
New Capacity for New Demand	174
Conservative Replacement*	26
Total Ships Without Economic Downturns	200
Estimated New Orders During 1990's	140

\*1/2 of the 52 existing ships over 30 years old

That data shows that, for the U.S. market, there's a requirement for 109 vessels, for the Mediterranean market 44, and so on. And what that basically comes down to is that if the economic situation doesn't destabilize completely (an important assumption at this point in time), the estimated new orders during 1990 alone will be 140 vessels. That is a phenomenal number, largely being driven by the fact that there are 52 ships currently in the fleet that are over 30 years old. I think as the cruise market develops, passengers are going to become even more selective in the kinds of cruise vessels that they're going to desire to sail on. In fact, my Greek ship owner friend is looking at building cruise vessels for what he terms a "luxury market" and that's probably going to be one area that we get into.

The question we asked ourselves two years ago was, "What do we do?" Given the growing international market and the fact that we really didn't have a supportive U.S. government policy, it's very clear that shipbuilding is one of those industrial sectors where governments tend to get themselves involved.

Because trade was a hot issue then and it's a hot issue now, and being good surfers (I'm a native Californian), we decided that the best thing to do was hop the wave and ride it. And I have to tell you that the tunnel's been a great deal of fun and I think our members have concluded that this was a very important exercise for us to get involved in. As I mentioned earlier, we filed a petition and we've had a very pleasant surprise that the U.S. Government is knocking itself out to try to get an agreement achieved. For the first time in the post-war history of the United States, we have an interagency team that is working on this particular issue. Not only the office of the U.S. Trade Representative, but also the Council of Economic Advisors, the Departments of State, Commerce, Justice, Transportation, Defense, Labor, the Treasury Department, and the Office of Management and Budget are all working on trying to achieve success in these discussions on trade. We've been supported by Congress. We had letters to Carla Hills signed with 50 senators and 230 members of the House supporting us. I mentioned earlier that we had another letter sent over by three senators, and it will be followed up by a letter signed by the Chairman of the House Ways and Means Committee, Dan Rostenkowski, who are the Trade Policy Committee on the House side as well. Negotiations started within the Organization of Economic Cooperation and Development largely because there was an existing infrastructure in the OECD where shipbuilding issues have been discussed. This committee includes representation from the government in Korea. The discussions have been so pathbreaking, and the issues that have been discussed from a trade perspective have been so enormous, that there's now some discussion about perhaps having a specific code on shipbuilding that would be included within the General Arrangement on Trade and Tariffs, better known as the GATT.

Where are we right now? Everyone's agreed in principle to eliminate

noncompetitive aids. One of the most severe problems and, I think, a problem that will last right through the end of the process, is the attitude of the European Community--not the civil servants who work in Brussels, but some of the member countries, particularly Spain and Italy, who really don't want to achieve an agreement. However, they do have a mandate to negotiate and they expect to conclude actions by December 14, 1990.

Where do we see the problem areas in the trade discussions? As I mentioned earlier, Southern Europe is the real problem and, in fact, if you were a cruise ship owner, the first place you'd go to talk is Italy, where you could get 82 percent subsidies on the contract price in order to build a cruise ship there. I think one of the interesting things is the relationship between Japan and the United States in this one (I still don't trust the Japanese position) but, at least outwardly, they're saying they want this agreement and they want it in the worst way. The U.S. and Japan are working together to try to exert some pressure on the Europeans. Naturally, there have been some questions raised by the other side about our Jones Act because they've concluded that it's an indirect subsidy. I think, honestly, we would have to confess that it is. It is a protected market and it is seen as a trade distortion, but because of the limited characteristics of the market, I think the Jones Act will, in fact, be excluded from the agreement.

In addition to that, one of the discussions that's being held is, How do we make sure that people don't break the rules? The only way to do that is to impose very tough sanctions on those who do break the rules. There's some legislation pending in Congress right now that would, in essence, put fines and penalties on those people who do not abide by the agreement, and they're fairly tough.

Let me just spend a second that will really lead into the comments

that Dave Klinges will make on where we see competitiveness in the current environment and where we see our long-term needs going. We think right now the industry is competitive in small vessels, or "onesies and twosies"; that is, custom design/limited production vessels. We think that there are prospects--in fact, we have already seen Southwest Marine take a major ship conversion job for Royal Caribbean Cruise Lines. They are expanding the capacity of that vessel by 50 percent and they beat out subsidized German competition in order to get that contract. I'll mention in a few minutes some details of a U.S. yard that was the low bidder on a high speed ferry project for British Columbia. **Some** of you know that Avondale has been contracted to work on the design of a huge new cruise ship, the Phoenix World City project, which would carry 6,200 passengers. I think the most critical thing in that project is going to be financing. And we already have yards that are working on double-hull tanker designs and, in fact, in the next couple of days there is going to be a conference held here in Washington where one of our members is going to talk about his capability to build a double-hull tanker at world competitive prices right now. I also think this industry is competitive in the construction of surface combatants for the military export market; a market, by the way, that should not be ignored. **Some** shipyards are going to desire to remain in the defense market; it's clearly an area that we need to be looking at. We need to be competitive tomorrow, though, in terms of the serious production of a number of other ship types in order to capture the market share that is enjoyed by countries like Japan and Korea.

Let me just mention very briefly the high speed ferry project in British Columbia. The competition was between Trinity Marine and Mitsui of Japan. Mitsui was the strict low bidder at \$88 million (Canadian) per ship as compared to Trinity's bid of \$95 million (Canadian). Mitsui was considered to be nonresponsive because they had no British Columbia content in their project,



plus, the Canadians charge a 25 percent tariff on importation of new vessels into their market. When that tariff is applied to Japan and because of the free trade agreement, the tariff is reduced in the case of the United States, Trinity had the low bid. Now, the British Columbians awarded the contract to Versatile in one of the most political decisions we've ever seen. The important point here, however, is these numbers indicate that here we've got a situation where a U.S. yard is, in fact, a competitive force for a specialized project involving those two ferry boats.

In terms of the cruise ship upgrades I mentioned earlier, one of the interesting things is that I think that we've had a practical result of our 301 filing already. Both the U.S. Trade Representative and the Department of Transportation urged the Ex-Im Bank of the United States to provide the financing. And the financing commitment was made at the same rates that the German yard was getting, 8 percent with 8-1/2-year financing. This represented the lowest total cost to the owner and explains why the job went to Southwest Marine. I mentioned earlier the situation at Avondale.

Just to wrap this up quickly, we've got to create a situation where we have a more level playing field than we have today. We recognize that the playing field will never be completely level but we've got to do our best to create more fair conditions. And the field can be made more level if we continue our activities. The thing that has been good about the 301 initiative is that it has developed the government/industry coalition that we never had before and one of the other things that it's done is that it's improved our ability to understand what's going on in the market.

Nancy Harris Our next speaker is Mr. David Klinges, Vice President of Maritime Affairs for Bethlehem Steel Corporation. Mr. Klinges is a 1950 graduate of

Franklin and Marshall College. He earned a Bachelor of Laws Degree from Yale University in 1953. He served in the U.S. Navy from 1953 to 1956, when he retired as Lieutenant Commander.

In 1956, Mr. Klinges joined the law firm of Haight, Gardner, Poor & Havens in New York City and remained there until 1961, when he became associated with Bethlehem Steel Corporation as a maritime attorney. He was named General Manager of Sales for Shipbuilding in 1972; elected Vice President of Shipbuilding in 1978; President, Marine Construction Group in 1986; and named to his present position Vice President, Maritime Affairs in 1989.

Mr. Klinges is a member of the Executive Committee and is Board Chairman of the Shipbuilders Council of America. He holds a wide variety of memberships in almost every maritime organization you could imagine. He serves on the National Defense Transportation Association's Sealift Committee and is a member of the Military Sealift Command's National Defense Executive Reserve.

He also serves on the board of trustees of Franklin and Marshall College and is the Lehigh Valley representative for admissions. He is a member of the alumni board of Yale University and a member of the board of trustees of Webb Institute of Naval Architecture.

David H. Klinges Thank you very much and good morning. Mr. Stocker provided you with the background and details of what we've been up to over the last few years and, as a follow-up, I want to give you a presentation which basically focuses on what the Shipbuilders Council's policymaking body--namely its Board of Directors--perceives to be the challenges that the industry faces and how we propose to meet this challenge in a number of steps. This is not earth-shattering; there's nothing here in this recitation that is something that you don't identify with. The point is that we as an industry have finally gotten

our act together to recognize what we have to do to bring about our own recovery over the next few years.

We believe that the tack that we are taking is consistent with national policy; we now see an increased awareness on the part of the government to support us in the position that we've taken. We've been protagonists with the government over the last ten years. We are now putting ourselves in a position to develop a new partnership, not only with the government, but also hopefully with labor and with our maritime support industry to develop a coalition that will bring about the necessary recovery of this industry in the decade of the 90's. And let me emphasize, this is not a business plan for 1991. We're talking about a strategic plan that guides us over the period of the decade. I don't think that anybody really seriously believes that we can consider ourselves to be in a position to be world-competitive in a period of anything less than three to five years. If we don't get on with it now, however, we're not going to be around when this situation turns around in the middle part of the decade. We've got to get on with it and we're working from such a perilously low base now that none of us can afford to let this situation continue any further and it certainly cannot be permitted to degenerate any further. So let's review the steps that we are taking as an industry to meet the challenges of the 90's.

The first thing to do is to recognize that we've got a completely different marketplace over what we encountered when we came into the decade of the 80's. With the elimination of not only the CDS Title V Program, but with what we saw as a complete turning of the back of the government on industry support. It was the fact that you couldn't get Title V, yes, but you also couldn't get Title XI. We've had a struggle over the last decade, as I'm sure you people are more aware of it than I, in the area of R&D. We encountered a

situation in which the administration that came on in 1981 said, "We are not going to provide you with any government support. What we're going to focus on is the biggest shipbuilding program in the history of the United States' peacetime Navy and we're going to get everybody aboard on that." The people who were fortunate enough to participate in that market were able to survive, but the net result was the collapse of the commercial business. Many of our colleagues disappeared off the face of the industrial map. We are sitting in a situation today where it would be very difficult to lay a keel for a commercial vessel in the United States if an order for ten ships existed. If we get a sealift program, I challenge you to detect where the hell we are going to build those ships in the United States today. The yards that are committed to Navy construction programs are in that business and they have order books which really take them out for three to five years. Consequently, we really have a very, very difficult time finding out where we would lay a keel in a commercially-oriented shipyard in the United States today. That's reality. So we've got to come up with the recognition that we've got a completely different marketplace out there. We see the growth in the commercial shipbuilding market. And we believe that there is going to be an opportunity for major Foreign Military Sales (FMS) in the decade of the 90's. There was a recent projection that indicated that there's a potential for upwards of \$100 billion in FMS construction--basically military sales around the world--that is, for bottoms and the systems that go with them. That's an area of the world market in which we are demonstrably competent and competitive.

We certainly know that reduced military budgets will be a fact of life for us for the years to come. We also understand that we cannot depend upon government policy to support us for the mobilization base. If we get a sealift shipbuilding program, we're all going to be delightfully and pleasantly

surprised, but we cannot plan on it as being a capstone of our market analysis for the decade of the 90's. We do, however, see a new government willingness to provide the limited marketing and the R&D support to promote export sales. And the reason for that is, in the discussions we have had with our trading partners, government role in supporting marketing efforts and generic R&D efforts are recognized around the world as being a proper role for government. That, then, is going to be the exception to anything that happens in the way of cutting out government supports and government subsidies. The exception will be in the area of marketing and generic R&D. We really believe that the drought for R&D efforts supported by the government should be behind us. How much support we're going to get in the future remains to be seen. You, ladies and gentlemen, know more about that than I, but we are optimistic that the worst is behind us in the R&D area.

Now this is perhaps the greatest recognition that the Board of Directors of the Shipbuilders Council has become aware of. At the session in Milwaukee, I think Ron Kiss was asked, "Who's going to be the sponsor for renewal of a shipbuilding effort in the United States in the decade of the 90's?" and he said, "The guy on your right," which was, of course, me. It means that the industry is going to have to do it; we're not going to get it out of the federal government. I think it's important that we've recognized that we are not looking to be at the public trough. We're not looking at a situation in which we are coming up with new and imaginative schemes, the way our trading partners have to try to get at the public trough. We're saying that we've got to be our own champions; that we've got to be our own sponsors; that we have got to address our own internal problems ourselves and that nobody's going to do it for us. Whatever we get in the way of external support and whatever dynamism is provided by the world marketplace and, as that subsidy level abroad goes down

and as our cost competitiveness goes up, then we say we're going to be there. The only people that are going to get us there, however, are ourselves. You and I are going to be responsible for making that happen. It's not going to come out of MARAD and it's not going to come out of DOD. That, I think, is a major recognition on our part. For so many years--the decade of the 80's--we were looking for somebody to help us out. We finally got, belatedly, to the recognition that there's nobody out there to help us out; nobody else gives a damn. If we don't do it ourselves, it's not going to happen.

Now the second step we've got to take is to change our complete business orientation--the way we do business. Because the only market we had, that monopsonistic situation in which the Navy (the government, essentially) was our only customer, we have gotten ourselves oriented to an internal business structure that's been responsive to that market. It's not too surprising, then, that a continued focus on that kind of market is a sure formula for disaster for the American shipbuilding industry. If we expected to do business in the commercial sphere in the decade of the 90's the way we did it doing business with the Navy in the 1980's, we might just as well forget about it. A number of these examples are in the CDRLS and the bureaucracy of doing business with the Navy.

I can give you all kinds of apocryphal tales. We met with John Lehman when he was Secretary of the Navy and Earl Fowler was running the Naval Sea Systems Command, and we really got a lesson in the bureaucratic approval process. At the time, we had a destroyer up in our Boston Yard. The ship had been in the yard for five months. The boilers on the destroyer were an absolute disaster. The Navy's SupShip representative knew it was disaster. But he had to go through the chain of command, the Type Commander, to do something about that boiler. At the time of the luncheon with Lehman in early March, the ship

had been in the yard since the end of October. I told Lehman, "We still don't have approval to fix that boiler and that ship can't go to sea unless those boiler tubes and the foundation are fixed." Lehman's response was, "This can't be." Earl Fowler piped up, "That is a fact, Mr. Secretary, it just takes that long to go through the approval process." Lehman then said, "Earl, I want to make it a point to follow this." Well, you know what happened. The redelivery date was the 15th of May, but it wasn't until about the 25th of April that we got the approval to do the work. Then we caught all kinds of hell because of late redelivery. It took us so long to complete the job after receiving approvals, we didn't get the ship out until August. A perfect example of a commercial type shipyard trying to do a Navy job. Believe me, if we continue to do business with our commercial customers the way we've been doing business with the Navy, we're not going to make it. So we got to recognize the change in the whole ambiance of how we do business. It's a different ballgame. We've got to reorganize our infrastructure. We've got to completely redesign the way we do business in the shipyards. It's amazing--John Stocker and I were over in Japan in August in a first-class shipyard. They have a throughput of about 100 thousand tons of steel in a year in a shipyard with 1,200 people. You know very well that they're not doing that kind of a job with the kind of organization that we have in our shipyards. It just can't be done. We have to recognize that we've got to change the whole internal structure of our shipyards or we're not going to be there either.

Recognize that there are fewer direct shipyard workers in Japan than there are in Newport News today--fewer direct labor shipyard workers in the whole nation of Japan with a 500 ship order book than there is in one shipyard in the United States. Now, with all due respect to Newport News, a crackerjack shipyard, the kind of workforce they have is driven by the fact that they have

one customer. And that's what that kind of organization is responsive to. But if Newport News wanted to compete on a commercial shipyard job in the world market today, they're wasting their time. They've got to completely restructure that shipyard to make it happen.

I've noted that we have to actively participate together in forming a partnership for international sales promotion. We've got to work together. We now find a far greater awareness, not only in the Office of the U.S. Trade Representative, but with the Interagency Task Force, that something has got to be done. It is not inconsistent for the government to say, "Yeah, we're not going to support you; we're not going to give you any money," but it is consistent with the free trade type of atmosphere that permeates our Federal Government to say, "Yeah, but we're not going to let you get hammered unfairly by the actions of our trading partners." It has taken a couple of years, and John Stocker has spearheaded this effort and done so very, very effectively with every office within the Interagency Task Force, to make people aware that we are not asking for any money, we are not asking for a dole and we are not asking for the protectionism that would prohibit foreign-built ships from coming into the United States. All we want to do is make sure that when we finally do get our act together that we've got a market out there that we can fairly compete for. And that's all we're asking. So it's a little bit different situation from even the steel industry. What the steel companies said was that they needed a couple of years to get their program together and, if they got that, then they would not need a protected market. What the steel industry got was a voluntary restraint agreement that gave it time to improve its structure and improve its competitiveness. Today, steel is being produced in the United States of America for fewer man-hours per ton than any industry in the world. But it took a couple of years to do it, and it's going to take us three to five years to get



to where we need to be. But, we've got to get on with it now. We do have a precedent for it. The steel industry did a good job with the support and the assistance of the Federal Government. We have every reason to believe that, with the approach we're taking, that's a realistic course for us to pursue as well. We at the Shipbuilders Council are committed to work with MARAD and the Navy to accomplish cooperative R&D. We're committed to do that on an industry-wide level. We have formed, within the Executive Committee of the Council, a committee headed up by our good friend Ellsworth Peterson to really put our money where our mouth is and to get the companies to do what has to be done actively to support your efforts, and government, and MARAD, and Navy efforts generally. We are prepared and committed to work with the Navy International Project Offices and Commerce and State and Ex-Im Bank to promote not only military sales, but commercial sales as well. The fact that Ex-Im Bank came aboard during the Southwest Marine situation was the shifting of the balance that made that thing happen. And the Ex-Im Bank had never before done a shipyard financing assistance project. All they know is how to finance 747s: how to get Boeing 747s sold. It was a real effort through the assistance of the Shipbuilders Council and the cooperation--the active cooperation--of people in government to work with Ex-Im Bank to make that happen. That's a dramatic breakthrough, believe me--I've been in this business a long time--to get those people calling up over at Ex-Im Bank saying, "Hey, make this thing happen." For the first time we've gotten an Ex-Im Bank commitment to support the effort of one of our members to get a very major project, that cruise ship conversion.

We must lobby Congress and the Executive Branch to discipline the world commercial market. We're not going to get these people to work with us just by jaw-boning, as we've been doing all these years. That's all baloney. You know it is. The only way to do it is to implement the other kind of thing

that we were talking about in the Lott-Mikulski Bill that has been introduced. That bill, in essence, says, "Hey, either you cooperate with us or we're going to hammer you when your ships come in." We're not going to enter into any agreement in the international arena that does not have teeth in it. If we don't have sanctions against the people who break the deal, then it isn't going to be worth the paper it's written on. So that's the clear difference. After all, in 1983, all of these wonderful trading partners of ours signed an agreement, like a treaty, that said, "We will eliminate all disruptive and distorting trade practices." And for the next seven years, they did everything they could to dream up new and imaginative schemes to figure out how the government could go and support their indigenous industry to our great destruction. And, of course, that is exactly what happened.

We can also take another initiative. There is available under the law something called an Export Trade Corporation. Under that law, American shipyards and vendor companies would be permitted to band together to put better combinations together to bid on foreign work. As all of us know, if a ship owner wants to build a series of six new container ships, he wants them yesterday. Once he decides what the ship is going to look like, he wants them as fast as possible. You recognize that in a number of the major contracts that were obtained in Japan for outfits like Sealand--it required splitting the contract among a number of different yards in order to achieve the shortest-term delivery. Certainly in our industry today, if somebody came and asked for the fastest delivery on six container ships, we'd tell them, "First delivery is in two years, and then we'll give you another one six months thereafter, and after three or four years, you get your fleet replaced." That's just not going to work. That's not realistic in the world market today. The only way that's going to work is for us to get together and say, "OK, if you need six ships,

we'll build three at Shipyard A, we'll build three at Shipyard B, we'll combine our planning and procurement and management and we'll get those ships all to you in 30 months." And that's the only way we're going to be there, and an Export Trade Corporation will be a vehicle to achieve that.

We've got to expend some creative effort in order to develop the world market. We're not comfortable in doing that, but it's a job that has got to be done. We've got to look for our market niches. We cannot expect an American shipyard to be able to go to a domestic oil company or foreign ship owner and say "We want to build ten 80,000-ton product carriers for you and this is how we're going to do it." The fact of the matter is that we will get the living stuffings kicked out of us in the world marketplace if we try to make that kind of a proposal today. There are shipyards out there who are building 80,000-ton product carriers, have been doing it for the last five years and they are well down the learning curve. We're just not going to be there. We've got to identify the type of projects that are going to get us from 1990 into 1995. We believe that the cruise ship market--limited run, high outfit, more complex ships, not long-run projects--gives us the potential where our cost competitiveness could be manifested. Certainly in the area of floating industrial plants, Ocean Thermal Energy Conversion (OTEC) facilities, anything that is in the area of a high-tech kind of project that lends itself to shipyard production and not into long serial runs, would provide us with a higher feeling of optimism that we might be able to be competitive. We're seeing signs of that in the kind of projects that are out there right now.

We think that we should do a better job of integrating our sale of military systems with the sale of the hulls that go with them. As you know, the Shipbuilders Council was unhappy about seeing the Aegis system being sold to Japan without having the total package sold to Japan. We thought the Aegis was

a kind of project in which we should have sold them the whole bloody ship--keel and systems. Just to give away the Aegis system was not the way to go. We're hoping that we can get a better integration of our military systems' knowledge and capability, with our proven capability of building hulls, to sell the total packages to friendly Third World countries. Of course, we want to be able to work with Ex-Im Bank for broader support.

In our focus that we echo on the need for quality--not only to recognize it, but to deliver it--we've got to invest in a lot of new technology to bring about the change that is needed in American shipyards. We're not kidding anybody--we are not there yet. We've got to do what has to be done and it's going to be a broad approach to how we're going to get there from here.

One of the things that we find, though an experience that we never had before, frankly, in the decade of the 80's, is bringing foreign-built ships into American shipyards and comparing them to American-built ships. This has led us to the conclusion that we must do either one of two things. We've either got to get the Coast Guard standards modified so that they look like the foreign standards or we've got to get the foreign standards up so that they equal the Coast Guard standards. Otherwise we're not going to get there--we're always going to be behind the eight-ball. At a conference we had a couple of years ago, I rhetorically asked the question, "Why is it that so much commerce is carried out around the British Isles and the northern coast of Europe on small vessels, and we don't have a coast-wise fleet of self-propelled vessels worth talking about? The reason is that we've got manning requirements on these ships and we've got requirements from the Coast Guard that say that we can't build a ship in that kind of a trade and be cost-competitive. And yet the fact of the matter is, you can't drive down here to Baltimore or go into Washington without seeing trailer-trucks full of gear that's being moved on our highways that

should be and is capable of being moved on self-propelled coastal vessels. The fact is that you're not going to get a self-propelled, coast-wise fleet if your going to require 12-man crews on it; it just isn't going to happen. This presents a marvelous opportunity to solve the problem of the destruction of our highway infrastructure by getting some of that freight off of the highways and off the rails and get it to sea, particularly where it's bulk. That's where it *should* be carried.

We all understand the need to work harder on developing our standards program, we certainly have got to work hard to get the double-hull requirements that we've now adopted, adopted as a world standard. We're going to be working to try to get that accepted by IMCO.

We've got to get the best and brightest human resources into R&D. We always say that if we were able to spend our effort in R&D to the same extent that we've got people in our shipyards working on claims (and you know who the claims are basically against); if we used our energies to help ourselves get into the twenty-first century instead fighting amongst ourselves or with our only customer, we'd all be one hell of a lot better off. The industry would certainly be better off and we'd be better prepared to compete in the world marketplace in the 1990's. But we're not going to get there when we've got 20 and 30 people on staff doing nothing but working on Requests for Equitable Adjustment and claims.

We have to invest in new product development. A number of us are working on double-hull tankers. We believe that there is also a potential for self-unloader work. We need to do more in recognizing the advantages and potential for the cruise market and the industrial plant market. The market is there; it just has not been fully exploited.

The next step is to restructure our procurement process. One of the

things that we have become aware of on our tours around the world is that everybody has a problem with procurement of ship materials. We've got to do a better job of getting our material costs down. And once again, this is an opportunity where the Export Trade Corporation, the trade organization structure I mentioned earlier, would be able to get us together and pool our efforts to do a better job. We also found that foreign shipyards operate with a fully-engineered, integrated package procurement. When we build a ship, too often we do the engineering and design for each little element of the ship. Foreign shipyards go and get the procurement packages put together by the engine manufacturer who does all of the engineering and puts the whole thing together. We've got to be able to find out how we can do that, so as to reduce our material costs, not only in the area of propulsion, but in pump-rooms, in cargo-handling gear, and in a number of other areas like that.

I'm sure that you'll all agree with this last, but not least, point-- we've got to do a better job with our human resources. I must say that I still think that we're getting there in this area far better than we are in technological development areas. Some of these suggestions are things that I know you are going to be grappling with in this and other, similar meetings to improve our use of our most important resource, which is our people. I think that we are all committed to that and certainly, on behalf of the Board of the Shipbuilders Council, I want to make sure that everybody recognizes that we are fully committed to recognizing the importance of better human relations and better productivity achieved through better motivation of all of our people.

## Operation Desert Shield and Maritime Policy

Nancy Harris Our next speaker is Warren Leback, who was appointed by President Bush to serve as the Administrator of the Maritime Administration in October 1989. In this position, he is responsible for an agency that is charged with developing and maintaining an American Merchant Marine adequate to meet the nation's commercial and defense needs. Captain Leback has broad experience within the maritime industry. He served in World War II and has held management positions with Central Gulf Steamship Corporation, Sealand Service, El Paso LNG and Puerto Rico Marine Management company. He has been responsible for construction or conversion of 45 American flag vessels plus 9 foreign flag vessels.

His operating experience covers passenger ships, break bulk vessels, bulkers, tankers, ro-ro's, container ships and LNG carriers. Captain Leback served as the Deputy Administrator of the Maritime Administration between 1981 and 1985. He received his B.S. degree from the United States Merchant Marine Academy in 1944. He also maintains an active U.S. Coast Guard Master's License.

Captain Warren Leback Well, first let me say that it is a pleasure to be here this morning. I certainly look forward to the results of this shipbuilding research program, having personally done quite a bit in the area of ship construction, conversion and shipbuilding. That experience includes the eight SL7's that are now involved as the FSS's for the Military Sealift Command which, with the exception of one that I will explain about a little later, are performing admirably in Operation Desert Shield.

Many of you in this audience are aware that, last February' Secretary Skinner unveiled the Department of Transportation's National Transportation

Policy, which encompassed six key objectives: maintain and expand the nation's transporting system; foster a sound financial base for transportation; keep the transportation industry strong and competitive; insure that the transportation system supports public safety and national security; protect the environment and the quality of life and advance U.S. transportation technology and research.

I can assure you that in the area of technology and research, Secretary Skinner is very high on it. In fact, in our 1992 budget, MARAD will be substantially increasing our R&D funds, about 80 percent of which is dedicated, on a line item, to shipbuilding research and technology. So we are starting to turn it around. It's not as much as we would like, but certainly from the standpoint of what we've done recently, it is 500 percent more than what we've had over the last several years.

Surely, one of the most productive projects that was spearheaded by SNAME and MARAD was the Ship of the Future Workshop that was held in May of this year. Joining SNAME and MARAD as sponsors were the American Institute of Merchant Shipping, the Shipbuilders Council of America, the United Shipowners of America and the National Institute of Standards and Technology. Among the objectives of that conference was a review of the requirements for design, construction and operation of technologically-advanced ships for the twenty-first century, and to summarize the multitude of actions within the maritime technical community to implement the development of such ships in the future. There were hundreds of interested panels that worked months in advance on this conference. They identified, assessed and documented the pertinent operational and technological issues that would have an influence on the conceptual designs of the ships of the future. No less than 14 conceptual ship designs were unveiled including several classes of container ships, cruise ships, tank vessels, along with car carriers, dry bulk carriers and two types of sealift



ships with military and commercial cargo viability. There will be a follow-up on that meeting out in San Francisco at SNAME's annual meeting, and all of the principals who participated in the conference in May have been invited. The objective is to formulate a \$300 thousand cost-shared program to further redefine the development of 5 or more of the most promising ship design concepts. I'm confident that we will move forward in this phase, which is a prerequisite for the transition from conceptual to actual design development.

Herein lies a small personal problem as far as I am concerned because, in history, we did much the same thing in the 1950's. In fact, in my office in Washington we have several very large scale models of vessels that came off the drawing boards in 1950. They were designed to replace the C-type vessels that were designed in 1936, 1937 and 1938, which revitalized the Merchant Marine under the 1936 Act. A considerable amount of effort went into them. The only problem was that the designers' including my own agency, were not in tune with what was out there in the real world. So the only place that those designs went was on the shelf and into a few models. Again in the 70's, when one of my predecessors and **very** good friend, Andy Gibson, was Maritime Administrator, they came in with a concept of designs on a competitive basis and, for the most part, those too went on the shelf. If I recall correctly, several tanker designs were finally adopted but were modified extensively by the shipyard that was involved in it. Consequently I'm going to caution the people out in San Francisco that they had better talk to the buyer or the ship operator before going too far on conceptual designs. There is more to design than the aesthetics or the layout of the ship. The ship has to return a profit.

When I did the SL7's, the total time from design to delivery of the last ship was just a little under three years, the first ten months of which were dedicated to the design effort and the financing effort. A number of

people characterized them as very ugly; they didn't look like a ship. My answer was "Well, the man asked me to design a seagoing tractor to carry 1,100 containers. If he had asked me to design a yacht, I would have done it." But we did it for practical reasons, and no matter what you come up with in the plans for marketing vessels, you have to take the ship operator's wants and requirements into consideration. We do have a problem in this country of doing one-of-a-kind or two-of-a-kind or three-of-a-kind, because the operator wants it that way. However, that same operator wants to be presented with a ship with a fixed price. Consequently, it may not be possible to have all of the frills, all of the gadgetry and the blue carpeting in the captain's office. If the price is right, however, he is going to buy it and forget about all of the frills. We've been prone in this country to do the design work and then make the changes that the owner wanted after he had agreed to a design at a fixed price. That's when the shipbuilding industry takes it on the chin as not being competitive, what with cost overruns and everything else that you can put to it. In other words, no matter what sort of shipbuilding programs we come up with, we've got to be hard-nosed with the operator. He is only going to be looking at the bottom line and, if you can discourage him from going into these extras, as we have not done in the past, I think we can do better than we have in the past.

Certainly over time in this country, we have become cost-competitive on labor rates. There is the intent, and certainly we support it, to increase productivity by standard designs by reducing the amount of paperwork and getting into series production. Series production is something we have done before and done admirably, both in World War II, and even as late as the 1960's with the very large replacement program that Lykes Brothers went into. That was a controlled and well-managed program and the yards did very well. If you get the productivity up and if the yards get the management to where they need to

concentrate on the people in the field--the people out there in the erection shops and on the ways--and less on the computers and less on paperwork, you accomplish three things. First (which you have already accomplished), is being competitive in the cost hours; second, when you bring productivity up to make it competitive in both Western Europe and Japan. The third one is by management managing the systems better. There is a fourth area that we cannot discount although there are a lot of people in this country that are not in tune with it or will not support it. And that is, How, as the owner, do you finance the ship? Even if the shipbuilders in this country over the next four years are able to eliminate the foreign shipbuilders' subsidies to improve productivity through standard designs and series production and to better management controls, we, in this country, still face the problem of financing a vessel. The one mechanism we have is financing through Title XI, which is a mortgage guarantee program by the federal government in the private marketplace. But Title XI does not have the same competitive interest rates that you can acquire in Europe or in the Far East. So the financing part of the equation has to be addressed. If the industry can get the first three pieces in place, we still need to have a mechanism for financing. A shipowner who would like to build in the United States has to look at the interest rates and the payout and the time for money. If what he's offered is two or three percentage points above what he can get in the Far East or in Europe, all things being equal on the first three areas, you can rest assured that he will take the contract of a yard that he's going to get the best financing from.

If you go to the Far East, you can put 20 percent down in some cases, and in others there's a balloon payment at the end with nothing down, no payment during the construction of the vessel and then you have 8-1/2 years to pay out the delivered cost of the vessel with the balloon at the end, running maybe 6 or

7 or 7-1/2 percent interest rate. In this country, we have to pay 20 percent down, pay progress payments over the course of the construction of the vessel, with the final amount of money due on delivery. In this circumstance, the owner, therefore, is faced with financing that vessel twice. He has to finance it while it's under construction and then he has to go into the long-term financing after it is delivered to him.

As I said earlier, Title XI is a financing mechanism, but its interest rates are pegged at whatever the bond market is doing at the time you place the bonds to cover the capital cost of the ship. It is not like using the Ex-Im Bank equivalent in Japan, or the same equivalents in France or in Germany or in Norway. Very interestingly enough, one of the first things that the Ministry of Marine of the Soviet Union did when they finally realized that they were going to become free was to establish a ship bank, for lack of a better word, and capitalized it 500 million rubles, which at the official rate of exchange is about 750 million U.S. dollars. A ship owner or a shipyard can apply for a low interest rate in order to construct the vessel in the Soviet Union or to purchase a vessel in the Soviet Union. So, again we need to look at this financing problem.

Now let's look at MARAD and Operation Desert Shield. Operation Desert Shield started on August 10th and we, MARAD, who have the custody of 217 ships in the National Defense Reserve Fleet, of which 96 are in the Ready Reserve Force, were ordered to start activating them. So over a three-week period, we activated 43 vessels. The vessels that went into service were those that had a very high military utility use: the ro-ro's; the lashes; the CB's; the crane ships; one tanker only, which was fitted to discharge over the beach and pump fuel about 4 to 6 miles inland; several break bulk ships; plus two helicopter repair ships. As you know in this industry, everything happens at 5:00 p.m. on

Friday, so the first notification came in at 5:30 Friday night: "Put 23 ships out there in 5 days." That meant we had to get the shipyards geared up, the repair shops geared up, and labor geared up. Everyone performed admirably on that weekend. We then thought we were home free and they would tell us on Monday to activate another group. Not until the next Friday, again at 5:30 p.m., did another order come for 12 more, and then the following Friday for the balance to make 43. By that time we were into the Labor Day weekend when, as everyone knows, labor is very scarce. It's the last holiday before school and everyone wants to take advantage of it. In spite of everything, the shipyards did an excellent job. We didn't experience any shortage of shipyard labor, any delays, or any problems as far as reactivating the vessels. My only concern was that we only took out 43 out of the 96. Had it been a shooting war and we needed to have tonnage out there immediately, I'm not so sure that we would have gotten all 96 ships, of which 65 were scheduled to be activated in 5 days, within the timeframe allowed. That's not the fault of the shipyards. We have been allowing our shipyard base to decline over the years and I think we will see as one of the lessons learned here in Operation Desert Shield the need to correct that. I can't guarantee it, but there's a lot of concern that had we been forced to activate all 6 ships, it would have been questionable whether we could have gotten them out in the timeframe. We would have gotten them out, there's no question. We would have probably had them all out within 4 to 5 weeks, but we wouldn't have been there in the five-day period that is required.

We have a group of ship managers that are charged with managing the breakouts, the activation, and operating the vessels once they are turned over to the Military Sealift Command for orders and instructions. They have worked fairly well. The best ones performed admirably: They were the ship owners and ship operators, such as American President Lines, who has dedicated a tremendous

amount of resources to managing the ships that were detailed to them. The smaller operators, whose sole source of income for the most part, was the Ready Reserve Force, did not have the engineering technology, skills or personnel, or the ability to activate ships and push them out as quickly as the line operators.

The crewing of the ships with the labor unions went fairly well. There were, however, shortages, particularly in the senior engineering staffs, for start-up of the vessels. Here the yards themselves performed admirably by providing marine engineers in their own employ to start the vessels up. Another problem was that, even though the greater part of the ships had their engineering staffs on board on day one, we've had a switch in this country over the last 15 to 20 years from steam propulsion to diesel. Eighty percent of the vessels in the Ready Reserve Force are steam turbine ships and the remaining 20 percent are diesels. That was one of our primary problems. Not only were we starting the vessels up from cold iron, but we also had to run a familiarization course for those engineers who had the requisite licenses but who had not sailed on steam driven ships for the past 15, 20 or 25 years. It's a problem that will have to be corrected. But outside of that, the labor unions were able to put 1,400 men out there in the space of about 3 weeks. I thought that was pretty admirable; we had really been concerned about whether they would be able to do it. The ships are running, we've had a few problems, but that's going to happen. The SL7's operated very admirably with one exception. That ship failed at sea, but that wasn't the fault of the design of the ship, nor was it the fault of the operator. One of the ship's boilers had been down for one solid year and was in the process of being repaired and the second boiler was marginal. She had to be towed into Spain. At the root of the problem was the fact that an awful lot of people on budgets don't believe in putting enough

money to put the "ready" back into the reserve force or the "ready" into the fast sealift. That ship should have been repaired the day that the boiler went down because its mission is to carry 1/8 of an armored division's equipment. If I were in charge of operations over there in the middle of the desert, I would scream bloody murder: "I've got the 24th Armored Division sitting here, but my equipment is 7/8 complete because the other boat is someplace in the Atlantic, broken down."

There have been and will continue to be glitches in the sealift program because of the age of the vessels, the problems involved and the fact that they haven't been maintained over the past 4 or 5 years because of budgets. Our budget was cut to \$89 million in 1990. On August 9th I was in front of Congress fighting for \$225 million. When I went up again with Admiral Donovan on September 26th to explain our performance in Operation Desert Shield, I was asked whether the \$225 million was enough, or was an additional supplement needed. Of course everybody knew we got the ships out, so I couldn't really ask for more than \$225 million. But then they also tacked on another \$38 million for breakouts and testing. While I know full well that you can't question Congress--you can only answer their questions--I would have liked to have said, "What's different today than there was on August the 9th, other than Operation Desert Shield?" It didn't help the "Ready" again in the Ready Reserve Fleet. We were very pleased that last night, the Senate passed an appropriations bill that has provisions in it for the Fast Sealift Program. That will mean additional ships being built in the United States. The bill now has to go back to conference with the House and they will reach an agreement between what the Senate funded and what the House funded. Then we hope we're off and running with putting some additional ships into the yards within the next 6 to 8 months. It's going to take a while to get this done but, as long as the money is there,

we are encouraged.

Desert Shield is going to have some influence on our maritime policy. I think we are going to see more vessels being built for sealift, whether we build them purely for sealift or we build them for economically viable, militarily useful ships will have to be jelled out over the next 6 or 8 months. As far as maritime reform is concerned, I think policy is going to be enhanced and supported and I look towards a better year next year.

Department of Labor

Bureau of Labor-Management Relations and Cooperative Programs

Lyn Haumschilt Charles Spring serves as the Acting Deputy Under Secretary for Labor-Management Relations and Cooperative Programs. As the agency head, he provides policy direction for the Bureau of Labor-Management Relations and Cooperative Programs and serves as the Secretary's Liaison with the Labor-Management community. Through a program of technical assistance, publications and research, the Bureau provides practical and timely information on cutting-edge labor relations issues.

Prior to his appointment, Mr. Spring served as the Director of Programs for the Bureau, as the Acting Chief Operating Officer and top civil servant; he was responsible for managing the human and dollar resources for the Bureau to meet its goals and objectives.

He has traveled extensively throughout the United States and the world. In addition to being the U.S. Delegate for the Organization for Economic Cooperation and Development (OECD) working party on industrial relations, he served as the Chairman for the U.S. Delegation to the International Labor Organization at their conference on collective bargaining; as the U.S. Delegate



on the Department to the Ministry Exchange Program with Sweden and Israel; as a State Department lecturer in India, and as the Moderator Of the Bureau's Biannual State of the Art Symposium.

Since joining the Department of Labor in 1962, Mr. Spring has spent most of his career as a Senior Staff Member in the Office of the Secretary. He has provided policy direction for the construction industry collections bargaining commission and the construction industry stabilization committee. He has held various jobs and made various publication8 on compensation, collective bargaining Structures wage and price controls and quality-of-life programs. He holds an A.B. in Economics and a Juris Prudence degree.

H. Charles Spring Thank you very much. I am happy to be here and talk about some things about human resource innovation. You know, every once in a while I have to step back and go outside the Beltway and take the pulse of the economy and the thinking in the whole area of human resource innovation, labor-management relations. Recently, I was down in Georgia expounding all of my knowledge and, of course, you know all knowledge exists within the Beltway around Washington. Since most of you here are part of that scene, you know that that is the case. I was going through this plant with the plant manager and some of the union representatives. This particular plant made horse heads. As I walked through the line, I saw how they made the structure out of this light aluminum material and how they stretched this fabric that looked a lot like suede, but was some kind of synthetic material over the horse head. They then glued it on and it became a very beautiful horse head. They put in the eyes and the teeth and, after the quality inspection, you couldn't tell the final product from the real thing. I was admiring them, and complimenting the workers and the manager on the production of these horse heads, not wishing to show all of my

knowledge. When we got back to the plant headquarters, I said to the plant manager in the privacy of his office, 'You know, these are wonderful horse heads, but tell me, what is it you do with horse heads?' And without flinching, he said, "We send them to Washington for final assembly." Sometimes you need that kind of perspective on things.

If we step back from the shipbuilding industry for a moment and look at the 1980's in this country, we can see that there were severe impacts that hit us, shook our very roots; tremendous changes that occurred in our economy which, I am sure you know, affected shipbuilding. Global competition certainly **was** one of those. We were being competed against by almost every nation in the world on almost every product that we produced, something we had not experienced before as an economy. In this country we sat astride the international markets. We controlled them. We became faced with tremendous competition. We were faced with some extremely rapid technological change. Captain Leback just talked about some technological change and he measured it in terms of 15 years, 30 years; he talked about ships in the 1930's and 1950's. What we were looking at in this country, in terms of technological change, were product and process life cycles being compressed to the point where you measured a product life in terms of months, and **sometimes** in terms of weeks, rather than in terms of years or decades as we had in the past. You look at some stable products like refrigerators and washing machines whose product life generally was looked at as about 10 or 12 years. Now we are looking at competition changing the knobs, the buttons, the technology once a year or so--tremendous change in technology, tremendous change in the processes and in the products that we produce. Throughout the world, these things are competing against us and the manufacturing structure that we had established in this country.

Foreseeing the tremendous change in the demographics in this country,

a couple of years ago, the Department of Labor commissioned a report on the Workforce 2000 by the Hudson Institute. It talked about those kinds of changes that we're seeing, where more and more women are entering the labor force, where minorities are entering the labor force, where handicapped workers, immigrants-- a whole group of folks who we have traditionally overlooked in our workforce and not called on in our workforce are going to be the mainstay of the workforce. The Hudson Institute went back and looked at the work that it did three or four years ago and it decided that Workforce 2000 was really Workforce 1990. Those changes are occurring today. There is a tremendous difference in the skill levels, in the workplace needs and in the training than we are ready for, and we need to look at that as an impact on our whole human relations aspect. We had in the 1980's deregulation in some of our major industries in this country. Overnight, airlines, communications, gas and oil, transportation, were told that they need now to compete in the free market. They've been controlled by the government for years and have built their structure and organization around that kind of control; now, however, they must compete in the free market. And that occurred over night. If you look at those four things all together, there were **some** very tremendous changes that occurred in our economy. And how did we respond to them? Well, at first we didn't think they were occurring. We denied them, and then what we did was tinker around the edges. We did some restructuring, we did a lot of paperwork, we did a lot of things like leveraged buyouts and junk bonds--words we never heard before suddenly became the rule of the day. We shifted around assets on paper, but we denied the permanence of these changes. We didn't do anything about restructuring the way we did business or the way we dealt with the issues of business. We stayed with our traditional methods of manufacturing, our traditional methods of providing services that we had developed back in the 1930's and 1940's. But I think that

in the 1990's, we're beginning to see that those changes are permanent, and we are beginning to address those issues in a very, very serious manner.

I'd like today to talk about the first three things that Captain Leback referred to. The way that we are addressing those issues, it seems to me, is through quality and excellence. Our business strategy has now become one of quality products, a strategy to meet customer's demands, a strategy of flexibility, a strategy that is driven by customer demand. And we've done that with a whole series of things that have become identified by their acronyms. I know you folks in the military love acronyms, but these acronyms only have three letters to them (most of them anyway)--TQM and FCC and QCC and CAD and CAD/CAM, and STF and JIT, and all of those other things that we've done as business strategies to improve the way we manufacture products or provide services. What we have done is taken those business strategies and implemented them in an existing organization in an existing environment, sometimes with little success, sometimes with some success, but not with the amount of success that was promised to us by the sellers of those things who had told us that this new business strategy was going to work. It seems to me that there is one key reason for that; that is, we need to look at our human resource strategy and we need to make certain that the human resource strategy is congruent with the business strategy.

We've gone around the country looking at companies--companies that are quality companies; companies that have looked at their business strategy and have looked at their human resource strategy; companies like the Baldrige Award winners: companies like Xerox, Motorola; some of those companies, large and small--we've looked at about 600 of them. There are some common threads that seem to run through those companies in terms of making this business strategy and this human resource strategy congruent. I'd like to spend a few minutes

just going over some of those common threads for you today. The common threads that I've pulled together, I call my CREED. The "C" is for Consensus. It seems to me that in any kind of a relationship where you are trying to make your business strategy and your human resource strategy congruent, and arrive upon it in a consensual fashion, you need to deal in an adult/adult fashion. The relationship between workers and managers has to graduate to the adult/adult model. We can't any long rely on the adult/ child model--"Do it because I said so." We have to engage the brains as well as the hands of our workers, and we need to deal with that in a consensual fashion in an adult/adult model. We can agree to disagree. There is nothing wrong with disagreement, but we need to be able to disagree without being disagreeable. I think we need to think about how is it we arrive at or how we develop an adult/adult model in our relationship with each other.

The "R" is Reciprocity. I, as a manager, have to understand that you, as a worker, have certain needs in order to be productive. In order to make a quality contribution to the organization, you have to have certain needs met. I, as a worker, understand that if I am to produce a quality product, that product has to sell, and you, as a manager, have to have a certain return on your investment for your stockholders. I need to make a contribution to that return on investment, so I need to put forth my fullest effort too. Both managers and workers have to understand that there is reciprocity; that is, there is a need on the other side that has to be met and that need has to be met by both sides.

The first "E" in my CREED is Equity. We're saying to workers that we want them to be stakeholders, that we want them to produce quality products. Quality can only come through people. You can't force quality. You can certainly force productivity--you can make people make more things, but you

can't make them make them well. If we want to have quality, it has got to come through the people's desire to produce quality. It doesn't come through any kind of statistical control; it doesn't come through any kind of notebook check-off system. It comes from a person doing the best job possible, having the best tools available, having the best knowledge available and having a desire to make that quality product. If that is the case, then we have to have some form of equity. We have to have some reward system that rewards and enhances the behaviors that we want to encourage. And not a reward system that holds down that kind of quality production. There are all kinds of reward systems--I'm not here to sell any one in particular. I've noticed on the Agenda that there is going to be some discussion about different kinds of reward systems this afternoon and tomorrow. Gainsharing, Improshare, profit sharing--all of those kinds of things are reward systems. Not any one is any better than any other one. What you have to do is sit down and find the compensation system, the equity system, that best suits your needs as workers and managers. That has to be done individually. It has to be done company by company. It is not just the case where you can take a program and plop it in anywhere and expect it to work. Too many times we see talk about golden parachutes where management folks or the top executives are bailed out, while the workers are given the lead parachute or are told, "Sorry, we goofed but you'll have to pay." If we are expecting a business strategy to be congruent with a human resource strategy, then we need to share the gain as well as the pain. We have to establish some sort of a system that does that. It's not an easy thing to do. I recognize that. But one of the most important things we need to do is to look at our compensation structure, our equity structure, if you will, in a new innovative human resource strategy.

The next "E" is one that a lot of my management friends around the

country shudder at when I say it, and that is Empowerment. If we really expect to use the brains of our workforce, then the workforce has to have the knowledge, the skills and the abilities, and the authority and responsibility to make the kinds of decisions that need to be made. And by empowerment, I don't mean that management comes down today and says, "Well, today this group of workers can make these kinds of decisions and I'm giving you the authority and responsibility for making those kinds of decisions." Because if they do that, tomorrow they can come back and say, "Well, I've changed my mind; you can't make those kinds of decisions anymore." What I'm talking about when I talk about empowerment is having the workforce fully trained, fully capable of producing the quality product, and it has at its fingertips what it needs to produce that quality product. It is also able to make the decisions it needs to make in order to produce that quality product. That's the training and re-training we talk about. Those kinds of investments in our human resources give the human resources empowerment. It is something that individuals have to acquire on their own. If we look at the workforce and talk to the individual workers and union members, you find out that they're running communities, they certainly vote in elections, they're on boards of directors of banks, they're officers in churches and PTA groups, a lot of them are trustees on jointly-administered pension plans, they're presidents of their organizations, and more. These are people who run their lives and run their communities very effectively. But when they walk through that gate to the yard, we tell them to check their brains at the gate. We tell them, "All knowledge resides in the corporate headquarters and all that we want you to do is come in and use your hands to do whatever it is that you do. We don't want to use that brain you've got in your head." I think empowerment is using that brain, getting that brain engaged in the whole work process.

The "D" in my CREED stands for some Due-process system. If we're saying we want you to be stakeholders--if we're saying we want you to help us innovate, to take risks, to offer suggestions--then there has to be system that accepts the risk of failure. We only learn from our failures and, if we're saying to employees that we want them to make suggestions, we want them to take risks and to innovate for us so that we can succeed, then there are going to be some failures. There has to be a system in place that accepts the risk of those failures. If there isn't some system in place, then productivity is going to sink to the very lowest level because people are only going to do that which they know they can do without any mistakes at all. There isn't going to be any innovation, there isn't going to be any risk-taking and there isn't going to be any engaging of the brain. Traditionally, those systems have been grievance systems in the union organizations. I'm not suggesting that a grievance system isn't an appropriate form, but some form of due-process needs to exist in a workplace to accept the risk of failure.

Watching over this CREED I think are two "eyes." One "eye" is Information-sharing. It is a fairly simple concept, but it is an extremely difficult one for us to accomplish. I don't mean by information-sharing that the company comptroller comes down with a six-foot-high stack of computer print-outs and says, "Here's all of the information you wanted about the company. Take it; it's every piece of information available." What I'm talking about is that every person has at his fingertips the information he needs to do the job and do it well. Does every person in the organization, for example, know the mission, vision and strategy of the organization and what part of it they have responsibility for? Is there a common direction? Does everyone understand that common direction? How can we expect them to function effectively if they don't know where it is they're going? That's a simple statement to make and it is



extremely difficult to accomplish. Does everyone know the mission, vision and strategy? Does everyone have the same expectation of accomplishment? Have we got the information that we need to be able to make the decisions we need to make so that we are all moving in the same directions to produce a quality product?

And the second "eye" is Integrity. That is fairly simple, too. Walk your talk. If you say you're going to do something, do it. If you say you're not going to do something, well then don't do it. Don't say one thing today and another thing tomorrow, or one thing to one group and another thing to another group and expect to have people going in the same direction.

I think if one were to look at human resources from the traditional standpoint, the comparison might be to a packaged tour. Everyone hops on the bus and management makes the decisions about where we're going, what we're going to see, where we're going to eat, how long we're going to ride and where we're going to end up. We're sort of disengaged--only along for the ride. That has been the traditional human resource strategy. It seems to me that if we're going to compete in this global market, if we're going to really engage workers' minds, if we're going to produce quality products that can only be produced through those workers, we need to take that model and turn it into what might be called a "trek" or a "backpack." In that strategy, I, as management, am going to equip you, the worker, with a backpack, and it is going to contain the knowledge, the skills and abilities you need so that together we can decide where we're going, what we're going to see, how we're going to get there, where we're going to eat and what the end result will be. Engagement! You need to be a part of the decision-making process if I'm to get from you a quality product.

The future is not something out there waiting to be discovered. The future occurs because of each action or inaction that we take every day. So we

are creating our future day by day. And I would encourage you, as you listen to the rest of the speakers today and tomorrow, to listen to the workshops, ask the questions, to keep this CREED in mind about human resource innovation. What is it that we need to do in order to engage the human resources in these processes and apply that to the concepts that you hear from the other speakers today? Take full advantage of the opportunities you've got here today and I thank you very much.

**Department of Labor**  
**Office of Consultative Program**  
**Occupational Safety and Health Administration**

Lyn Haumschilt Mr. Collier is responsible for the Occupational Safety Health Administration' voluntary programs, which include the Voluntary Protection Programs or the VPP'8. This is a network of federally-supported, State-Operated Constitution projects and a new Model Plant Development Program. The VPP provide recognition of Worksites that have, or are willing to develop, Outstanding job Safety and health programs. The Constitution projects assist smaller employers in identifying and correcting hazards and improving their safety and health programs through the provision of on-site training. The Model Plant Development Program assists volunteer sites and industries with few or no models to develop as models.

Mr. Collier participated early in his career as a Management Intern in the task force that planned the establishment of OSHA. Prior to his current position. he worked in a variety of positions in OSHA, related to enforcement policy, program evaluation, state programs and personnel. He has a Master's Degree in Public Administration from the University of Southern California.

Joseph Collier It is a real pleasure and privilege to be able to talk with you. As people involved in an effort to look at human resource innovations in the shipbuilding industry, you are in a position to do a great deal in regard to improved worker protection in relation to injuries and illness. As many of you may know, there is a lot to be done, a lot of room for improvement in worker safety and health in the shipbuilding industry. The Bureau of Labor Statistics data for 1988 shows that shipbuilding and repair have the highest injury incidence rate in the nation--40.8 instances per 100 full-time workers. It is second only to special-product saw mills in the lost workday case rate--16.7 instances per 100 full-time workers. The focus on human resources is in a position to do a good deal about that record. I want to congratulate you on including worker safety and health on your Agenda. You are essential members of a team that needs to hone in on the improvements that can be made in the industry.

As you think about innovation in the use of human resources, you might do well to remember the results of a survey of employees that was published last year by a New York management research firm on what the employees thought should be the necessary goals for corporate performance. The number one goal that these workers decided was necessary to be carried out was safe working conditions. Among the employees surveyed, the goal of improved safe working conditions was placed higher more often than such goals as good benefits and good pay. That suggests that the employees, as clear members of the team that is needed to improve worker protection, are on the side of doing so. Also in the environment of intense competition that we've heard discussed this morning, it would do well to remember a story told by our Assistant Secretary for OSHA, Jerry Scales, in talking about the impact that job injuries and illnesses can

have on an employer's profits. He told of a CEO whose company profit margin is 5 percent and whose company's annual costs and increased workers' compensation costs due to injuries and illnesses amounts to \$14 million. To wipe out these workers' compensation losses, the company salespeople would have to sell \$280 million in products. And as I'll mention in a bit, that does not take into account all the hidden costs that injuries and illnesses impose on a company. It's just the workers' compensation costs. It seems, therefore, that there are plenty of financial reasons for management and other critical members of the team to be concerned about safe work, not to mention the more fundamental concern about the suffering that injuries and illnesses cause in the workers and their families. Given all of this good motivation, one is left with the question, "Why hasn't more been done about safety and health protection in shipbuilding?" One of the reasons that we frequently hear mentioned is the one that we also hear often also in construction industry--the working conditions change so frequently and the job is so inherently dangerous that you really can't do much about job-related injuries and illnesses.

I'm here to talk with you about a program in which it has been demonstrated that you can do a whole lot better than 40.8 injury incidents per 100 employees and 16.7 lost workday cases per 100 employees. A shipbuilding company in OSHA's Star Voluntary Protection Program had an injury-incidence rate of 17 instead of 40.8 and a lost workday case rate of 4.1. This incidence rate at Avondale Industries in Avondale, Louisiana, is almost 60 percent below the national average. And the lost workday case rate is more than 75 percent below the national average. Avondale is not resting on its laurels--it still has room and is still trying to improve--but what a difference it would make if the industry, as a whole, could do just as well as Avondale has done or is doing at this point!

Why hasn't it happened? I really suspect that you would have good ideas yourselves and better ones than I have. But one of the things that I suggest is that the people who are in a position to make something happen have not decided together that they will make it happen. The commitment to cooperation and action in regard to safety and health protection has not been clearly made. You are all in an excellent position in your own work to start this process rolling. I simply want to challenge you to do that, and with that thought in mind, to leave with you three sets of ideas about innovations to improve workers' safety and health in the shipbuilding industry.

Idea number one is a basic idea of the Voluntary Protection Programs (VPP) that I spoke of, and how your company could participate if you choose to do so. Number two is a description of OSHA's voluntary guidelines on safety and health program management that form the core requirements of the VPP, and number three is an idea for demonstrating to your bosses and colleagues how much impact effective safety and health management can have or is having in your businesses.

The Voluntary Protection Program is an experimental program of cooperation to form a new relationship between management, labor and government. There are currently three programs in the VPP. The Star Program is the most prestigious program, aimed at industry leaders. The Merit Program is a program used to guide employers towards the requirements for Star, so it's a kind of stepping-stone. And finally, the Demonstration Program is provided for those situations in which the current requirements for the Star Program are not appropriate to a particular industry. It provides an opportunity for someone to demonstrate that different requirements would provide equal protection to those that are currently used in the Star Program.

The VPP's purpose is to emphasize the importance of encouraging improvements in and recognizing excellence in effective safety and health

management. The basic idea that we are working with is that compliance with our standards is only the beginning in providing the kind of protection that workers need. It is only by well-conceived systems of management protection that protection will be thorough enough and strong enough to ensure that workers are, in fact, protected. The systems that we are talking about are the way in which all potential hazards of a worksite can be identified and prevented or controlled, and that worksites can become models for their industries.

To get into any of these programs, the management of a worksite must send OSHA an application that outlines how the site safety and health program meets VPP requirements. If it looks as though most of those requirements are met when we review the application, we do a three- or four-day site review with a team of three or four people. We look at records, and we interview various levels of management and various groups of employees on a random basis, and we walk through the worksite to check to see if, in fact, the program that was described to us on paper has been implemented at the site. The team then prepares a report that goes ultimately to our Assistant Secretary. If the report recommends approval, we provide an opportunity for a ceremony recognizing the fact that the particular worksite, working together with employees and managers, has achieved the kind of worker protection that puts it well ahead of others in the industry. Thinking of the kinds of cooperative-relationship experiments that Mr. Spring mentioned earlier, it is those kinds of experimental working relationships that really can thrive in the midst of a Voluntary Protection Program effort. One of the things we have seen is that the joint focus by management and workers on safety and health has frequently given a rallying point and a point of common commitment that has in many cases resulted in improved labor/management relationships at the worksite. The lost workday case rate in the VPP sites that we currently have in the program are only 30 to

40 percent of the industry average of each of the industries in which they are located.

In the VPP, there are currently 60 Star Program sites, 11 Merit Program sites and no Demonstration Program sites at this point. We've had an approval rate of about 80 percent. When a site applies for the program and we find that there are problems that are too great for them to fix quickly, we provide an opportunity for the application to be withdrawn. We return the application, so there is no lingering concern that OSHA will use the information we found in an enforcement action. As to the survival rate in the VPP, 81 percent have survived. The others did not survive mainly for such reasons as the closing down of a plant or the completing of a construction site. In the Star Program the survival rate was a couple of percentage points higher.

In order to give you some additional background on the safety and health management of the Star Program, I'll briefly run through the central core requirements which underlie the Voluntary Protection Program. They are expressed in what is called a "Guideline," published in the Federal Register on safety and health program management. It's a voluntary guideline in the sense that it is not a standard that OSHA requires companies to follow, but one that we recommend be followed. Underlying the guidelines is the notion that operational errors indicate a flawed management system. One of the favorite examples we use is, if you find a machine guard off of the machine lying down near the worker, you have several system failures that may be the cause of that. Number one, the employee who took off the guard may not have been trained to understand that that guard should not be removed. There you have the training area. It may be that there was never a clear work rule against taking that guard off. It may be that the employee actually did know all of these things, but the supervisor has just not enforced the guideline or the work rule that is

required. From there you can move right up the line in terms of looking at the management systems that have failed or may have failed as the basis for that machine guard being off.

Also underlying the guidelines is the notion that we do not want to simply wait to react to injuries that occur--we want to get out front and do analyses of the worksite to anticipate, as much as possible, where the injuries might occur and to come up with ways to prevent their occurrence. We find that the kinds of requirements or proposals that the guidelines represent are consistent with the work that has been done by Deming in relation to quality. Along the same line, the solutions for quality and safety and health problems are found in the striving for error-free performance.

The four basic guidelines of the OSHA program are:

- o Management commitment and employee participation,
- o Worksite analysis,
- o Hazard prevention and control, and
- o Safety and health training.

Management commitment and employee participation has the biggest portion of our concern. Included in that guideline as number one is a policy statement making it clear that the company's commitment to safety, in relation to other parts of the operation, is that safety is as important as production. That needs to be spelled out in a goal for the company and site, with detailed objectives for reaching that goal, and with clear and visible top management involvement. If there's a requirement for wearing hard hats, then when top management is on the site, top management wears hard hats. That kind of demonstration of involvement includes getting involved with workers and committees and tracking progress at the site. In talking about employee involvement (which does not deny the employer's responsibility), what we mean



are labor-management committees that are meaningful and active and get the employees involved in the structures, operations and decisions affecting their safety and health. Next is the assignment and communication of responsibility so that everybody in the workplace knows what is expected of them. Everybody needs to understand what they are expected to do so there is no confusion or overlap. Along with the assignment and communication of responsibility is the giving of adequate authority and resources to carry out that responsibility. It makes no sense to give responsibility if you do not provide the means for carrying it out. Then is a system for all managers, supervisors and employees to be held accountable for what they have been assigned to do. That involves rewards and corrections. We find that this is most important when we go out and do evaluations at worksites. One of the most important areas that many companies have not been clear about is the critical importance of holding everybody accountable for what is expected of them. Then, finally, an annual evaluation is the second thing that is frequently missed. This means stepping back at the end of each year and being sure of what has happened in relation to each of the management systems that you put in place.

The second major factor is worksite analysis, involving, first of all, comprehensive surveys to set a baseline of understanding about what kinds of hazards are present in the workplace. Another critical part of the effort is that whenever change is to be made in the facilities, equipment, materials or processes of the site, safety and health issues are taken into account. This is one of the things that Avondale Shipyard spoke to us about. It is one of the ways they have been able to hold their injury rates down. They always get safety and health people involved with the architects and engineers and others who are planning the manufacturing process or the assembly process to take account, up front, the hazards that might be put into place by these changes,

and to be sure that there are preventions or protections for them. Also included in worksite analysis is routine hazard analysis, including phase hazard analysis in situations when you move from one place to another. Finally, just routine, regular safety and health inspections and reliable systems for employees to report hazards; participation of employees and others in investigating accidents and near-misses; and analyzing patterns of injuries and illnesses and addressing them.

The third major factor is hazard prevention and control using engineering controls; work practices that are enforced with a progressively serious disciplinary system, if necessary; personal protective equipment and then administrative controls. Preventive maintenance is also included, to be sure that machinery does not become hazardous because of breaking down or whatever and finally, emergency planning and a medical program.

And then, under safety and health training, the key concerns are (1) that employees understand the hazards to which they and their fellow employees are exposed and understand their role in preventing anyone from being hurt because of the hazards, (2) that supervisors understand their responsibilities to identify previously unrecognized hazards, to maintain the physical protections that are placed in their work areas, to reinforce employee training through feedback and to enforce rules and (3) that managers understand their role in the process of safety and health. That is one of the things that we at OSHA feel we need to pay more attention--to the importance of managers understanding that concerns about safety and health need to be built into every management system that the company puts into place.

I think that that covers the basic guidelines that we use as part of the Volunteer Protection Programs. I will not be able to tell you about the method you can use to impress your employers on what impact such a program as

this can have. The methodology that I was talking about is contained in the Federal Register, Part II, Department of Labor, dated January 26, 1989. I suggest you review it if you are interested in demonstrating the number of injuries that did not occur because of the work that you have done in safety and health prevention. We typically look primarily at the injuries that do occur. If, however, you compare your record with what an average company of your size would have experienced, you can show to your management that you have in fact prevented X number of injuries. You can price out what those injuries would have cost if you had not prevented them and then you can show, in a stronger way, the impact of your program, and thereby gain support for increased investment in safety and health.

#### **Employee Involvement/Safety at Electric Boat--Groton**

Nancy Harris Our afternoon session begins with Chuck Rupy, who is a member of Panel SP-5 and is Special ASSiStant to the Vice President of Operation8 for General Dynamics Electric Boat Division in Groton, Connecticut. Actually, we are going to be having what is to be called a "chuck Rupy Hour.. He has a team with him to give US some information on Employee Involvement and Safety at Electric Boat.

Chuck has been with Electric Boat for about 26 years. His present major responsibilities are as Manager of the Strategic Weapon8 System8 Group for Trident submarines; the Operations Department person responsible for interfacing with blue-collar union officials and he is also the individual responsible for GD being awarded the 1989 Department of Defense Contractor for Value Engineering change proposals.

Charles Rupy I think our presentation will blend pretty nicely into what you heard this morning. The message this morning from various speakers was on the importance of integrating the major component of our business into our processes. That major component is our people. We think we did that very professionally and very effectively for the shipbuilding industry and specifically for our own Division at Electric Boat.

To demonstrate Employee Involvement, appearing with me today are six union representatives, namely Joe Messier, the President of our Metal Trades Council (MTC); Roger Dawley, the senior statesmen of our MTC in Groton and the head of our Carpenter's Local; and four of our five Team Leaders. I am the only member of management. The Team Leaders will be participating in this presentation. Just as it did with the task that we will be describing this presentation will also include Employee Involvement.

Under the auspices of Panel SP-5, we undertook a project in which our key objective was to establish Safety Action Teams that would go into various areas of the shipyard and attempt to reduce some injuries and some medical costs. There were really two major goals.

As an employer, you have a moral obligation to reduce injuries to your employees and, obviously, as a businessman, you want to make a profit. With today's astronomical medical costs, you have to attack that problem. We captured the results of this task in an NSRP manual. It is Manual NSRP #0301, dated June 1990. There are about 20 copies over there on the table for those of you who might be interested. It provides some more detail as to specific tasks and some of the things that we accomplished overall.

As I said, we have a moral obligation to protect our employees and we have a financial motivation to reduce costs. What we did was to rally around a theme--to try to send our employees back to their families in the same physical

condition that they came to work in the morning. That, in general, was our focus. Along with that, we recognized that in our business 60 percent of our costs are people-related, including salaries, fringe benefits, medical costs and compensation cost, to name but a few. In many other industries, that percentage is in the neighborhood of 20 to 30 percent. Accordingly, although we build submarines, we really are in a "people" business.

To give you an idea of some statistics, in the last 12 months our yard hospital had a little over 30,000 visits by employees for one reason or another. That is a huge amount of incidents. You can picture the amount of lost-time hours in just accommodating that population of injuries, not to mention the medical costs. Many of these individuals are referred out of the yard to other medical services, so those costs are in the high rent district and our workers' compensation costs are going through the overhead.

If you look at General Dynamics, we are the second largest defense contractor in the country and have in the neighborhood of 15 divisions. The Electric Boat Division alone represents 45 percent of the workers' compensation costs of the whole of General Dynamics. That has to tell you that building submarines is a lot tougher than building F16's or M1 tanks and so on. It is a tough business. We are working in a confined envelope where accidents are waiting to happen.

We started this project to attack this problem, and we have a lot more work to do, as you will see. What we thought was unique about this task which, by definition, was hard enough, was our startup environment. Electric Boat had just come through a 3-1/2-month strike with our major blue-collar workforce. That strike was not deemed successful by the rank and file. It was very discouraging; there was no real winner in any event. Further, during the 3-1/2-month strike period, we did something more to warm the cockles of the unions'

heart. We hired people to replace them, and a number of employees who were not very loyal to the unions crossed the picket lines. The major union-represented population returned to work 3-1/2 months later, with 1,500 people already in the yard who were not held in high esteem by the unions. That situation, coupled with the fact that, as I mentioned, there was no major gain in the resultant labor agreement, created a workforce that would not be described as a bunch of happy campers. Now we're going after them to say, "Hey, we want you guys to help us embark on this task to reduce injuries and save us some costs." They didn't really welcome that with open arms. However, the rank and file rallied around the issue on the basis of their belief that, independent of whether it saves a nickel for the company, we owe it to our membership to take this seriously, and to help reduce injuries to our fellow workers. The theme I mentioned earlier, about sending the workers home in the same condition that they arrived, was a good horse to ride for the union. Employees who did not directly participate in this task sometimes would chastise some of the team members, but the team members could always come back to say, "Hey, look, we're doing this for our membership not necessarily the company." That position stood the test of time throughout this task.

As to team composition, we had five teams--carpenters, electricians, painters, steel trades and pipefitters. We focused on three types of injuries - back injuries, eye injuries, and hand and finger injuries. Each team consisted of five union people, one foreman and one member of our Safety Department. From the outset, it was determined that one of the union people would be the Team Leader, and for four of the five teams, the Team Leader was a Union Steward. Accordingly, we weren't just working with the rank and file here, we were working with the union leadership also. To complement the teams, we had a Metal Trades Council Safety Representative who coordinated the activities of the five

Team Leaders, and also, from management, I was the management coordinator.

Based on the post-strike environment that I just described, we knew we had to do some things to prove that we were really serious. We had to prove that management was sincere and would listen to whatever recommendations bubbled up as a result of this task, and that the recommendations would be implemented.

My boss who, is the Vice President of Operations, and the General Manager both committed to the teams that any recommendation that they would come up with would be acted upon and, if not implemented, a rationale would be provided as to why it wasn't implemented. We had to prove that sincerity, and I think we were successful at the front end of this task. We had to show immediate results. We were not going to wait for a suggestion to bubble up and then wait for six months before we got management approval to implement it. As soon as a suggestion or recommendation came out of the teams, we would implement it or initiate implementation. If that meant going after more funding or whatever, we wouldn't wait for some presentation to upper management to explain the benefits of whatever recommendation came out. We had to do that to show immediate results. Obviously, we had to build a trusting relationship with the team members. There were a lot of hard feelings from the strike, as I mentioned. The immediate action here was to show that we understood their position and would show empathy for that as best we could. Another key component was to always keep the upper levels of the unions, as well as the upper levels of management, immediately abreast of what we were doing. So we tried to bond the upper levels of the management and the unions along with us while working on this task, and I think we accomplished that.

Our approach was, basically, to educate all of the team members in one session on just what type of numbers we are talking about as to injuries and the dollar value associated with them. We then had our Training Department train

each of the teams on how to look at data, how to use data, how to conduct interviews, how to conduct surveys, how to brainstorm ideas, how to present their recommendations to upper management, and so on. It was a training session up front to make sure the guys had the tools to do the job successfully. For some of the key evolutions where injuries were occurring, the teams would actually go and monitor those events and then go back and brainstorm how to either reduce the injury potential with new hardware or different procedures or whatnot.

A key component of this approach was the presentation to upper union management, as well as company management. We would like to show you today these presentations to upper management, including the General Manager and the vice presidents. They took about three hours, but we are obviously not going to take up that much of your time. We are going to show just a typical piece of one of the recommendations and how we presented that to upper management. Our Team Leader from the Electrical Team, Chick McCombs, will show you just one of the recommendations on how to band cables. He'll show you the previous method we were using, as well as the recommended method that came out of the teams.

*Chick McCombs* Good afternoon. We found that the most common cause of injuries to hands and fingers was in the preparations the electricians made in handling cable, for banding the cable on the submarines. While trying to make the bands tight, they have to pull on them. A lot of this material is very sharp. Our team determined that a way had to be devised to get the hands away from the banding material. We designed a tool that we call a "band-making tool". With it, an electrician can attach the tool and, instead of using his hand to pull on it, he uses the banding clip. The object is to pull the band as tight as possible, because after he is done with that process, he takes the other end and



wraps it around the cable, slides it through the clip and secures it. That was just one of the things that we came up with.

Chuck Rupy Thanks Chick. In the Phase I portion of this project, we had in the neighborhood of about 40 recommendations. We're not going to show you all of them, of course, but we are just going to touch on a few of them, like the band-making tool. I broke them into categories - what I call simple and then what I call more complex. Let's take the matter of work gloves, for instance. Consider, if you will, Mary Jane Pipefitter, who weighs 110 pounds soaking wet; she has a very small hand. Then consider Mike Tyson Pipefitter, who weighs about 250 pounds and has a hand like a foot. I'm kind of embarrassed about this, but in our tool cribs, we stocked one size glove. Here's a typical case where upper management is not aware of the situation, but the guys in the trenches are suffering hand and finger injuries because the gloves don't fit and, if they don't fit, they're not worn. Sometimes it takes a task like this to elevate that problem to where you say, "Wait a minute. Let's correct that." Sure, the guy running the tool cribs saved money in stocking one size glove so he looks good to his supervisors. Meanwhile there's other color money being spent in the injury area. So that was a simple problem requiring a simple solution.

The next problem area was failure to wear safety glasses. Our goal here was to have people wear their safety glasses more regularly. People take their glasses off for various reasons. For instance, traditional safety glasses are very functional and so on, and you can reduce injuries if you wear them. But, if you are some young stud and you want to look cool, you might prefer glasses with exotic frames. You could then bop around the yard, maybe line yourself up for the weekend or something. But anyway, we found that by making

safety glasses with more fashionable colored frames available, people were not only wearing them in the yard, they were going out to lunch with them. They would wear them out in the street while socializing. They became very popular.

Bob Lakowski from our Painter's Team will describe a couple other things here in line with that.

Bob Lakowski The Painter's Team recognized that people would bring their glasses onboard, but they would be losing them out of their pockets and elsewhere. We recommended that the tool cribs provide "bonkers" to the employees. A bonker is a strap that attaches to the ends of the frame of safety glasses and goggles, fits around the head and is capable of adjustment as to fit. Some of the positive aspects of bonkers are that they eliminate the frustration caused by the glasses slipping down the nose, reduce the number of glasses damaged by slipping off, aid in the fit of the glasses and act as a reminder to wear them. That recommendation was implemented, as was the recommendation on colored frames. The Painter's Team found that out of 11,000 injuries in the yard, the most common was the eye injury, with over 3,000 of them, costing the company close to \$120,000 in a 6-month period. We do not have the stats on the results of the implementation of our recommendations, but we feel that they are going to prevent a number of injuries throughout the yard.

Another recommendation that we made was for a tool bag. Because of the hatchways that the workers have to go through, what with ventilation tubes, welding leads and everything else in their way, the old method of putting your tools in your back pocket or carrying a square box was cumbersome. A simple soft-sided bag strapped over the shoulder improved maneuverability going through the hatch. We have now made the bag available in the tool cribs.

Chuck Rupy Thanks, Bob. Another recommendation that I categorize as a simple

one has to do with eyewash stations. In response to the Painters Team's recommendations, we strategically positioned about 30 eye wash stations around the yard. People can now get some immediate relief if they get some debris in their eyes. It wasn't to preclude them from going to the yard hospital, but it was to give them some immediate relief. If that relief solved their problem, they went back to work and didn't walk 1/2-mile to the yard hospital.

Those are examples of some simple recommendations. In the category of more complex, General Dynamics has embraced the TQM mode and, in the area of training, we looked at who the customer is. Is the customer the guy up there with the three-piece suit who has a big ego and is trying to impress people, or is the customer really the tradesman down there who we're trying to train either in injury avoidance or on how to do a specific evolution? So our Carpenter Team, taking that approach said, "Hey, let's look at our injury investigation theme, which was backs, with respect to training." I would like to introduce John Algieri, who was our Team Leader for the carpenters. He'll tell you what we structured with regard to back training for the yard.

John Algieri My name is John Algieri and I represent the carpenters at Electric Boat. When we were first asked to get involved in looking into back injuries, we had five carpenters on the Team, with one safety engineer and a supervisor. We had no idea what we were looking for. All I knew was that I was partial to back injuries because I am a three-time victim of a back injury. I thought that, since I was a victim, I knew what was going on. So we pushed really hard to look into back injuries. Like I said, we had no idea what we were looking for. We picked a team with the help of the Union President and our Business Agent and we ended up with 120 years of experience in the yard. We picked carpenters from different sections of the yard, because each section of the yard

performs different jobs. From that point, once we started meeting, we obtained from the company through their Health-Net process--a computerized list of injuries--a list of all the Carpenters who received back injuries during 1988 and 1989. On looking into them, we noticed that a lot of them were injured because of lifting. Due to the lack of specific information in the Health-Net, we had to go and investigate this a little more thoroughly. We said, "Well, what can we do to find out exactly how they got hurt?" We proposed to the company that they give us some time to go and talk to each individual who got hurt. Some of us said, "No way are they going to give us a blank check to spend that much time," but we proposed it to Chuck, and Chuck was very instrumental in getting this passed through. We took a good part of approximately a week and a half to two weeks to go down and talk to 40 people for approximately one half hour each time, with no pressure and no supervisor looking over our shoulder. We asked them basic questions like: "How did it happen? When did it happen? What were the conditions? Were you doing the job under duress? Was your supervisor screaming down your back, saying to get the job done in a hurry? What were the conditions and what kind of pressures were you subjected to? Were you briefed on any kind of safety precautions before you did the job? Was it a job that you did on a normal, day-to-day basis, or was it something that you just happened to be thrown into to get this job done because they needed to get it done right away?" Once we covered those questions, we also asked them, "When was the last time you went to a back injury prevention school offered by EB?" One hundred percent our of the 40 people could not remember. I myself could not remember; we had to look back through the records and it was discovered that nobody in the carpenters had gone to any kind of school for over two years. So we said, "Well, let's see what EB has to offer as far as back injury prevention class." We did that and we found out they had a 15-minute video. They took

about 40 or 50 people, just like ourselves right in here, shuffled us in, showed us a 15-minute video, shuffled us back out, just to meet their OSHA requirements for back training. We said, "We think we can do better." Well, some of us said that we were only carpenters; what did we know about back injury prevention? We said that we knew we could do better than a 15-minute video. So, through the help of John Bjorge, who is a supervisory trainer down there, we investigated a little further and one of us on the Team said, "Let's make our video; to hell with the one they purchased from an outside outfit. Let's get something made in here that people can relate to." We did. Through the facilities at EB, we looked up five individuals who had injuries in the yard--a back injury, a severe injury, incapacitating some of them, some who were no longer working there--and let them tell the rest of the students, in their own words, what it means to have a back injury.

We also developed and conducted a course on proper lifting techniques, using actual blocking and staging equipment. We demonstrated to the students the way you should pick up certain equipment. The students are very appreciative because, for a lot of them, this is the first time in their lives that anybody ever told them the proper way to lift. Then the beauty of the whole program is that, after showing them the proper way to lift, we had each and every one of the students come up and demonstrate to us that they learned something that day and that they knew how to lift. So, after we went through the hands-on with real equipment--nothing fake, no Styrofoam planks or anything like that--we had 70- to 80-pound planks up there for both one-man and two-man lifts. They got the feel of what it is really like. In some of the cases, people had never done any kind of work like that before because they were new hires.

We taught 750 carpenters in the course of about 1-112 months. The

teachers are people like myself who are their peers and who had no idea about teaching, We had some rough. times going through it, but we feel that the carpenters, at least from the indications they gave to us, are very appreciative that someone of their own peers would be standing up there teaching instead of somebody in a three-piece suit who doesn't have a clue as to what is going on. After we finished with the carpenters, we looked into the riggers. We're just about ready to teach the riggers basically the same course. The only thing that we are changing is the hands-on material. We are going to have shackles and come-alongs and things like that and go through the same gamut with them. Then we are going to move on to the pipefitters and we'll probably at that time have pipefitters teach their own.

chuck Rupy Referring back to the banding tool, we blended some community relations into its manufacture. The tool that we designed was built by a local technical high school. We gave the hardware to the technical high school, and the students fabricated them and gave them back to us. They learned something through the fabrication process--welding and cutting material and so on--and we got 200 tools free of charge, so to speak. It was a good teamwork effort by the community, the union and the management.

Our Steel Trades Teams thought that we have a lot of tough people in the yard who are not interested in looking at safety posters that portray cartoons. They felt that if we're going to put up a safety poster, let's make it realistic. On their recommendation, we are presently developing actual 35 mm pictures, blown up into posters, showing real life situations. For example, you could have a father giving a baby a bath in a bassinet and there may be some words saying, "It's nice to be able to see this; you don't have an eye injury" or something like that. The intent is to drive some real messages home that

will stick with the person, not a cartoon-type thing.

We have what we at EB call "EB Green" tape, and we use it for almost anything. It is very famous in the Groton area. I'll call on Wayne Peccini to show you one example of one of the recommendations that came out of this program with respect to this EB Green tape.

Wayne Peccini Everywhere you go and everywhere you work certain rules, regulations and procedures have to be followed. One of the procedures that we are going to look into today is Standard Shipyard Procedure SSP1.8, which covers maintaining cleanliness in pipes. Every pipe and valve that goes to a boat has to have stickers on it verifying that it has been cleaned. What happens now is that, once a pipefitter working on a pipe feels it is clean, he has to have an inspector check it out. Once it passes, it must be capped. Aluminum caps are put on both ends and the famous EB Green is wrapped around four or five times. Then the inspector puts a sticker on it, indicating the grade of cleanliness to be maintained and then covers the sticker with clear cellophane tape. The pipefitter then carries the pipe to the boat where he is going to install it. The first thing he does is whip out his knife to remove the sticker and tape. Twenty-two percent of our injuries were knife-related, so anything we can do to come up with keeping a person from using a knife is going to be beneficial. Our solution was simple. We recommended putting a tab on the end of the tape, which means you fold over the end on both the EB Green and the cellophane tape. When you want to take it off, you just peel it right off. Because it comes off so easily, you don't need to use your knife. That was the easy part. The hard part was getting the Standard Procedure (SP) changed. Anything that is written down takes an act of Congress to change. It wasn't until just six weeks ago that we finally got the word that it is written into the procedure. No pipe can

get to the boat unless it has these tabs on there. It is going to save a lot of time, which we weren't really interested in; we were interested in the injuries, and it's going to save a lot of people from taking their knives out and getting cut.

Chuck Rupy Thanks, Wayne. I'd like now to turn to problems experienced. Obviously, even though it sounds like we had a lot of fun here, we did have some problems. Middle management and first-line supervision were not always on the same horse that we were on. What was great about this task was that if we had a deck-plate-type recommendation that bubbled up, and it was achievable and reasonable, we wanted to implement it. Anyone who resisted was on a bad horse. It became necessary for them to become refocused so as to get aboard the right horse. As I said earlier, we had little difficulty in doing this because we had upper management backing us on this task. Sometimes middle-level management feels, "What do the trades know? They don't know anything. They left their brains at the gate," as we heard earlier. That didn't work in this case.

There is never a good time to spend money on overhead. We had some resistance periodically at some of the recommendations. There are still a few things hung up with overhead, but for the majority of the items, we corrected them. It doesn't sound today like we had a problem maintaining enthusiasm with these guys here, but, when you have a task that covers about a year and a half, you do have to light some fires under the people and generate some enthusiasm. We did that mainly by positive stroking, including the presentations that they made to upper management of both the union and the company. After those presentations, the batteries were charged and the enthusiasm level was enhanced.

In any large organization, like a school system or company or whatever, you have generic chain-of-command problems. We experienced a little



bit of that, but ours was nothing like the real world, because we did have a conduit directly from the deck plates to a vice president and even a general manager. You are all aware of those occasions where you have a problem at the deck-plate level, and in order to address it, you have to go through five levels or more of management. It is not unusual for someone to chicken out along the way. We didn't have that because we had deck plate input to a guy who talks right to the vice president, so there was no filtering of anything. It was a slight problem, but it was very easily corrected.

Looking at the cable banding evolution that we described from a dollars and cents standpoint, on a Trident submarine, we installed 132,000 temporary cable bands. We also installed 44,000 permanent cable bands. The injury potential with the new method has been considerably reduced. From the productivity aspect, we reduced the time to do each one of those evolutions by at least a third. On one Trident boat, you're in the \$60 thousand range just on productivity payback. As we said earlier, the prime mover in this task was not productivity payback. We went into the moral issue and the medical cost issue, but here we had a third by-product, which was productivity. Obviously, this helped to encourage upper management to continue with this type of task.

That is just one example. There are many other recommendations that we priced out and we also have a lot of projected savings in the medical field for the back training. When we compare historical data from a year after the training to a year before the training, we're going to see what kind of numbers we come up with and whether, indeed, the back training is bearing some fruit.

As I said before, the TQM approach was sort of an evolution here. We weren't thinking of TQM when we began. We then initially extended it to training. But what we're doing now goes beyond that. If you look at a procedure like welding using argon or something, that's a documented procedure.

It involves potentially life-threatening evolutions. That procedure has historically been written by the management types. It is put down on the troops--the tradesmen--and they have to comply with that procedure. If they don't comply by not turning off the gas when they're supposed to or whatever, they suffer consequences either by way of physical personal harm or discipline. What we at EB are doing now, as a by-product of this task, is trying to involve the union and upper management in writing the procedures. Sometimes we, the guys in the three-piece suits, lay down some rules that we couldn't comply with ourselves if we reversed the table. Applying the TQM approach, with the employees as the customer, they are going to help produce the document and make it the best document possible at the time. A by-product of that joint approach is that it is going to be reasonable with respect to discipline. Now we are not asking for a union approval for a procedure; we are asking for their help in generating the procedure. We're planning to do a lot more of that. It is an area where we're just scratching the surface.

That's what I mean about TQM. Peers listen to peers, as John Algiere said about back training. We thought that was a real key component of that training exercise. A guy that had experienced injuries in that particular trade was teaching that trade, not someone who had never seen a boat before. The credibility issue was addressed with peers teaching peers. That was a very important lesson learned.

Another lesson was that you should not embark on a task like this unless you have support. There are so many things that have to pull together that you could waste a lot of people's time and cause a lot of frustration if you don't have that support.

## Employee Stock Ownership Plans

Nancy Harris Our next speaker, Mr. Lenny Beauchamp, is the Director of Research and Collective Bargaining Services of the International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forger<sup>s</sup> and Helpers. He is going to speak to us On Employee Stock ownership Plans (ESOP's). Mr. Beauchamp began his career in the labor movement in 1966. His labor experience includes 24 years a<sup>s</sup> a member of the AFL-CIO affiliated union and 23 years the the International Brotherhood of Boilermakers, where he has represented the Boilermaker in a variety Of capacities. He ha<sup>s</sup> been on the staff of the International Brotherhood of Boilermakers for 16 years, with the last 7 year<sup>s</sup> as Director of Research and Collective Bargaining Services.

Prior to his current position. he was assigned to international Headquarters as an International Representative. In his present position, he deal<sup>s</sup> with all aspects of the collective bargaining process, being directly involved with <sup>a</sup> large number of Companies, primarily in the manufacturing sector. He has negotiated a number of plant closing agreements, as well as being involved in numerous negotiations with troubled companies, resulting in agreement<sup>s</sup> incorporating, among other things, gain-sharing and profit plans, revisions of established incentive plans and employee Stock Ownership programs.

Mr. Beauchamp is a graduate of the Trade Union Program of the Harvard Graduate School of Business, a member of the Bureau of Labor Statistics Labor Research Advisory committee and is a union Trustee on the National Boilermakers Industrial Health and Welfare Joint Trust. He interacts frequently with other labor organizations in the area of research and collective bargaining, including coordinated bargaining.

Len Beauchamp Well, thank you very much. I really enjoy the opportunity to speak to this type of group on ESOP's. ESOP's, as far as unions are concerned, have been viewed with mixed results, primarily because of some of the early dealings that some unions had, where ESOP's were established and pension plans were terminated. The programs were not well designed as far as the union's perspective or the employee's perspective, and there were a number of problems with them. The evolution of the union's views towards ESOP's is not unlike what happened in the areas of profit-sharing, incentive plans, gain-sharing and some other concepts where we had some bad experiences. People tended to withdraw and get away from them, as opposed to looking at whether or not they were fundamentally sound concepts, but were being used improperly. Currently, within the AFL-CIO, there is a tremendous variance as to what unions perceive ESOP's to be--good, bad, or indifferent. Many unions view ESOP's as management's means of coming up with a unique scheme to share the misery. Conceptually, you go into the situation with a leveraged buyout (LBO), for example, and someone comes in and says they're going to buy the company and need your cooperation to make this thing work, especially in a troubled or marginal situation like a divestiture or anything of that nature where the employees perceive themselves at risk in some manner--either of losing their jobs, substantial lay-offs, or restructuring--or the management people also view themselves at risk for some of the same reasons, someone comes in with an LBO arrangement with very little equity involved on the owner's part, a highly leveraged operation, and then says, "I'll tell you what I'm going to do for you. I'm going to come in here with this program to save your job, and all you've got to do is give me a 15 percent concession. For that, I'm going to give you some stock." And what happens then is, immediately this marginal or troubled company is saddled with a heavy debt repayment, a tremendous strain on their future cash flow needs and some kind of program that

is supposed recoup all of that.

Again, if the program is designed properly and if people understand what they are getting into, they can be useful tools. Some unions, including the Boilermakers, view ESOP's and other arrangements as a tool. Just like any other tool, if you try to use that tool for the wrong job, generally it will not work. Or, if it does work, it probably doesn't work very well. On the other hand, if you use the tool properly on the proper job, it can do a good job for you. It also involves the skill and the ability of using those tools.

There is another concern unions have. This is something that is not, traditionally, an area that unions have been involved in, nor do some unions feel, philosophically, they should be involved in. Because they are viewed somehow as a management over here and labor over there: you manage, we come to work; we get our compensation on the basis of our effort during the day at a pay rate, and at the end of the week, we collect our checks; if we want deferred compensation, we're looking at pensions or some other type of a defined benefit-guaranteed type of arrangement. So, the concept itself is foreign to some unions and they just don't like to get involved with it. But, like anything else, adversity tends to open one's mind at times. You are kind of forced into looking at things and a lot of unions who otherwise would have never had anything to do with ESOP's have become involved with them, purely by the fact that they had no other choice--at least as they viewed it at the time.

With this exposure, ESOP's are becoming very, very popular, not only in the LBO situation, not only in the troubled situation, but in other situations. Unions have started to look at ESOP's in more than a kind of "I have no other choice" approach. AS a matter of fact, we now have a group within the AFL-CIO that is actively pursuing a more pro-active role for ESOP's, seeing how far they can work into the entire scheme of collective bargaining and labor

relations. Furthermore, we recently had a meeting at the George Meany Institute for Labor Studies where we brought in various people from unions who have had some experience with ESOP's, and we have also brought in the professionals that they work with and feel comfortable with. You have to understand that when you get into the areas of finance, tax law, business plans and feasibility studies and in relating to professionals in those areas, unions are really not in an environment where they feel comfortable. It is not an environment in which they know people. If you have dealt with unions, you understand that developing a sense of trust or a sense of familiarity is very important in working with the union. If they do not feel comfortable with you, you can be the greatest thing since sliced bread and you're not going to get to first base. So we didn't have a large group of these people that we could really work with. Some unions were very concerned about that. They don't have the in-house staff to handle this kind of thing because, again, it is not an area that they are involved in regularly. We have the same problem when we get into industrial engineering, incentive systems, job evaluation and other types of work measurement systems. Unions have to evolve their expertise in these disciplines over a period of time, once they become entrenched in certain industries.

You still have unions today that, from a philosophical standpoint, will not have anything to do with any kind of work measurement system. But it's changed over the years, and I think you are going to see a similar change as it relates to ESOP's. As a matter of fact, in the area of ESOP's, one of the critical concerns is financing, as well as the ability to attract equity financing. As the unions view ESOP's, one of the problems is that if you come in, you should have some type of equity financing. There are a lot of places that the money could come from, as it relates to the employees. Generally,

unions are opposed to employees putting up any additional out-of-pocket money or deferred compensation such as their pension plan into an equity stake in an ESOP. I'll talk about that a little more in a few minutes.

One of the problems was trying to develop an effective source of funds. We have a group now starting to develop a concept called an "equity partnership arrangement" whereby we are trying to develop a fund from which we will draw union pension funds and other funds, to try to develop a pool of financing for these types of deals. And there again, that is a pro-active move on the part of the union, rather than reacting, waiting until the thing hits you in the face, and saying, "Now we'll scramble around. Where are we going to go get the money? What are we going to do?" That is an attempt that is being made right now. Some recommendations are going to be made in about six months as to some of the other areas in which we may want to take a pro-active role.

This evolution that is taking place in ESOP's really started in a negative situation; a lot of unions found themselves thrown into these things, not knowing anything about them and had a lot of bad experiences. Some became very close-minded. The ones that didn't get burned heard all of the horror stories about the ones that did, and you couldn't talk to them very much about it. That's changing. There are more and more unions that are involved in them, even the unions that take a national position against them. If you check those unions out you will find that they probably have ESOP's in their union, but they just don't talk about them, because they don't want to talk about them. But they are there--they are there in many, many unions. Sometimes they don't even know that they are there. That can happen. As I said, the Boilermakers view ESOP's and some of these other programs (like gainsharing) as something that can be used under the right circumstances. It is not a panacea for every problem. It is not the solution to labor-management cooperation on a macro

scale for every plant to have an ESOP, for every plant to have a gainsharing plan--that type of thing. In the right circumstances, they can be very effective. But that puts a burden on the union to become involved. They are taking a risk at that point, both the employees who are getting involved in it on a local level, as well as the leadership of the local union, the district or vice presidential level and, of course, the international level. They are taking a risk, they are becoming involved, they are becoming a part of that process as opposed to stepping back from the process and saying, "OK, you're doing your thing. Go ahead and do the best you can. If I don't like it, you'll hear from me." You know, we're used to doing that. We're letting the management deal with the problem and then we'll react. If we do not like your approach, we'll let you know. Well, you have to get out in front of the process in order to make this thing work.

In our union, for example, we have ESOP's in which the union has been very, very actively involved in setting up the program. We have some where we have had no involvement. We have had some where we were brought along kicking and screaming at the local or regional level because we didn't have any other way to go. So I think we can speak with experience from all of the different areas. We are also looking at and have tried, but have been unable to put together a deal in a company that doesn't have any kind of a problem. I'm talking about moving, purely on a real pro-active basis, where you just go out and decide you want to buy the plant. It's a good plant without problems and you want to buy into it. How does that happen? For an example, we had a unit where we did make an attempt, but we were outbid. A profitable division of a major corporation was being spun off. Originally, it was a closely-held company bought by this public corporation, and later on the public corporation decided that it did not fit into its strategic plan, so they wanted to get rid of it.



It wasn't because it wasn't profitable. You must appreciate that this was the second time these people were being sold, and they were very concerned. They decided to look into the option of purchasing the company themselves and, hopefully, thereby controlling their own destiny a little more down the road. They hadn't had too bad an experience with the first sale, but they were very unsure what was going to happen in the second sale. They also didn't know how many times they were going to be sold after that. They were getting very concerned about the long-term viability of that operation. People had been there 20 to 30 years and, naturally, they were concerned. We did get involved and put together a package for this one plant of four that the company was selling, either in a group or separately. We simply got outbid on it. But we've looked at that approach, as well, in addition to situations where we run into a troubled company.

One of the main considerations, in our judgment, is that the union has to decide what the goal of this ESOP is. The union has to decide that. Obviously, the management group or the buyer or the person involved in the ESOP has an idea or a goal. That's the first step. What are you trying to accomplish with this thing? Because that will drive everything else. ESOP's are not all created equal; there is no such thing as a generic ESOP. ESOP's can be developed for a lot of different reasons. One reason is financial; leveraged buyouts are an example that a lot of people know about. Another reason is tax advantages. There are considerable tax advantages in ESOP's when an owner is trying to sell his company and shelter or avoid some of his tax liability. By properly structuring an ESOP, he can get some benefits. So you really have to know what the union views as the goal here. Is it truly to have an employee-owned and controlled or employee-owned and influenced company? Is it simply to deal with a troubled company to try to save jobs? What is your long-term view

of employee ownership? Do you want this to be an employee-owned company for a long time? Do you want it to be an employee-owned company for a period of time, but then find a buyer and, in effect, make a substantial capital gain on your initial investment? There are all sorts of approaches to these things. Having an idea when you go in is really important to developing the proper plan and the proper approach. Employee ownership is not synonymous with employee control. There is a big difference. You can own something and have little or no control over it. That is why, in some cases, unions have pulled away from ESOP's. They tend to be considered employee owners for those aspects that are beneficial to whomever is on the other side of the arrangement. When it comes to actually having any say as to what goes on, any effective influence over any decisions or the way the deal may be structured, they may not even get any voting rights at all on anything. So there is a big difference between employee ownership and employee control. And if the union doesn't have a clear understanding of what they are getting involved in or if all of the people who may be involved, like the union workers, the white-collar or non-bargaining unit employees and the management, are misled into believing that they not only own shares of the company, but they are an effective voice in what goes on, and then they find out that's not the case under the way the plan was set up, some serious, serious problems would result. There have been some tremendous labor problems in ESOP companies where that has occurred. And you also have morale problems with the non-bargaining unit people who believe that this thing has been designed to give them this effective ownership control, ownership input, and they don't have it. It really becomes critical, so for the union to sit back passively and let this thing develop and then try to deal with the aftermath, simply does not make sense. We think you ought to understand what is going on initially, then decide whether you are going to be involved in it and, if you are going to be involved

in it, get involved in it. If you are not going to be involved in it, recommend against your people having any part of it.

ESOP's can be designed to exclude unions. Many unions don't want to be involved in ESOP's. There is a danger there, depending on the type of ESOP you are dealing with. For example, if a company comes in with an ESOP arrangement whereby they are going to leverage the company, the union is going to get the problem of the ESOP without any kind of benefit from it. If the company is leveraged substantially and the loan has to be paid over time, that's going to put a constraint on the union's ability to negotiate wages and benefits downstream. This is another area where people tend to lose sight of the long-term consequences of structuring an ESOP. The loan has to be paid, but if it is not and the lenders pull the plug on the operation, the very thing you were trying to avoid becomes a certainty. Banks have to be paid or they foreclose. Too many times people lose sight of that in their plans for the ESOP arrangement. If the union gets involved early on and understands what they are trying to accomplish and they know what their goals and the other party's goals are, they can structure a program, including the trust arrangement, the loan covenants and all the other things that have to be dealt with like types of stock and the issues involved in the ESOP, so that the people know what they are getting into, the chances of success are much greater.

Many unions kind of fade back from the issue of employee control, contrary to what a lot of managements think. Management people think, "Well, when the union gets into an ESOP, the first thing they want to do is run the company." Well, not really. A lot of unions have had a problem in dealing with the concept of employee control. How much control do you really want to get? Along with control comes responsibility, and the problem of making a decision or being involved with making business decisions that somehow affect the people you

represent. That has to be looked at. The next question is, "Do you want a majority or a minority interest?" Depending on the deal, a minority interest might be fine. If you really want to have some effective control, if you're afraid of the plant being sold six times, you may want a majority or other effective control against sale, if you have the block of votes necessary to stop it. If you start to get into control issues, you start talking about Board of Director issues. Do you want to be on the Board of Directors? If you're going to be on the Board of Directors, then who, specifically, is going to be on the Board--employees, union representatives, outside directors that are selected by the unions--who's going to be there for you on that Board? How much of that Board do you expect or can you expect to be able to deal with in a negotiation? Underlying all of this, you have to keep looking over your shoulder, because many of these deals require some kind of financing, depending on the type of deal. Then you have to go into the financial community and you have to look at your desires in light of what the financial community is going to be comfortable with.

Generally speaking, the financial community looks at majority employee-controlled ESOP's as the inmates running the asylum--they have a real problem with that. They are very conservative people by nature. The other thing, of course, is that when you go ahead and get involved in these things, the union has a responsibility to its members to make sure that they have people who are capable of filling these spots. They provide training and outside resources to support this program and, again, many unions are either unwilling or unable to do that which is another reason why there is a problem with them. If you are going to get involved in saving a troubled company, again you have to look at what type of concession or investment you're prepared to make initially. What do you reasonably expect to get out of that investment as far as a return

is concerned? Returns can be manifested in a number of ways. Saving jobs, in and of itself, may be a substantial portion of what you consider to be a return. Another consideration is that if this thing turns around, you can sell it in four, five years or six years, because you are not really interested in employee ownership down the road; you're using it as a means to get by a problem. That has happened and employees have done very well in those situations when they have been structured properly.

The other thing, of course, is, when you are looking at a troubled company, you have a double whammy. Usually, you are looking at an immediate investment or concession of some sort. Again, we do not believe in terminating pension plans and taking excess assets and buying companies with them or taking an employee's savings and putting them into the company. If, however, the people are making a concession, that in and of itself is an equity stake, because it is wages or benefits they would otherwise have received. In that case, those concessions can be looked at as an investment. Not only do you take that immediate hit but, as I said earlier, you must realize that this must be paid back, generally over five to seven years. There is a cash flow requirement there and, in effect, you are putting some limits on what you can bargain, and you have got to understand that when you go in. The other thing that must be considered is wage increases three or four years down the road. Are they going to be available? Some other things that have been coming up are the means of using ESOP's to avoid hostile takeovers or to deal with people who are inept and unable to properly manage the company. A classic example of a pro-active strategy right now is UAL, United Airlines. The airline pilots are using the ESOP arrangement as a pro-active means to eventually own the company, but they have had a couple of other strategic thoughts along the way. And they have dealt with a management they didn't feel was handling the company properly.

These are some of the things that a union has to consider going into an ESOP in order for it to really function.

Another consideration is that these things take time, resources and commitment on the part of all of the parties involved. They are not something to enter into lightly--at least, that has been our experience. The goal in one particular ESOP situation was to save a troubled company. It was a holding company with a number of operating units. It was a unionized operation in some aspects and they had some unorganized smaller facilities. We also had people who were concerned about maintaining their presence in the shipbuilding and maritime industry. The other primary goal was to develop an effective employee ownership plan with substantial employee control. The long-range goal was to maintain the enterprise as an employee-owned operation. There were twelve unions involved, including the Metal Trades with ten unions, of which the Boilermakers was one. The Metal Trades in that area asked us to come in on the international level. They asked me, specifically, to get involved and I spent about fourteen months dealing with this thing from the beginning to the end. Other unions involved were the Inland Boatmen's Union and the Masters, Mates and Pilots Union. The company was having some real serious financial problems and they finally filed for Chapter XI protection. Nobody wanted to be held responsible for this thing they called a "labor agreement." The union didn't want to be tagged with recommending to its membership that they vote in favor of an agreement that provided less than the prevailing rates in some of the other contracts: the management felt that they should have had a better deal and they didn't want to claim ownership of the thing either. They went to the bankruptcy judge, however, and said, "If you recommend this, nobody is going to object." So that is how they ended up getting their labor agreement, which did involve some concessions. From that point on, they started looking at developing an ESOP as

a method of dealing with their long-range problems.

Adversity makes strange bed-fellows. Considering the groups that were thrown together in this process, it is amazing that we were able to work as well as we did. If you understand your goals going in, a lot of problems that can get you off track won't get you off track, because you are going to keep sight of what you are trying to accomplish. If it is important enough to you, you are not going to let some petty differences or some personality problems or anything else get in the way of getting the job done. You have to approach these things from a pure problem-solving situation.

We developed the ESOP as a plan of the reorganized company. It became an integral part of that whole process. It provided us, in effect, with a vehicle to make the reorganization plan palatable to the major creditors and, without it, I don't think we would have ever come out of bankruptcy with a reorganized company. Another problem that we had was that we had no equity partner. We had nobody coming in with a bunch of money to get this thing going. We ended up restructuring a company completely out of debt--no new capital infusion whatsoever.

That was my first really close encounter with the investment banking community. And it was a great experience. These guys would make some of the worst management people with whom I have had to deal look pretty good. They are tough people to deal with. They deal with each other that way and that is kind of like the way the game is played. They'll go out there and tear your heart out, put it on a table and hit it with a hammer, and next week they'll go out and pat you on the back and ask you how your deal is going. But that is the name of the game with these guys--how they dealt with the creditors and how they dealt with individuals. It was really an experience. And we're talking about a fairly good-sized deal. We're talking about a company that had assets of \$100

and some million, debts about \$30 million and ended up with a company with \$70 some million. So it wasn't a small operation. We had major creditors: the U.S. Maritime Administration, six major banks and a number of unsecured creditors. So we ran the gamut.

The ESOP was set up with 73 percent initial ownership by the employees. The former owner had 5 percent with an incentive of 5 percent if he did certain things, one of which was to stick around to assist in getting this thing off the ground for a period of time. He had to be there for 5 years and he would get another 5 percent. The investment bankers got 5 percent with another incentive amount of 5 percent if they could generate an infusion of capital within a certain period of time. The unsecured creditors had 7 percent of the company. As I said, it was completely internally leveraged. The union had substantial ownership control.

There was an eleven-member Board of Directors. The employees had five seats; four went to represented employees and one to a non-bargaining unit employee. Of the represented employee seats, one went to the IBU, one to the MM&P and two to the Metal Trades. Of the six other seats, five were filled. For the year that I was on the Board, one seat, that of the unsecured creditors, never was filled. They chose not to take one. There were three management seats. We had a Chairman of the corporation, the CEO for shipbuilding; the CEO for tug and barge also had a seat. The investment banker had a seat. The Board members were selected as part of the plan of reorganization and were named in the bankruptcy documents. Inasmuch as it took us all this time to reorganize the company, it was decided that this first group should serve for one year. From that point on, the employee seats would be filled on a rotating basis by employees of the company. I was one of the initial members of the Board of Directors. Another Metal Trades member, one of our international



representatives, was also involved in the whole program from inception, through the plan of reorganization, to the coming out as a reorganized company. So, the next thing that we grappled with to was how the employee members were going to be selected. You have to recall that we had three basic union groups to deal with: the Metal Trades with ten unions, the Masters, Mates and Pilots and the Inland Boatmen's Union. You had really three groups, but one group had ten subgroups. Trying to get all of these people to agree on something was at times an herculean task and really created a diversity.

One classic example occurred when we were trying to establish the allocation of shares. Typically, the union is concerned about allowing the management to accumulate a disproportionate number of shares. If you go purely by Internal Revenue Service W-2 Form earnings, generally speaking, management people tend to be more stable in their position's and tend to have higher salaries. Therefore, they will tend to accumulate a seemingly disproportionate share of the shares. Well, we figured we had the foolproof method. We would go by W-2 earnings and, because of tax considerations, we figured we would cap it at \$50,000. That seemed like a reasonable sum. While the management guys were rolling that number around in their heads, all of a sudden, the representative from the Masters, Mates and Pilots said, "Len, we've got a little problem." I said, "What, is it too high?" He said, "No, you're only going to cover about 50 percent of our income." And I went, "What? Say what?" And, that was the problem. Here we had a union group--the Masters, Mates and Pilots--whose income level is substantial when you compare it to shipyard workers. There is no guarantee that they are necessarily going to make that kind of money--it depends on the season and how things go--but we had to come up with an answer. We resolved it by simply saying that it would be \$50,000 or the amount of the highest-paid employee covered under a collective bargaining agreement with the

company, whichever is greater.

These are the kinds of problems that you run into, especially when you are dealing with other unions, but also when you are dealing with nonrepresented and management groups. We had some very difficult decisions to make and reorganizing the company got very involved.

We had to make a decision as to whether or not to maintain a particular operation. It was ultimately decided to not include that operation in the plan of reorganization. It really adversely affected two of the unions; it did not adversely affect the Metal Trades. But again, they had to make a decision in this whole process as to whether they wanted to keep an operation that was of questionable viability. When it was agreed it wasn't wise, some of their people were out of work. Again, that is a problem.

The other thing we had to deal with was how management should be paid. I was in a unique position of being on the Compensation Committee, which determined the pay of the management people. That was another, different role that you would have to play.

We dealt with collective bargaining issues by excluding Board members who represented the union from voting on any collective bargaining agreements. As a matter of fact, three collective bargaining agreements were renewed while I was on the Board.

Another unique feature was that the President of the IBU became the Chairman of the Board of the company and served in that position until just recently. The owners who were originally there are no longer there. So the thing is completely changed, but it is still operating. They still have a concern about their cash flow restrictions. Many of the employees who were involved in the initial reorganized company are still there and, frankly, they have a great degree of interest in making this thing go.

It was an interesting experience, and that kind of gives you the feeling that, if this thing can work, I guess it can work just about anywhere. We haven't had complete utopia; we've had our problems out there; they get grievances; they have problems. We haven't had a labor dispute there yet and, hopefully, we won't.

That kind of gives you an idea of what we have been through, our view of ESOP's and what has transpired in an ESOP that has been going on for a couple of years now.

### **Congressional Insights**

Nancy Harris We are most pleased this morning to welcome Congresswoman Helen Delich Bentley to kick off the second day of this workshop. She really need8 no introduction. Her name is synonymous with the American Merchant Marine and the shipbuilding industry. For over three decades, Helen ha8 been in the eye of the storm on issues affecting maritime industries.

For 25 years following the end of World war II, she served as reporter and maritime editor of the Baltimore Sun. While in that position, she was a key catalyst in the rebirth of the Port of Baltimore. She produced two television programs; one was the award-winning program The Port That Built a City and a State, which was aired for 15 years.

Helen's expertise and interests transcended her beloved Port of Baltimore and her skills were recognised when, in 1969, President-Elect Nixon named her Chairman of the Federal Maritime Commission. While serving our country in that capacity, Helen presided over one of the most tumultuous eras in our country's maritime history. Landmark maritime agreement8 and policies were implemented during her tenure at that important regulatory body.

Upon leaving government service in 1975, Helen transferred her energies to the private sector, becoming President and Chief Executive Officer of her own international maritime consulting firm, HDB International, as well as serving as shipping editor for World Port Magazine and Public Relations Counselor with the American Association of Port Authorities .

During her private sector years, Helen continued to be in the forefront of those concerned about the maritime health of our nation and its ocean carriers, playing a key role in the implementation and passage of the landmark Shipping Act of 1984.

Upon her election in 1984 to the 99th Congress as the Representative from the Second District of Maryland, Helen once again found herself in the forefront of those members of congress, serving as vice chairman of the Congressional Maritime Caucus. She has single-handedly fought and won the many battles for enforcement of military cargo preference carriage and she is one of the driving forces in Congress to restore America's industrial base.

Helen serves on the Committee on the Budget, the Select Committee on Aging, as well as the Merchant Marine and Fisheries Committee, a key committee assignment which enables her to continue the leading role which she has accepted as protector of the U.S. Merchant marine.

The Honorable Helen Delich Bentley Good morning. I hope you all have been enjoying your visit here to Baltimore. I hope you have had the opportunity to go see our marvelous inner harbor and to see how we do things to improve all those points around the waterfront. Baltimore has been doing, I think, a spectacular job in many areas in making the people of Maryland aware of the harbor and what it has done over the years. However, we've got to do more in the cargo end, and that is what we are working on now.

But here at MITAGS, you're also at an institution of premier learning, one that certainly offers tremendous training facilities for men and women in this country. The one thing wrong with it, of course, is that we don't have enough American flag ships to provide the jobs and induce more people to get into the business.

I had a talk on the phone last night with Dave Klinges. He told me he had been here yesterday and we talked a little bit on some of the subjects you had talked about. I'd like to stick around today, but I see that I am not going to be able to. We have something called a budget problem in Washington and the war will go on, I'm sure, over the next few days.

One of the things that we did get removed from this Budget Reconciliation Bill last night was a horrible point about OSHA. Last night we did get thrown out of a bill, proposed by the Democrats, a provision that said that all OSHA violations in the future could become criminal violations. I could just think what that could do for industry, particularly for shipbuilding, but for any industry in this country. Sometimes I wonder who does these things and why they do them. Why would they even think of imposing that upon industry in this country, when industry is suffering enough just from trying to meet the basic OSHA requirements and what that adds to the cost of doing business in this country. There is no need for me to run down what is happening to the shipbuilding and ship repair industry in this country; you know it better than I. I have been fighting for it a long time. I always appreciate it when somebody like Nancy says she's been around for three decades or so. I think I've been around about a century. It feels like that, and when I look over what has happened during that time, I kind of feel like, well, it's all doubled up. We have been here that long.

But what I have been fighting for the hardest is your industry. This

country has a direct effect upon your industry, upon ship repair, upon shipbuilding, upon everything that goes with it. What I've been trying to point out loudly two or three times a week on the floor is that the United States really stands to be in severe trouble if we convert everything from a smokestack industry to one that stands on the quicksands of a service economy. That, unfortunately, is where I think we are going. But look at what is happening right now in those businesses that we classify as service in this country-- savings and loan, banking, etc. If you don't have things that you produce and you don't make things, they can't offset the losses over here. So these are among the reasons that we are facing not only a severe trade imbalance, but also a tremendous budget deficit that is gobbling us up. Now let me point out to you what that gobbling up is. Last fiscal year, which ended September 30th, the interest on the debt of this country was \$182 billion, the third largest item in the federal budget. This year, the fiscal year projected now, it will be \$243 billion, the second largest item in our budget. For fiscal year 1992, I would expect it to be the top item in the budget, unless we take some very drastic steps now to get the interest rates down and cut that sharply.

These are some of the reasons that it has been very difficult for industry in this country to get rewed up. The cost of doing things here, with the high interest rates that we have been paying, makes it very difficult to be competitive, as you all know. I'll just cite an example of Bethlehem Steel, which is also the site of the Sparrows Point Shipyard. The Bethlehem Steel Plant here was just about teetering on the edge of closing down a few years ago. It was only because Bethlehem was able to get a \$250 million loan from Austria at 9 percent interest, plus making the continuous caster. Bethlehem had to take the money and buy the continuous caster there (which was fine) and install that here. It is only because of that that the steel plant has been able to survive.

They have been able to turn out quality products and be competitive with others. what that really points up to me is the need to have sources here that can help in financing our industrial needs. It is one of the reasons that I have been pushing for something like a Marshall Plan to try to do something for this country. you know, they talk about our yards not being competitive. They can be competitive. They blame it on everything. It was true yesterday and it is true to a degree today, but many changes have taken place in the meantime; many changes of management and labor working together, etc. Those gaps have closed but the gaps that haven't closed are the gaps of subsidy by the foreign countries to their industries. I get so angry at our "free traders" who keep saying, "Well, you know, you've got to compete, etc." They **never stop** to think that what we are doing here is putting up a private company--a privately-operated company--against a company overseas backed by its government, which provides financing, subsidies of all kinds, etc., etc. And this is true not only in shipbuilding and ship repair, it's also true in many, many other industries. The free-trader mentality of our bureaucrats and policymakers, I say, is what has been putting many of our U.S. industries into extinction. While the Federal Government here took the unilateral step of eliminating Construction Differential Subsidies (CDS) for commercial shipbuilding ten years ago, the yards overseas have been stepping it up for themselves. They give direct and indirect subsidies and, as a result today, there are some 1,800 merchant ships **on** order in yards all around the world. In the United States there is one, and that is from Matson. If we didn't have the Jones Act, that one wouldn't be on order either, and there are some people in the government right now who would like to wipe out the Jones Act.

When I ran for office, I ran on the basis that I was going to get the deeper ship channel into Baltimore. This fall we'll finish it. So we have

succeeded there. And I can tell you that, after they have had a high-priced funeral for me, then they can get rid of the Jones Act, but not until then. You had John Stocker here yesterday, and I know he discussed with you the efforts that we are making through the U.S. Trade Representative's office on trying to force these countries to get rid of their subsidies and their assistance. I'm not terribly optimistic about that because we have already gone by two deadlines and they have failed to come through. One of the reasons they're back on track talking right now, saying, "Maybe something will happen between now and December 14th" is the fact that Senator Mikulski and I have spearheaded a bill that is aimed directly at those countries. It is a shipbuilding-ship repair bill to help the industry here. After we had introduced that bill (I won't go into details of it now), these countries got back on track in negotiating with the USTR and they said, "Maybe we need to do something." I can say, in all of my years of experience in dealing with the foreign countries and dealing with others, the only way you can get them to do anything is under pressure. In Washington, I'm called a "Japan-basher" and I tell them I like the title. But I tell them that they are not really being honest when they call me that because what I am really demanding is fair trade. I'm really demanding two-way treatment. I recall back in 1974 when I was Chairman of the Federal Maritime Commission, the Japanese steamship lines wanted a particular agreement that they have to get if they are serving this country. The American steamship lines representative complained to me, "Hey, you know we're really getting ripped off over in Japan. They don't let us dock when we should. They hold up labor. They give us the worst terminals. They won't let our high-cubed containers go down the streets of Tokyo, etc." So I said, "Well, fine. We won't let them operate here until they do this." So, I went over to Japan, leaving on a Sunday from Seattle. We arrived in Tokyo on Tuesday morning, their time, and went into



negotiations immediately. By the end of that night they were not going to do anything; they were going to hold firm. I said, "OK. Sayonara. Good-bye. I'm leaving." They knew then that we meant business. They came back to the airport and called us back and we went back in the next day and we got an agreement out of them. They maintained the terms of that agreement until I no longer was Chairman of the Federal Maritime Commission. Then they went back to some of their same practices of treating the American line operators that way. You have to hold their feet to the fire, and if you don't, they have no respect for you. We in this country are just letting them get away with whatever they want to do, without demanding and requiring fair and equal trade. That's one thing we have to get out of this USTR agreement.

It is another reason why many of us have been fighting against the GATT negotiations now going on in Geneva. The GATT people don't know what the maritime issues really are. When I've seen some of the negotiations that have come out of GATT on other items, I just feel like we are going to give the whole store away. Well, really, the store is almost gone, but let's not close the door on it and give everything away. This is another arena that we are trying to close up.

Going back to the legislation that Senator Mikulski and I introduced, this is where you can be very helpful next year. We need to push that legislation. We need to do it in order to rejuvenate the shipbuilding and ship repair industry of this country. We need to make certain that those foreign countries remove their subsidies. This is the only way that we feel we can do it. You all have employees in your companies. You all have employees in other companies with whom you do business. The only way I have found to get things done in Washington is through pressure. In Washington, people pay attention to pressure, pressure from the voters. You need to get after your members of

congress and your senators early in the new year, when we have got new bill numbers on that legislation, and get your people to participate and help push these bills through. It is the one ray of hope that I feel is left for this industry.

The other is that I think we are going to be able to get some activity next year on the Bennett/Jones/Bentley Bill. That is aimed at reviving the shipbuilding industry as a result of the extensive, four-volume report of the President's Commission on Merchant Marine and Defense which was instigated by Congressman Charles Bennett and headed by Senator Jeremiah Denton. The reports were finished in 1988, and we've been sort of floundering since. We do have a good bill, but nobody really wanted to pay any attention to it. Now that we have Operation Desert Shield, everybody is saying, "Hey, you know, maybe we have been wrong. Maybe we need to do something more about sealift." I think that there will be a chance next year of getting both of these pieces of legislation through. But we are going to have to have help from the voice of America, and that is the people--the people who are affected by it, the people who will be affected by it. So as soon as these two bills are reintroduced, SNAME, I'm sure, will get the word out to you. Please don't fail to get busy and push your people to write in on it.

I've been involved in fighting a number of bills and in trying to get others through on a variety of issues, and let me tell you, the attention is paid by the members to the mail and phone calls that come in from their constituents. I don't care what the issue is. But that has to be done. And the one criticism that I have had of this industry (since I've been around it for a hundred years) is in their lobbying. They leave their lobbying too much to the small cadre in Washington. Even though they are very good, the attention is not focused until the word comes from the grass-roots.

a good example was the textile bill that we got through. It was voted in by 272 votes on the House side. In order to override the veto by the President, however, we had to have about 300, and we couldn't get up to the 300. The reason I was fighting very hard for the textile bill was, again, this was an American industry that was being hit unfairly by imports. We already were receiving 60 percent of the Third World countries' exports of textile, the European Community only accepted 25 percent and Japan has only accepted 6 percent. They want to open our doors wider, but this is an important basic industry, and it is all part of the same premise. I told those who worked very hard on lobbying for it, "Where you made your mistake was that you didn't bring some busloads of textile workers from the areas where you needed the votes up to the people who were sitting on the fence and who could be turned." The lobbyists are fine, but the members need to see their voters. And let me tell you, ladies and gentlemen, it does make a difference. And that is the type of thing that this industry has to do more of. They have not done it over the many, many years that I have been around. When I consider what has been done in the lobbying effort versus where we are today, the industry has probably been lucky to survive as well as it has. Don't forget that you need to bring in all of the people and we need to keep reminding people that it's not just the shipyard down here, it's all of the other industries that benefit from it. It's not just those who are in the engineering department; the engineering office can't keep going without all of the backup. Those are the types of things that we have to tie in together.

## Employee Involvement and the New Manufacturing

Lyn Haumschilt Dr. Gaffney is the Director of Cornell's ILR School's Programs for Employment and Workplace Systems. He divides his time between teaching, research and providing technical assistance for the University to companies and unions throughout New York State.

Mike is a graduate of the U.S. Merchant Marine Academy, so he understands the arena that we are in. He worked for several years as a licensed officer aboard deep-sea commercial vessels and as a pilot on the Great Lakes before becoming an anthropologist. He has an M.A. from the New York School for Social Research and a Ph.D. from Ohio University.

It was during an anthropological study of the merchant seamen in northwestern Europe that Mike was introduced to the field of employee involvement and work redesign, which is his current specialization.

Mike joined Cornell University seven years ago from the National Academy of Sciences where, as a Senior Staff Officer, he had worked with maritime management, union and government leaders, and on plane for work design in the U.S. ship operating and shipbuilding industries. He has continued his maritime activities and is currently serving on the National Research Council Committee, investigating the safety implications of reduced manning vessels--a committee that has taken on more significance since the grounding of the EXXON VALDEZ.

Mike has recently published two monographs on work design in shipping for the U.S. Department of Transportation Effective Manning in Asia and Effective Manning at American President Lines. He has also recently collaborated with Dick Walton of the Harvard Business School in two publications, a book, Innovating to Compete, and a paper in the American

Behavioral Scientist, "research, Action, and Participation.'

I would like to make all of you aware that Mike was SP-5's first Program Mnager. During the Panel's gestation period, prior to its first meeting in April of 1984, Mike was tht panel's most active missionary. He visited fourteen shipyards at management's invitation to those yards, spreading the gospel on human resources innovation and winning over many of the converts to ths new religion. The Panel is deeply indebted to Mike for those and many other efforts on its to behalf.

Dr. Michael Gaffney Good morning, everyone. It is nice to come back and talk with shipbuilders. It has been several years since I have had that opportunity. The subject that I want to talk to you about today is Employee Involvement (EI) and what has become known as World Class Manufacturing (WCM).

I was hired and came to Cornell seven years ago because of a significant loss in manufacturing jobs in New York State. You might recall that such losses were occurring throughout the Northeast. The University was receiving some pressure from its alumni and the Trustees to do something practical to address the problem. Six of us, I from the National Academy of Sciences and five other folks from different industries around the country, were hired and formed sort of a SWAT Team. When companies would announce that they were shutting down a factory or a product line or were going to start up a "Tex-Mex" operation or were going to outsource to Asia, our job was to work with both the union and local management to see if we could assist. We looked for ways to bring about significant cost reductions, so as to convince the corporations to keep the jobs in New York State. We had some success in that, but the model we followed was very much the QWL, Quality of Work Life, model. In fact, a book was recently published describing three of the cases, Trico Corporation--they

make windshield wipers--Harrison Radiator and Xerox, where this technique was used. Mind you, the challenge that was offered in all of these cases went like this, "Look, we've made a decision; we're going to get rid of these jobs. If you guys can do what we have not 'been able to do--figure out how to take substantial costs out of the operation--we'll consider keeping the jobs here in this State." So my colleagues named the book A Fighting Chance. I thought that was a wimpy title; I thought a better title would be Take This Job and Save It. But, that was considered not to be very academic and so I lost.

I mention it now because there has been a dramatic change between 1983, when I came to Cornell, and today in terms of manufacturing management's view of the world. In 1983, the prevailing philosophy was, "We're good at marketing. We're good at engineering. We definitely want to hold on to those functions. But we're lousy at manufacturing. We should give it up; just get out of the business and have it done offshore, overseas, or down on the border." That has changed dramatically now. Management now has a new religion. Early in Panel SP-5's development, it is fairly accurate to say that I was sort of a missionary. But now everybody seems to have the religion. Employee Involvement was kind of a strange thing in the early days of SP-5. I remember a number of people in SNAME having some problems with the notion. Now, however, it seems to be fairly mainstream and there is this World Class Manufacturing phenomenon that is sweeping the Nation and Europe. There is a substantial difference between management's view now and management's view then. I see it as a good news/bad news story. The good news is that, now, management in this country, at least in manufacturing, has a plan to stay in business. The bad news, and that is really what I want to talk to you about, has to do with the problems with Total Quality Management. In many cases, these programs that are put in place are rather superficial and not very effective. I am speaking primarily on the basis of my

travels in New York State. I teach at the University, but most of the time, I am on the road in New York or around the country knocking around in plants, mostly manufacturing plants, talking with unionists and managers on how to make this thing work. So, what I wanted to do with you this morning is just cover some of the insights that I have had, and since I am also an anthropologist, I've couched it in anthropological terms. Nevertheless, I think you will find it interesting.

What I want to do is talk about this transition from the QWL days, which was the environment in which Panel SP-5 was formed, to today, which I call the World Class Manufacturing days. I want to focus on three issues.

(1) How is WCM like the Melanesian Cargo Cult? I'm sure not many of you are familiar with Melanesian Cargo Cults but I'll explain that in a moment.

(2) Does Total Quality Management (TQM) plus Just-In-Time (JIT) plus Teams equal Management By Stress? A year or so ago, that was quite a bit in the popular press, especially with regards to the auto-assembly industry that this new approach to manufacturing was in fact causing stress, especially amongst its unionized employees.

(3) What's happening to participation? I would suggest to you that there is a lot of talk that "people make it happen" and "Employee Involvement is essential" but, in many instances in my experience, I am actually finding a loss of participation, especially in the bargaining unit ranks. Some managers are having real problems with involving the unions in this movement. They had less problem with it when it was just QWL. Now that it is the main operating philosophy of the company, they are a little nervous about working with the unions. We can talk about that.

During the QWL days, the focus was on job satisfaction--making the workers happy. Productivity was felt to be a spin-off benefit, but I can

remember when use of the term "productivity" was forbidden. In some cases, these *QWL* labor-management agreements were contained in memoranda of understanding or agreement and the term "productivity" would never appear. You weren't allowed to say it because it was not the main reason that companies and unions were getting involved in it. In those days, there were Quality Circle Groups and Labor-Management Committees. Now, with World Class Manufacturing, which I would date from the early 80's, and certainly we're in the middle of it right now, the focus is on productivity and quality and efficiency. The idea of job satisfaction and quality of work life hasn't been entirely lost, but it is really secondary. I know of some large corporations who have instructed their people not to use the term "quality of work life" anymore. It's been wiped from the record because it carried with it the tone of job satisfaction and just sort of playing on the fringes and not really getting down to business. Components of World Class Manufacturing are this Total Quality Management or Total Quality Control, and I'm sure everyone is familiar with that, so I won't describe it here.

I'll mention Just-In-Time (JIT). I don't know if it has too much application in shipbuilding, but it certainly has a large application in manufacturing. The basic notion is there are lots of efficiencies and monies to save if we don't build pieces and parts in large quantities, but rather wait for your immediate customer to request certain parts or a service before you produce that service.

Next, let's take work teams. This is becoming immensely popular now. Work teams take various forms; some self-managing, some not. They go by many different names, like "focus factories." I got a call just last week from a bargaining-unit fellow at DuPont who was calling for information. He said that his company, about a year ago, had announced that they were going to set up the



whole production operation with work teams. They were going to be a team-based system. He didn't know exactly what they meant by this, so he got out his American Heritage Dictionary to find out what the term "teams" meant and he read them to me. He said he was still not sure which of these definitions applies to his company. The first definition of teams was, "two or more draft animals used to pull heavy equipment." The second definition of teams that he gave me over the phone was (this is my favorite), "a group of animals used to perform or on exhibit." I know a lot of teams that fit that very well. The third one was, "a group of people playing a game," and the fourth one was, "a group of people organized to do work." That, of course, is the definition that we hope gets operationalized. I thought I knew all of the acronyms in this field but it is burgeoning so quickly.

In a nutshell, what I'm going to try to do this morning is to draw a connection between Deming and Juran and the concept represented by a Melanesian Cargo Cult. Let's first talk about this whole notion of cargo cults and Melanesia. What I am going to suggest is that this World Class Manufacturing revolution has many parallels with what anthropologists have described as revitalization movements. Basically, the origin is the recognition that, in most cases, cultures change rather slowly. Whether we are talking about a national culture, a village culture or a corporate culture, it is a very slow, self-contained process, barely perceptible to the eye. It is neither a deliberate, nor even a conscious change process. It is just a continuous modification corresponding to changes in the external environment. Anthropologists use terms like "evolution" and "drift" and "diffusion" to describe that. Some culture change, however, occurs when "slow and steady" just doesn't cut it. The external environment has changed so fast and so dramatically that it grabbed you around the collar and shook you so hard that

societies actually undertake a deliberate, conscious, almost overnight change in their culture. This is what anthropologists call "revitalization movements" or "crisis cults." This is a description of what it is all about and I quote from a work by Keesing and Keesing in 1971:

A tribal people in pre-European days simply took their view of the world and their patterns of custom for granted, as the proper the way for the world and man to be. The white man's intrusion and dominance led a tribal people to perceive their culture as a way of life - not the way of life. And it was a way that no longer worked or satisfied new demands.

The point is that, in many cases, people immersed in a culture really see their culture as being the only proper way to live. When such people, especially pre-literate cultures, get shocked by the appearance of white men who have vastly superior technology, it causes them to say, "Hey, wait a minute. Maybe the way we do it isn't the only way or necessarily the best way." So, having to come to view their culture as a "thing," they could reject it as having withheld wisdom, wealth and power from them. And I'll talk about cargo cults in a moment. Or they could glorify it as a state of grace from which they had fallen.

Melanesia is that part of the Southwest Pacific, just kind of northeast of Australia around Borneo. It was a large staging ground for the Pacific Campaign in World War II. There were a lot of American bases there, and even before that, a lot of Western missionaries. The Melanesians were Stone Age peoples. With the tremendous influx of the American servicemen and their technology and their food, they very quickly adopted many Western ways. And then, when the Americans just as quickly pulled out, as the missionaries did at one point earlier in their history, it left them without the basis of their traditional culture. You had very strange things happening. You had certain Melanesian charismatic figures going off into the bush for periods of time, having trance-like experiences and talking to deities and then coming back and

announcing to their people that God had given them a new plan, a new set of directions. In the case of Melanesia, the people made uniforms to look like American GI khaki uniforms. They cleared whole stretches of jungle to make dirt runways. They carved rifles out of sticks, formed up into platoons and marched up and down in the jungle to make planes come and bring cargo. Hence, the whole notion of cargo cults. What is really dramatic is the extent to which their culture changed, including even the way they reckoned their lineage. Everything changed almost overnight.

It is all quite similar to what happened during the last days of the North American Indian wars. After the buffalos were largely gone and the Indians were making their last ditch stand, again, a similar phenomenon happened. Certain charismatic leaders would go off into the plains, I guess, and have hallucinogenic experiences and commune with spirits and come back with new instructions on how the culture should change. In this case they were told that they needed to do a certain dance that would bring the ancestors back from the dead. That was also characteristic of the cargo cults in Melanesia. The ancestors would come back from the dead, and the society would regain a state of prominence that it once had. In the case of the Indians, the ancestors that would come back from the dead would help the Indians to finally defeat the white man, drive him into the ocean. You remember those B-grade movies where you would see Plains Indians just charging into murderous Calvary fire--I mean just right into it--and being killed by the thousands. That, in fact, did happen during this period. Before that, the Indians would hide behind a rock. But during this period, it was just a charge, because they thought their ancestors had made them invulnerable. The fact that so many got killed didn't seem to make much of an impression because they kept on coming.

There is a lesson there for Total Quality Management that we will get

to in a moment. Again, quoting from Keesing and Keesing:

Such a resynthesis, a quest for new integration requires a doctrine - and it is at this point that a prophet entering the scene, combining old and new symbols, can create a cultural revitalization.

Quoting now from a 1956 work by Wallace:

A revitalization movement is defined as a deliberate, organized, conscious effort by members of a society to construct a more satisfying culture. . . . The persons must perceive their culture or some major areas of it as a system (whether accurately or not); they must feel that this cultural system is unsatisfactory; and they must innovate not merely discrete items, but a new cultural system, specifying new relationships as well as, in some cases, new traits.

The point is that cultures, whether corporate or societal, have to make sense. That is the function that cultures provide for us. They give some order to chaos and some assurance to the anxious. Sometimes they do not, as when a society is under stress, especially when that stress is induced by foreign elements, although it can also happen for political reasons, economic reasons and natural disasters. I just mentioned cargo cults and the North American Indian situation, but this has happened all over the world in just about every society that we know of and in many historical periods.

One way to cope is to create a new or changed culture almost overnight. An essential component in doing so is that an identification or a model must be chosen. One option is to revive an earlier system. These are "Nativistic Movements". Examples are the North American Indians. They actually reached back into their pre-white-man contact days and revived some old traditions. The Boxer Rebellion in China is another example. In the contemporary Mid-East, this whole notion of fundamentalism in Islam can be viewed as a revitalization movement or a crisis cult, although Muslims don't like it when you use the term. I made that mistake recently at Cornell. I called it "fundamentalist Islam," And they said, "Fundamentalism is a Christian

concept. Don't apply it to Islam." And so I never will again, believe me.

Or you can import elements of a foreign system. That is, you can actually adopt many of the characteristics of the culture that is causing you the stress. In that context I'll introduce Handsome Lake, because it was next door to where I lived in central New York State, in Ithaca. Handsome Lake was a charismatic leader of the Iroquois who, you will remember, made a serious mistake in the Revolutionary War--they fought on the wrong side. They sort of reaped the results of this mistake by losing a lot of land and coming under a lot of stress. In 1799 Handsome Lake went into the woods, had a vision and came back with a whole new plan: "No longer would we live in the long house and no longer would we trace our lineage through the matrilineal side and no longer would it be inappropriate for men to garden." Prior to that, women were the only ones who did any of the horticultural work, men were just for fighting and for hunting. Well, the fighting was over and they lost and, in fact, the hunting was dramatically cut back because of the presence of white men in the area. He said it was OK to learn English and it was OK to form conjugal families. Overnight the Iroquois culture changed.

So the choice of a religious or secular context determines whether you are going to rely on human or supernatural forces to pull off this big culture change. Often religious models are chosen, but even when they are secular, as I am going to describe in a moment with regard to manufacturing, there are really interesting parallels with religious models. Consider the leader-follower behavior, the importance of doctrine, the whole process of conversion, confession, moral purity and even this sort of millennial notion of the world coming to an end, or being reborn and regaining lost prominence.

So now I am going to talk about manufacturing. Manufacturing culture in the last ten years in this country has been under significant stress. As I

mentioned earlier, when I moved to New York State, the common approach was to give it up, just get out of it. Now another approach is to revitalize and these quotes are what managers tell me as I visit plants around the country. "We are in crisis;" "traditional ways of managing are no longer viable;" "nothing less than a culture change is required;" "this is a survival issue--our last hope." World Class Manufacturing, therefore, is a deliberate effort to change our manufacturing culture by modifying the entire system of manufacturing. This is not just playing on the edges; it is hitting to the core: philosophy, values, organization, work process, everything. It is deliberate in the sense that, whereas QWL used to be just something that a plant could experiment with, here we are talking about corporate policy. This stuff comes down from on high. Actually, that is good news and it is bad news. It is good news in a sense that there is a real corporate commitment to it. It is bad news to the extent that it doesn't allow much room for local experimentation and development. It is part of the strategic plan. World Class Manufacturing today is the strategic plan for any manufacturer that I am familiar with. It has caused the creation of new high-level management positions. In places where I've spent time, like Kodak, Corning, Xerox, there are now vice presidents for quality. I have even seen vice presidents for excellence (which, to me, begs the question of what the other vice presidents are about). We are talking about a huge investment in money. Corporations are putting their money where their mouth is on this one, which wasn't always the case in the QWL days. When I came to New York, Corning was probably a state-of-the-art trainer. They dedicated one to two percent of their payroll to training. Now they are up closer to between five and ten percent. The amount of training that goes into changing manufacturing culture is just immense. It's incredible. It involves the entire system. It's a universal way of thinking and includes all functions at all levels. Again,

these are managers talking to me; they say now, "This is the way of life. This is the way of looking at the world. It's a new mind set." And in many respects they are reacting and in some cases over reacting, to the old QWL model.

You might remember the old QWL model involved a lot of pilot projects, experiments. SP-5 had a hand in promoting some of those. It wasn't a complete change across the shop floors. The thinking was, "Well, we'll just try it over here to see if it works. In most cases it was voluntary and there continued to be a parallel structure. You did not have all the regular line managers and line union officials taking responsibility for it. It was something sort of off to the side. It is very different now with this World Class Manufacturing stuff. It is very much main line. This is a quote by a guy by the name of Conway, who used to be President-CEO of Nashua Corporation and was one of the early Total Quality missionaries in this country. He eventually set up his own consulting firm and has done a lot of work around the Buffalo, New York, area and, in fact, we frequently run into plants that have Conway Circles (which I thought didn't show a lot of humility). Anyway, here is what he says (and compare this to what the anthropologists were saying); "The problem lies in management's failure to create a new management system. The new management system of continuous improvement finds all waste, gets rid of it and keeps it out. It means continuous improvement of all work processes, whether people or machine, in every area of the business, at all levels of an organization, forever." Obviously, we are talking about major culture change here.

Now as to the religious analogy in terms of leader-follower behavior, I'm not suggesting that Drs. Juran or Deming ever had hallucinogenic experiences and were communicating with deities but, in fact, the way that many managers respond to them is a classic example. People are enthralled with them. The term "guru" is used to refer to Juran, Deming, Crosby and Feigenbaum.

The importance of doctrine or creed is really kind of interesting in this movement. Juran has his 12 Points, Deming has his 14 Points, Crosby has his 14 Points and Feigenbaum has 5 Absolutes. These are not just a listing of technical things to do. They are sort of moral, ethical imperatives in many cases, as for example, "Drive out fear." And then the flip side of that, Deming has 5 Deadly Sins, as has Feigenbaum, although they are not the same deadly sins.

Now let's talk about mission statements. First of all, if I didn't say it before, I'll say it now: I think this World Class Manufacturing and Total Quality is definitely the way to go. It is far superior to QWL. I am just pointing out some of the weaknesses in its implementation. I'm also a big fan of mission statements. It's hard, however, for me to walk into a manufacturing firm and not be greeted in the foyer by a large poster in which the corporate values or philosophy are listed. Then I'll go to a manager's office and he'll have a smaller version of it framed on his wall. In some cases, especially the engineers, they'll carry a little plastic card and they've got the seven points or whatever. And that's not all bad; in fact, in many cases, it's good. In many instances, these mission statements and statements of values were handed down from on high. The people had very little hand in constructing them and so there is not a whole lot of real belief that goes along with it. It is kind of surface stuff.

Consider the concepts of conversion, confession and moral purity. Managers talk to me about how they really didn't believe this JIT stuff or this Employee Involvement stuff. They sort of went along with it. Then one day while driving to work *Bang!*--it hit them; it just came to them like that and it all fit together. They talk about a breakthrough. It wasn't a gradual understanding. It was like Paul of Tarsus getting knocked off of his horse. It



just swept over them. Also, this is different from the QWL days. In the QWL days you could be a non-believer and that was OK. You could pretty much continue on with your life without too many negative consequences. These days, however, in World Class Manufacturing you are either with us or you are against us. And this notion of eliminating the unbelievers is becoming quite pronounced. Xerox has a term to describe this, called "cocooning." When they identify a manager who is not a true believer in World Class Manufacturing, they "cocoon" him, which is to find a place where he can't have much impact on anyone else.

Another thing that I am finding really dramatic is the extent to which proselytizing, making converts, is involved here. In some cases, they have this notion of cascading training. In the QWL days, when the CEO decided he wanted quality circles, he'd hire a consultant. The consultant would come and train the shop floor people and all of those middle managers would get bypassed in the process. We all know how stupid that was and how that came back to bite them. Now there is this notion that the top guys get trained first. Deming will not talk with you or train you unless he has first talked to or trained your boss. In cascading training, each level of management, once it's got religion, then takes responsibility for converting the next layer of management and you don't skip any steps or jump over any layers. You have to go a step at a time.

The original equipment manufacturers recognize that this stuff works for them, but they manufacture half or less of the parts that go into their assemblies, the rest comes from suppliers. They have decided that unless the suppliers are doing this stuff, especially the JIT stuff, then they are not really effecting a culture change. Sonow there are very elaborate certification programs in place where, if you want to remain a supplier, you too have to be world class. That means you have to have Employee Involvement, you

have to have JIT, you have to have Statistical Process Control, and on and on. There's also all kinds of checklists and systems of inspection that go along with that.

And then proselytizing is even taken home. I have managers talk to me about how they say, "You know, if you really believe this stuff, this Just-In-Time stuff, you won't buy toilet paper in bulk and jam it under the vanity in case you might run out. You'll only buy as much as you need, as you need it." And also, I have heard managers describe this whole notion of control charting-- that is, once you identify what the critical process variables are and then you chart them so you can tell whether the process is in control or not. They are starting to use this at home, like control charting the performance of their teenage son's schooling. Actually, I intend to try this myself, since my son is 16.

What is interesting is that although companies have had mission statements for a long time, it is the extent to which this more recent crop of mission statements don't focus on technical issues as much as they highlight an ethical stance or values. Characteristic of crisis cults is the extent to which they rely on magic to meet their ends, especially in tribal societies. I mentioned marching up and down that clearing in the jungle to force planes to land to bring cargo, etc. But I even see some of that in this World Class Manufacturing. An example is when companies are really going gang-busters on Statistical Process Control--one component of Total Quality Management is the focus on measurement, a very strong focus on measurement and data. I frequently hear folks talking in anticipation of the day when this thing finally comes to fruition in their firm. Nobody has said that they are there yet, but they are anticipating it and they vocalize it. Some day, when they get all of the critical processes' variables charted and they collect data on everything, then

they will be able to manage by science and not by judgment. Nobody will ever make the statement, "Well, I think." When you get together at a management meeting, everybody will bring his control charts and it will be just a question of sharing the data and the solution will pop up. More remarkable than that, however, is that status or hierarchy will no longer be important in the organization. Since we are going to be managing by the numbers, the data will speak for itself. A person's position in the hierarchy at these meetings will not have a significant influence on the outcome in terms of the decision. I think there is a certain degree of magical expectations in both of those statements.

In what I call "adopting without understanding," I see firms doing statistical process control and charting without really any good notion of exactly why they are charting. It is just that the production of the charts by themselves will somehow bring success. This sounds like I'm burlesquing it, but I'm not.

The most extreme case of this I ran across was while I was at the Syracuse Airport waiting for a plane. I saw a fellow sitting on the bench between the restrooms reading a copy of Schoenberger's book World Class Manufacturing. I have a personal theory called the "Airport Bookstore Syndrome." This theory suggests that some of this stuff gets started because the high-level executive's plane has been delayed and, during the two hours he has to kill, he wanders into the airport bookstore and he goes through the business section. That wasn't the case in this instance, but, since I hadn't seen anybody else reading Schoenberger in an airport, I walked over, introduced myself, and asked him what he thought of the book and why he was reading it. He explained to me that he was a middle manager in a medium-sized firm that operates right outside of Kennedy Airport in New York. His firm had recently

been acquired by a larger firm and his boss had gone to Connecticut to visit with the new head honcho to get his marching orders. At this meeting, the new head honcho told him, "Well, we're glad to have you part of the XYZ family now and you should know that you've x number of months to make your firm into a World Class Manufacturer." And the guy said, "OK, but what exactly does that mean?" And he was told, "Well, it means Employee Involvement; it means Just-In-Time; it means Statistical Process Control;" and on and on and on. His boss then asked, "How do I do all of that stuff?" and he was handed a copy of Schoenberger's book.

He then went back to his firm and had a meeting with his top staff and said, "Well, I went to see the new head honcho and he told me that we've got 18 months to be a World Class Manufacturer." and his staff said, "What does that mean?" and he said, "Well, it means Employee Involvement, JIT, Statistical Process Control. It means Gain Sharing. It means etc., etc." and the staff said, "How do we do all of that stuff?" and he opened the carton and handed out copies of Schoenberger's book. That's really true.

There is kind of a head-long rush to this stuff. In fact, we get calls from unions all of the time at Cornell. The union will call up and say, "Hey, we're in negotiations and management says that they have to have 'JIT'. What the hell is 'JIT'?" So I'll explain it to them. Or they will more calmly say, "Management says they have to have flexibility." And we ask, "Exactly what do you mean? How are you going to use flexibility? How exactly are you going to put it into practice?" They don't have the answer to that. They just know that they have got to have flexibility, it's part of the menu.

Another thing that amazes me is how frequently manufacturing firms in central New York State are using Japanese terminology, not just the obvious "KAIZEN" but "ANDON" boards and a number of other ones, when there are perfectly

good English translations. I have come to the conclusion that somehow it is felt that these things can be more potent if we leave them in the Japanese and don't translate them. You see a little bit of that in advertising, like, what is "konzi engineering", or what's worse, what the hell is "Fahrvergnuegen"? It doesn't matter what it is, it just gives you the impression that it is either Japanese or German and I'll buy it and it is going to be good.

Also, this Millenarian element, the idea of the end of the world, the dead coming back to life, a new order being re-established, etc., etc. In manufacturing, it is this notion that we will once again regain our position as preeminent manufacturers, our rightful place; it's a way to get back on the top of the heap.

I read a lot of the books in this field, obviously, and what is interesting is that every single book has a chapter, "People Make It Happen". I turn right to that chapter and it is the thinnest one in the book. It doesn't say much on how people do make it happen. I wish I knew. A lot of talk about people making it happen and you have more participation and more involvement. But I haven't always seen it when I've been out in the field. Definitely there is a trend towards more management participation. It is unclear in some cases as to what is happening with hourly participation, and it is also unclear as to the direction of more union/management cooperation. And I will briefly touch on each of these.

In terms of more management participation, in some respects World Class Manufacturing is a correction or maybe an over-correction, to the QWL days where management basically said, "Well, we're just no good at it, but if you want to form a quality circle and see if you can pull the yard out, be my guest." Now, the central tenet of Total Quality Management is that most responsibility for World Class Manufacturing rests with management. You heard

earlier that 85 percent of the problems are management problems or the Pareto Principle of the Vital Few and the Trivial Many. The old view is that the problem was the workers. The new view is that the problem is mainly management. Now you may think, especially if you are a trade unionist, that that's a healthy perspective. But the corollary to that is that the solution is also management. I don't think Deming or Juran or these fellows would say it's exclusively management but, in implementation, the pendulum has corrected to the point where, in fact, it comes down to that. Most of these quality-improvement teams or problem-solving teams that are part of these quality programs frequently are all management groups. The role of direct labor is to maintain a control chart. If it gets out of the control limits, fill out an error correction form and give it to the manager. The manager then forms a quality-improvement team and there may be very little hourly involvement in that. Somebody mentioned the distinction between special causes and common causes. When an element charts outside of the control limits, that's called a special cause, and the notion is that it is something that the hourly worker should be able to fix himself. It happened because his tool is dull, he's dull, he's tired, he needs sleep, the material is shoddy, he can fix it easily himself. But where a departure from control limits are due to the capability of the process, or the degree of skill training of the worker, the capability of the machine itself, then that is a management problem.

Now, in terms of what is happening with the unions there is an interesting book out called Transformation of American Industrial Relations. The author, Harry Katz, one of my colleagues at Cornell, said that we had QWL, but that turned out to be unstable because it got boring after a while, and they were prevented from getting into the contracts. After you did quality circles, you wanted to do something sexier, so you wanted to do self-managing work teams

and that moved you into the work-team environment. That's also unstable because you cannot really do that effectively without starting to impact the collective bargaining agreement. This means you have to almost invariably move into Stage Three, which is strategic planning. This then suggests that unions are going to become real partners with management on strategic planning issues. At some places, that is working. In many places, however, I've seen them lose ground because, as is characteristic of trade unions, the way they exert power in the equation is to withdraw. If they are unhappy with an outcome of a negotiation or something else, it is very common for them to drop out of any kind of labor/management cooperative activity. And then, after it cools down, they'll come back in again. But, it is common, it is a fact of life as far as I am concerned, that trade unions are going to come in and come out, etc. If you had a QWL program that only focused on where to move the Coke machine, it didn't matter much if they came in and came out. But if you are now talking about the central philosophy of the firm and it looks like the union may come in and come out, that really causes cognitive dissonance for managers. The best solution, I think, is if the two sides agree that when the union pulls out, they are only going to pull out from the process, but any product of their previous collaboration remains in place. I think that satisfies management, "While we're not going to do anything new together for a while, the good stuff that we did over the last six months isn't trash and stays in place."

Katz's conclusions were that World Class Manufacturing is much better than QWL. I really think it has got quite a future for our industry. But, if the managers get this religion too much and presume that all the rest of the managers and the hourlies have also become sort of born-again World Class Manufacturers, they're just kidding themselves. I have often sat in the back of a room when a manager is making his World Class Manufacturing pitch, his

awareness session to the troops. He goes on and on about how wonderful it is: it's a new day, and we're going to regain our leadership position, etc. The folks in the back think, "What is this guy on?" Then he makes the mistake of saying stupid things like, "We don't want you to work harder, we want you to work smarter." Well, that is a lot of crap. They know it. If you are going to make it today you are going to work harder and smarter. The point is that some managers get so carried away with this, they get a little unrealistic and, believe me, the guys in the back of the room are very realistic and it doesn't help your cause by being sort of too far out.

Also, and I heard a number of presenters today say that they have been given room to customize. That is critical. There has to be ownership of this. I have had plants say, "No, we can't do that because we're a Deming plant. We're not a Juran plant, we're a Deming plant. So we follow the Deming way and this is this." They are so hardbound that every site has to use the same approved terminology; you can't even have different words for it. The real key to this, however, is ownership, widespread ownership throughout all levels of the organization, and ownership comes through participation and customization.

#### The Impact of Multi-skilling on Productivity

Lyn Haumschilt Jan Klein is an Assistant Professor in the Production and Operation Management Area. She received her B.S. degree in Industrial Engineering from Iowa State University. an MBA from Boston University and her Ph.D. in Industrial Relation from MIT's Sloane Institute of Management.

Prior to her appointment at Harvard, she worked for General Electric Company in various manufacturing and human resource management positions. Professor Klein has taught in both the first and second year of the MBA program



("Production and Operations Management" and the Management of Operations"), as well as the Program for Management Development (PMD) and Manufacturing in Corporate Strategy (MCS).

Professor Klein's research focuses on workplace Management, job design and the changing role of the lower levels of management with the introduction of new technology and participative management program. Her textbook Revitalizing Manufacturing: Text and Cases was recently published by Richard Erwin Inc. Her other publications includes 'why Supervisors Resist Employee Involvement (August/September 1984) and 'The Human Cost of Manufacturing Reform" (March/April 1989). both published in the Harvard Business Review. Among the Organizations she has worked with in a consulting or teaching capacity are United Technologies, Xerox, Polaroid, Hewlett-Packard and Goodyear.

Dr. Jan Klein Mike Gaffney started talking about a cultural change and how sometimes it is gradual, while sometimes it's a revolution. The subject I'm going to be talking about is, I think, a major revolution at least, particularly in your industry, but also in many other industries. That subject is multi-skilling of trades or cross-trades. Most of my work has been in manufacturing, not shipbuilding, so, hopefully, you can make the link with what I will present. Tom Sotir has been kind enough to open the doors for me to see Electric Boat, particularly the Quonset Point Facility, where they have done some pilots on cross-trades, so that will sneak into this presentation. The first time I ever did a presentation to a trades group on multi-skilling was in Australia at Kerington Slipways. That was indoctrination by fire. Somehow I managed to make it out of there. Those of you who know anything about Australia and the industrial relations climate there will understand what it is like to talk about job design to a group of trade unionists at the yard. I think they figured

that if they brought in this lady from the United States and things went awry, they could blame it on her first being an academic, second being a woman and, third being from the United States. If I was a total bomb they could just say, "What do you expect?" But, somehow, I managed to do four hours there, so I figured I could manage a half-hour here.

Let's begin by discussing some recent work that I've been looking at in conjunction with the latest three-letter word wonder coming from Japan. You recall all of those three-letter acronyms that Mike Gaffney included in his presentation. One of them was TPM. For those of you who haven't heard about TPM, it's called Total Productive Maintenance; and it is coming on-stream and my gut tells me it's going to be here. It is a critical component of the rest of World Class Manufacturing. You can't have World Class, particularly Just-In-Time and Total Quality, unless you do have equipment that is up and running and well-maintained.

For those of you that haven't had the opportunity to be exposed to it, there are three elements of TPM. One is autonomous maintenance and, within manufacturing, what that means is having the machine operators or production workers do their own PM, or productive maintenance. There are four components to autonomous maintenance--lubricating, bolting, inspecting and cleaning. This is happening in a number of organizations, and we can talk about that in the Breakout session, if that is of interest. Another component of TPM is looking at the maintenance organization and how it runs and trying to plan it better. The third component is consideration of maintenance issues in the early design of the equipment, and in the selection of the equipment. And so, it makes sense. It's just that they had to put another label on it so that they could have a TPM "guru" and a new banner and all that. My cynicism probably is on Mike's side around that.

The title of this talk is "The Impact of Multi-skilling on Productivity". It probably would have been better labeled as just "How is Multi-skilling Currently Being Accomplished in American Manufacturing?" Let me define multi-skilling for a second, because that is important. In fact, one of the main causes that I've seen for significant resistance is just in the definition of multi-skilling. In the production area, in manufacturing, when we talk about multi-skilling, we talk about team members being able to do every job on the production line that the team can handle, and all team members are equally skilled. That's the general definition. When you talk about multi-skilling in the trades area, it is slightly different. What we find is that there is multi-skilling of the routine and semi-skilled elements of a craft and, even in certain of the expert elements, but people still retain a certain identity with their craft. This is true, even in those plants in which I've seen just one generic classification, like a "maintenance technician". We expect people to be flexible, to handle a number of things and not have to wait for another trade. But there is this trade-off that occurs between flexibility and depth of expertise. What we are finding in organizations is that it's not an either/or kind of thing, and that is what scares a whole lot of folks. It is moving more toward generalism, but it is still keeping some experts, and even the generalists have their own area of expertise.

There are four different approaches, from what I have seen. One is keeping traditional job classifications, the typical trade demarcation and having teams comprised of people from different crafts. When you have a team of people who go out on a project (I've read a couple of examples within the shipbuilding industry), they sort of help one another out just because they are part of the team. There has been no structural change in that approach. We find this in several industries, including paper-making where, in a paper mill,

they set up a flexibility-improvement team in which all the different trades work together. Another, sort of a subcategory of the first, is a "helping hand" classification that says that even though you are in one particular trade, you will help out another trade. The distinction is that the first is not addressed in contractual language where as the second, the helping hand, usually is covered within the language. It is keeping the traditional job classification, maybe narrowing the number of trades classifications, but still keeping distinctions.

The biggest and probably the most significant move is in the generic trades. You'll find this in the Japanese transplants, typically in electronics and mechanical. You'll find it also in Chrysler's new cooperative approach, wherein they are taking 17 or 18 job classifications and whittling them down to eight. So what they are doing is taking many and coming up with families. That seems to make a lot of sense for a number of people. What it says is that there are certain sister trades, and there are some trades that are very difficult to cross.

Now the holistic approach is one single classification. You typically find these in non-union facilities, as opposed to unionized facilities. However, I have been at a couple of unionized manufacturing plants where they have one maintenance classification, a maintenance technician. The comment I made earlier about the definition of multi-skilling comes in here because, even in the plants where they have one generic classification, you will find that whoever was initially an electrician is still the expert electrician. When you really need that top-notch expertise, that is who you turn to. That doesn't mean that the other folks don't do electrical work, but that is the distinction. Realistically, even in production areas where everybody is multi-skilled and supposedly everybody knows how to do every other job, some people do some things

better than others. Probably less than ten percent of the time are they called upon to do it. That is what they mean by one classification.

The other thing that is coming on board around one classification is this thing called "mechatronics", another Japanese import. There is a new view that in order to have Computer Integrated Manufacturing (CIM) or Flexible Machining Systems (FMS), you need to have people who can do both the electronics and the mechanical aspects. In the near future, therefore, we are going to see people moving in that direction. Some of the questions in my research, which is still ongoing, are: How far can you really move? What is economical about that? Does it make sense to have all mechanics handle electrical work and vice versa? Generally speaking, we are finding that there is a limit to how far you may want to go in that direction. That becomes an individual choice. So those are the four approaches, and we see people moving in that direction.

Let me cover some of the key things that are occurring that you have to consider in moving in this direction. By the way, does it pay off? What's the impact on productivity? There seems to be no question. I have yet to find any site that has moved in this direction that has found a negative in productivity in the long term. Let me emphasize long term. In the short term, there are other considerations. Because of all of the training and rotating people from one job to another and getting down the learning curve, yes, there is a short-term problem. But the question is that trade-off. Long term, we see major percentage increases. In fact, Panel SP-5's cross-trades pilot at Quonset Point showed almost a ten percent increase in productivity over the traditional. I mean, that is pretty representative.

Our issue is with the long term. In the short term, there is the training cost, and I don't want to simplify or minimize it. It is a **major** training cost, particularly as I look at your industry, because everybody has a

trade. You're talking about the whole workforce as opposed to manufacturing, where the training cost is less because the maintenance workforce is pretty small. In that same pilot, it took a couple of years before you could have a cost/benefit trade-off. So, is it one year? Is it two years? It depends on the magnitude of the training.

Some of the issues in doing training include: Is it going to be in the classroom or on the job? Is it going to be off or on company time? Again, my best recent example is Quonset Point in their cross-trades program. There they have chosen to do a little bit of both, and also to do the on/off--two hours at the end of the shift and two hours on people's own time, making a four-hour block. That seems to make some sense. It is a shared type of commitment.

The other question which really came out of my visit to Quonset Point was this: If you are going to do this off company time, are you going to do it before or after the shift? This seems to be a minor little thing, but what came out when I was talking to some of the participants made me stop and think. Let me explain that the program at Quonset Point was voluntary. I said, "Well, how come you volunteered and your fellow workers didn't? Is it just because of this craft-pride thing that people are afraid of cross training?" They said, "Well, there is a little bit of that." But the big part had to do with the hours of the training. For those of you setting up training programs, it seems like it is so simple, but consider this. They said, "It's the summer. They expect me to stay two hours after the shift. We've got Little League, we've got golf leagues." It just doesn't make any sense. If they had put the training at the beginning of the shift, more people would have volunteered.

Another thing about training that you have to consider is that if you train your folks to become more flexible and broader-based, you are going to lose them to smaller companies that can't afford the training. We have found

this in case after case after case, not only with the trades, but also with engineers. I have been working at a particular company's plant where they have cross-trained, multi-skilled, and multi-disciplined some of the manufacturing engineers. They have cross-trained engineers from different disciplines and they are losing these folks left and right. It is a computer-integrated manufacturing plant. Their people now know programming, they know control systems, they know manufacturing engineering, they know IE, they know quality engineering, they know everything. They are leaving the company for much better-paying jobs. So that is an issue, and how you keep these folks is a problem.

Another issue is should it be voluntary or mandatory? (I am going to raise these because in the Breakout sessions, I would like to focus in on some of these issues and what you are facing.) Can you make it mandatory? Is it possible to take someone who has been an electrician or a pipefitter or a shipfitter for twenty-odd years and all of a sudden expect them to become cross-trained? My guess is that the answer is, not totally. What we find is that, generally speaking, there is a mix as to the degree to which it is mandatory. Therefore, you have two issues. One is pay inequity. How do you treat those who are more skilled than others? Do you give them a pay premium? And then the other is, "Where do you place the untrainable?" This is more acute in manufacturing environments where there is a smaller workforce and they feel that they need to cross-train everyone. Then you have a few of these folks who, for whatever reasons, either mechanical or intellectual ability or whatever, have difficulty. What do you do with these folks? Do you pigeon-hole them? If so, what does that do to your flexibility?

The pay issue is typically being handled by a thing called "pay for knowledge", or "pay for skill". Let me just quickly give you a very generic

example. One organization--this happens to be a paper mill--has approached the pay-for-knowledge method within the craft area. The idea is to pay people for additional skills and, as I said, this is generic. Let's say you have four crafts and each craft has three skill levels--an unskilled or routine level, a semi-skilled level and an expert-skill level. If a new hire comes in as unskilled, he could choose one of two different ways to broaden his skills. He could move up within his own craft or he could learn a second craft. The idea is, hopefully, to have everyone eventually achieve the expert level in all four crafts. Realistically, however, not everyone will. Each level of acquired skill within and between crafts has a different amount of pay associated with it. People are encouraged to move up within their own craft. Then once someone has made it up to the expert level, if he wants to go learn some of the other skills, it will impact his pay.

This brings up the issue of skill assessment. Two pieces of that come into play. One is a qualification test. Can you quantify those skills? In the trades, it is usually fairly easy to quantify whether somebody can do it. The place where I have seen pay-for-knowledge systems go amok is where they haven't put in qualification tests and then tested people. And the second one is just as important: the periodic follow-up. What we find in organizations that go to multi-skilling is that people say, "Aha, I'll go do the multi-skilling for additional money." They get the additional money and then they never use the skill. As a company, you are paying for something you're not getting. In the best pay-for-knowledge system I have seen (and this is another manufacturing operation) every single year everyone is recertified on their skill base. If someone did not maintain his skill level, he was given a certain amount of time to rebuild that skill. If he didn't, he lost money. I know it sounds pretty tough, but they told me it was true. I never talked to anybody that actually



lost money, but it was a pretty good threat.

Let's look at a couple of other issues. Trying to make sure that people retain their skills raises a real staffing issue. There are two pieces here. One is the balance between having a lot of generalists and some experts, and the other is the job rotation to retain skills. If you look at it, you need different skills at different points in the construction of a ship. And it is not always smooth, from what I have been told. So the trouble is trying to balance those needs while balancing employee needs at the same time. The employees want to get the skill and want to use the skill, but you may not need all of those trades all at once. That creates a real planning issue for managers.

The last issue we'll discuss is the growing issue of city and state license requirements or apprentice certifications. In my discussions with the training group at Quonset Point, I was told that, in response to their inquiry to the State of Rhode Island, they were told, "We will not certify a multi-skill apprentice program." That sends a pretty strong message from a public policy standpoint. Now, that is not true in every state, but I'm finding it to be more and more the case. I also did a presentation similar to this in Canada last month, and there they have the same issue in the provinces. So it is not just within the companies, but if you are looking to state or federal apprenticeship programs to help you, you may not find that help. The other thing which is surfacing is an issue around a license. In the State of Massachusetts, a company that has gone to multi-skilling within its chemical plants wants to cross-train the mechanical and the electrical folks. The way the electrician's licenses are granted (or the way it is written in the state) is that others can work under the supervision of a licensed electrician, even if they don't have a license. The question comes down to, what is supervision? Many of the

electricians are saying, "I'm not going to take responsibility for that guy. If he doesn't have a license, then I'm not going to be the person who is on the line." And I'm also finding that in the aviation industry. There you have FAA certifications for different trades, and those folks are not about to share work because when they create a mistake, they are going to lose their license. As a result, they don't even share work, much less share the skill. So that is another issue, and it will be interesting to see in the Breakouts how you are facing them.

I have tried to look at multi-skilling from a management perspective as well as a trades perspective. I have been not quite stoned out of trade groups before in the past for talking about multi-skilling. I must admit, it's not a favorite subject for many trade unionists, but I've built my armor and I'm ready to go at it. One of the things that I have realized in doing this is that it's important to look at what the pluses and minuses are from the trades' perspective. From a management perspective, it is flexibility and long-term productivity. But what is it from a trades' perspective? What's in it for them and what isn't in it for them? I'd be particularly interested in some of the reactions from the union leaders here. Let me start out with job security. It is a plus for some people and it is a minus for others. It is partly perspective; it is also how the company looks at multi-skilling. The plus comes from those folks to whom I've talked who say that it builds their skills, makes them worth something, both internally and externally; particularly internally, because realistically, as a company starts down-sizing, if there is an opportunity for people to make some choices, they are going to keep the people who are more broad-based. These folks are saying, "This is where my job security is coming from." On the other hand, a lack of job security occurs because when you break down craft lines, you increase productivity resulting in

fewer jobs. Now there is no question that it's an increase in productivity. This is where the perspective of the company comes into play. We are finding, particularly in manufacturing plants, there are two approaches. One is multi-skilling where they reduce the number of trades they need in order to handle the day-to-day problems. They can either reduce the trades, which is the traditional way of doing it, or, alternatively, they can say, "All right, we've got some expertise and skills here that we can apply in a different manner." In some plants where they have gone to multi-skilling and have freed up trades folks from day-to-day activities, they now have them work with engineers and on longer-range types of planning and equipment design and so forth. It is that continuous improvement perspective, as opposed as to, "Let's cut our losses immediately." But if a company doesn't take that perspective, job security is going to be the number one issue on the negative side.

Another consideration is broader knowledge. That fits in with the job security issue. Then there is this thing called "craft pride". I am really convinced that this is the heart of the problem. The first time I heard it, I was incredulous, but I kept dealing with it more. Then it finally dawned on me: people *like* what they are doing. And it applies in management and in the engineering ranks as well as in the trades. Some people *chose* to be electricians; they didn't choose to be welders. That is the skill that they like doing. I'm an industrial engineer. I chose to be an IE. I didn't choose to be a chemical engineer. I don't like doing that stuff. So there really is something to this. In fact, there is a lot to it. We need to think about ways to continue to enhance and maintain expertise.

Multi-skilling reduces boredom. Along with reducing boredom, it spreads dirty jobs. Everybody has to do the dirty job. It raises legitimate concerns over safety, quality and productivity. Multi-skilling provides

additional promotional opportunities on the one hand and, on the other, it creates overtime balancing and some overtime loss. On the positive side, multi-skilling provides responsibility for the total project, which creates a sense of real commitment and understanding. The flip side of that, though--and this one is significant--is the fear of going back to school. We have a major literacy problem in this country and that really plays into that.

#### TQL in the Navy

Nancy Harris Vice Admiral Jerry O. Tuttle is the Director of Space and Electronic warfare in the Office of the Chief of Naval Operations. He'll be speaking to us about the implementation of TQL within the Navy. Admiral Tuttle was born in 1954 in Indiana, enlisted in the Navy in March of 1955, and was awarded the American Spirit Honor Medal upon graduation from recruit training. Shortly thereafter, he was selected for the Naval Aviation Cadet Program and was designated a Naval Aviator and commissioned in October 1956.

Admiral Tuttle's career has included assignments to the staff of Commander of Naval Air Force, U.S. Atlantic Fleet; Attack Squadron FORTY-FOUR, FIFTEEN and ONE TWELVE, FIGHTER SQUADRON ONE TWELVE and the Office of the Chief of Naval Operations. He has served as Executive Officer of Attack Squadrons ONE SEVENTY-FOUR and EIGHTY-ONE and as Aide and Flag Lieutenant to the Commander in Chief, U.S. Pacific Fleet. He has commanded Attack Squadron EIGHTY-ONE, Carrier Airwing THREE, the replenishment ship USS KALAMAZOO, aircraft carrier USS JOHN F. KENNEDY, Carrier Group EIGHT and Carrier Group TWO/Battle Force SIXTH Fleet. Prior to assuming command of Carrier Group EIGHT, he was assigned as a Special Assistant to the Chief of Naval Operations and as Deputy Director for Intelligence and External Affairs at the Defense Intelligence Agency.

Admiral Tuttle was the Naval Inspector General from August 1984 until November 1985, after which he was Deputy and Chief of Staff for the Commander in Chief U.S. Atlantic Fleet. In May 1987, he was assigned as the Director, Command, Control and Communication Systems, the Joint Staff. In May 1989, he assumed his present assignment as Director, Space and Electronic Warfare in the Office of the Chief of Naval Operations.

Admiral Tuttle received a Communications Engineering degree from the Naval Postgraduate School in 1965, having attended the undergraduate and postgraduate school simultaneously. He graduated with honors from the Naval War College, Newport, Rhode Island, and concurrently received a Master's Degree in International Relations from George Washington University in 1969.

VADM Jerry O. Tuttle Thank you for your kind introduction. I often address audiences who have a great impact upon the Navy, but I seldom have the opportunity to address as august a group as this, which has such an impact upon the entire spectrum of the maritime industry of the United States. My topic today can have a major impact on the Navy and U.S. industry and, indeed it must, if we hope to remain a world leader.

The Navy is in a period of great change and is dealing with many of the same problems your companies have. We are fully involved in world events. We are in an era of explosive technological change and are facing the situation with fewer resources.

The Navy is tasked to defend the interests of our country by stopping aggression and preserving the peace. We have been entrusted with this task while being asked to reduce the resources required to carry out our mission and responsibilities. A difficult, but not an impossible, task.

The Navy will prevail through our people--sailors, reservists and

civilian--as we always do. But we must provide them with the proper tools, tools fashioned by people like yourselves. You are our supplier of goods and services. Our Navy people who carry out their mission today are uniquely qualified and competent. Leading the Navy into the twenty-first century is our challenge.

The Navy justifiably is focusing upon people. We are reinforcing many of the fundamentals that have made us the world's premier naval force. In the past decades, other economies have been out-producing the United States and providing a superior product. Meanwhile, the quality of our goods and services has deteriorated.

Clearly, you have heard of Total Quality Management. Some of your companies are using the concepts to manage your companies. In fact, I have been struck by the commitment to Total Quality Management by senior executives in industry. You may wonder how such a perceived manufacturing-oriented philosophy can be relevant to the military. In point of fact, TQM is not limited to manufacturing, but is applicable to all endeavors. In the Navy, we call it Total Quality Leadership and its focus is on people, processes and making decisions based on facts.

The speaker following me, Bruce Worden, will elaborate further on Total Quality Management in the Navy. I will provide you my thoughts and perceptions of what it is and why it serves as the overall umbrella of a quality focus, and how it is and has been working for me.

Quality was a basic ingredient of the work ethic that drove our success in World War II and allowed the U.S. to be the economic engine of the world. Quality was built into products, and many techniques were developed to ensure high quality as the industrial might of our country developed. After World War II, with the high demand for goods and an intact industrial base

capable of handling the demand, we had it good. Then we started to lose sight of the long path we had traveled to get to where we were.

During the reconstruction of Japan, Dr. W. Edwards Deming took the ideas that worked so well for us and exported them to Japan. During the next 25 to 30 years, the students became better than the teacher. In short, we became preoccupied with using the results of our success, rather than continuing to improve upon what we had done. The Deming ideas are not new; they have been around for a long time and they work. I am not only a disciple, I am an evangelist for the Deming management methods.

Today's Navy, particularly in space and electronic warfare, is a highly technical and diverse service, composed of young men and women who must understand and use advanced equipment. They must be capable of making decisions in many areas about the best use and employment of their equipment. They must also be taught sound management methods.

Our Navy people are a cut above the average, and they join the Navy predisposed to do a good job. While we maintain the world's most technologically-advanced navy 'at sea, we must also continuously improve the processes that our sailors use to do their jobs. It is now our task to utilize all of that talent, our greatest asset, to progress into the future in a quality and productive way. The ever-increasing leaps in technology will require it, the taxpayers demand it and the young men and women who serve deserve it. Concentrating on achieving high quality through our people, understanding our processes and fact-based decision-making is the method of transitioning into the next century.

Admiral Kelso, Chief of Naval Operations, in his first address to his staff, stated that we must "put quality first in our workplace and in our lives ." He is taking a strong leadership position, following up the initiatives

of his predecessor, and is expanding it Navy wide. He stated that Total Quality Management is equal to Total Quality Leadership in Navy operating forces.

Making Total Quality Leadership a reality will not happen quickly. In fact, the act of understanding and changing processes based on facts takes a significant amount of time. The Navy has been successful using TQM in various commands for some time. I have had a Quality Management Board in effect since shortly after I arrived in OPNAV.

We are creating the leadership environment that allows problems to be identified and analyzed, changes to be made, results observed and measured, and further improvements to be made continuously. Implicit in the foregoing statement is the need for continuous feedback to make continuous improvement. In command and control terms, we describe this as full duplex operations. The person who gives an order is often little affected by the order. It is incumbent upon him to receive feedback, so that he can effectively judge the effects of the order, not only pertaining to the results, but also the process by which the results are achieved.

Deming maintains that in manufacturing, 85 percent of all quality deficiencies are the responsibility of management and only 15 percent the responsibility of workers. I concur, and confidently predict that a similar situation exists in the Navy. We, as leaders, must be open, and listen to good ideas and fact-based feedback from those throughout the chain of command.

Everyone can and should be encouraged to contribute to making improvements in the process of which they are a part. This does not mean that every idea brought forward is a good one, nor that leadership is in any way abrogating its responsibilities. It does mean that leadership must create the climate for people to contribute, and for those contributions to be evaluated and acted upon. It is the responsibility of leadership to act to improve



processes that our people carry out and to be open to new ideas. The very act of participating in improvements in quality is as important, or even more so, than the results that pertain from such improvement.

I have several Process Action Teams (PAT) in operation, and they cut across organizational guidelines to get the involvement and necessary expertise to apply to their particular process. Their success has exceeded my most optimistic expectations. I will provide you with an example later.

Just as many of you are familiar with Deming's 14 Points and 7 Deadly Sins of Total Quality Management, we have adapted these same tenets to Total Quality Leadership.

Each sailor must have a clear grasp on how his or her command supports the Navy's mission and how the principles apply to day-to-day operations. This is not a very easy task. In this regard, Admiral Kelso asked me to initiate the process of defining, with his top leaders, the vision, mission and principles of the Navy, in terms that every sailor can understand. This process took Ford Motor Company 18 months. We expect to be somewhat faster. However, it is the process of doing this--of our top Navy leadership focusing on the vision, mission and principles of the Navy--that is as important as the words that result, and provided some valuable and startling insights.

Insist on quality performance. Do the job the right way the first time. This means that management is committed to fixing the process, to permit quality output. One Process Action Team chartered by my Quality Management Board is active on one of my major processes at this time.

Operation Desert Shield stressed our bankrupt Naval Message System, which is a continuous information-dissemination process, of which many of my sailors are a part. The sailors are working extraordinarily hard, yet the system is not giving us a quality output. We are concentrating on the Shewart

Plan, Do, Check, Action (PDCA) cycle to analyze and improve the process that we have, so that the system can satisfy the fleet customer with the highest quality service. The very act of a rigorous examination of the process is producing amazing short-term payoffs, as well as recommending process improvements realized by collecting and analyzing data. After implementing the recommendations of the PAT, one Naval Communications Master Station processed more messages in the first 8 hours than had ever been accomplished before in 24 hours.

I have personally just completed going through Naval Communications Area Master Station Mediterranean with a comprehensive look at procedures, equipment, etc., from the message drafter to the customer using the PDCA cycle. The amount of information that I picked up that will immediately improve the quality and productivity of NAVCAMS MED is overwhelming.

We must analyze and understand every facet of our responsibilities, and those of our people. As the pace of change increases, the person who understands his job can offer the best way to improve it. This applies with equal validity to leaders in all levels of the Navy.

Total Quality Leadership is not exhortation by slogan. We must take the time required to gather data on the processes for which we have responsibility, and to make decisions to solve the problems based on facts, not just attack the first symptom that seems to suggest a solution. You cannot manage or control what you cannot measure.

The Navy has always prided itself on its dedication to training. I am rapidly coming to the determination that we may be dedicated, but we are not very effective. People must be fully trained to do their jobs. None of us is ever too senior to learn. It is not enough to do our best if we don't know what we are doing. This situation is most depressing as I visit our facilities. We

have loyal, dedicated and hard-working sailors working incredibly long hours on systems in which they are not trained.

We must thoroughly understand what it is we are doing, and then we can see more clearly how to improve the processes that lead to the desired result for the organization. From some of my experiences, it appears that learning to manage the process itself, rather than sub-elements of the process, is where the biggest payoffs will accrue.

The seven analytical tools identified by Juran, Crosby, Deming and other quality authorities provide a simple, powerful capability to analyze any process. It is through the use of these tools that a process is examined to establish its baseline, identify common and special causes for variation, and predict the output of the process. As changes are made to the process, the continued use of the tools allows for accurate measurement, showing that the changes improved the quality of the output. Management can make further fact-based decisions and continue to improve the predicated quality of the process.

The concept of a team is a pervasive idea in the military services. However, we must become a team across departmental lines and between commands. We must listen to the junior as well as the senior people. All suggestions for improvement must be analyzed and action taken, be it acceptance or rejection, and explained by leaders. The use of the talents of all of our people will become more and more important as we evolve into the ever-increasingly complex future.

We need to recognize and reward people who tell us what they see that needs improvement. Good ideas and lessons learned must be transmitted and shared between departments and commands. Good leaders have always done this.

Inspections should be methods of learning and improvement, rather than be threatening. As we better define our processes and reduce variations of

them, the need for inspections will decrease.

We strive for quality in the workplace and in our lives. If we get quality, all other goals and quotas will follow. Our nuclear submarine program is a premier example of this philosophy.

We must always get better. Our all-volunteer force is an educated force with high expectations. We must nurture the self-esteem and self-worth of our people by expanding their personal horizons for growth so that they will do better for us, as well as for themselves.

As we lead our people through the decade of the 90's, we have the responsibility to return to society an improved person from the sons and daughters who were entrusted to us. Based on their service in the Navy, they will take a place in the economy of this country, having gained skills and acquired an attitude of quality.

In an office, the small improvement that deals with more efficiently handling the office routine correctly may have as big an impact in the long run as the more spectacular improvement to a major weapons system. Never, never underestimate the value of so-called "little things". The world's great music is derived from just 8 notes and all of our great literature springs from only 26 letters. In fact, the area of administrative improvements is so important that my executive assistant is a member of a Process Action Team that is wrestling with our complex internal OPNAV administrative procedures.

The Navy has long held that leadership is a part of Navy life. Being a leader means guiding and assisting your people, as well as directing them. Total Quality Leadership reinforces this concept. A leader provides his people with the tools and training they need to do their jobs correctly. Leadership is not based on formal rank or title. It is based on the knowledge and capability to lead people. No greater leadership challenge exists than to implement Total

Quality Management/Leadership. No call is more necessary or noble and in no areas are the prospects for success so great.

You who associate with Navy personnel, military and civilian, of all ranks and grades, should understand our motivation and be prepared to do your best as well. Not in isolation. Talk to us! Your ideas are important and the quality that you design into your products and services is essential to our Navy. The feedback that we provide each other is important to us both.

Engineers are a crucial element of quality. In the continuous cycle of improvements, realize that a suggestion from a First Class Petty Officer offering a design improvement, to be incorporated in the design phase, will be enormously less costly to incorporate than that same suggestion made by an Admiral after the ship is delivered.

I challenge all of you to look into how you are doing business. Are you spending time demanding that things get better, or are you doing something about it? Read Total Quality Management literature. Understand that the process by which things get done right is important, and then get on with implementation. You will make mistakes, but I will guarantee that quality and productivity will greatly improve.

The Navy is in a period of change. In focusing on the fundamentals of leadership and improvements by the conscious active participation of all of our people, we hope to maximize the talents that will make the difference in the challenging times that lie ahead.

## Total Quality Management

Nancy Harris Our next presenters will be Bruce Worden, who is the TQM Consultant to the Office of the Chief of Naval Operations, Tom Sotir, who is Director of Total Quality Management for the Electric Boat Division of General Dynamics and Captain Lew Felton, who is the Commander Of Port amount Naval Naval shipyard. We have represented here the industry, the Navy shipyard and the thought process at the Pentagon, which will be interesting.

The first presenter is Bruce Worden. Bruce was born in Orange, New Jersey. He graduated from Farleigh-Dickinson University in 1973, with a Bachelor of Art8 Degree in Psychology and a minor in Language8 and Accounting. From 1973 to 1975, Mr. worden worked in the U.S. Navy Intemational Logistics Control Office as a Supply Systems Analyst. Pram 1975 to 1977, he worked at the Naval Air System command in the Component Rework Branch as a Logistic8 Management Specialist. During the same period, he earned a Masters of Science Degree in Systems Management with specialties in Logistics and ADP. From 1977 to 1978, he worked for the Electronic Material Readiness Activity in the U.S. Army the Budget Officer; from 1978 to 1979, for the Navy Aviation Logistics Center a8 a Program Analyst; in 1979, he worked for the Coast Guard a8 a Program Analyst in the Search and Rescue Planning Office and from 1979 to 1990, Mr. worden worked for the Secretary of the Air Force for Financial Management as a Supervisory Budget Analyst. During this period, he earned a Masters in Public Financial Management from American University. Mr. Worden is currently assigned 88 an Advisor to the Chief of Naval Operation8 for Total Quality Management.

Our second speaker will be Tom Sotir, who is currently Director of Total Quality Management for the Electric Boat Division of General Dynamics, with the responsibility for implementing a TQM initiative at each of the

Division's ten locations. Prior to joining General Dynamics in 1977, Mr. Sotir served for 18 years in increasingly responsible manufacturing and employee relations positions with General Electric.

Mr. Sotir joined General Dynamics as Manager Of Labor Relations at the Electric Boat Division in 1977, and in 1978, was named Director of Industrial Relations. He was appointed Division Vice President, Human Resources in January 1987, and held that position until his appointment as Director of TQM in April of 1989.

He grew up in Greater Boston area and graduated from the Boston Latin School. He received his Bachelor of Science Degree in Industrial Engineering from Northeastern University in 1959 and was awarded a Master Of Business Administration Degree from Xavier University of Ohio in 1965.

Our third expert, Captain Lew Felton, is a native of Fort Scott, Kansas. He entered the Navy through the regular NROTC program in 1966, when he graduated from the University of Kansas with a Bachelor of Science Degree in Aerospace Engineering. His initial assignments included three sea tours as Chief Engineer on the USS DETECTOR, the USS JOHN R. PERRY and Commissioning Engineer on the USS GRAY. In 1971, Captain Felton was selected for post-graduate school at the Massachusetts Institute of Technology where, in 1974, he earned a Master of Science Degree in Mechanical Engineering and the Ocean Engineer Degree.

Upon graduation, he was designated as an Engineering Duty Officer and assigned to Pearl Harbor Naval Shipyard, where he served as Senior Ship Superintendent and Assistant Repair Officer for submarines. His major duties included Senior Ship Superintendent for the overhaul of the USS POGY and for the refueling overhaul of the USS SKATE. In June 1979, Captain Felton reported to the USS SPERRY in San Diego, where he served as Repair Officer until the SPERRY

was decommissioned in August Of 1982. He was then assigned to washington, D.C., where he served two tours, first at Naval Sea systems Command 88 Director Of Site Operation8 in the Submarine Maintenance Monitoring Support Office, and later 88 an Engineering Duty Personnel Assignment Officer at the Naval Militaryryitary Personnel Command.

In 1984, Captain Felton was assigned to portsmouth Naval Shipyardrdrd 88 Repair Officer. From June 1987 Until his assignment as Commandingofficer officer Of the Portsmouth Naval Shipyard in August 1990, he served Mare Island Naval Naval Shipyard as Production Officer and Ocean Engineering Program Director during the complex conversion of the USS PARCHE.

As you can see. we have tremendous, depth of knowledge here, and we are going to see how folks are implementing TQM within their various environments: the industry, the Naval shipyard and the Pentagon. We'll start off with the Pentagon.

Bruce Worden Good morning. I'd like to follow what Admiral Tuttle was talking about by pointing out some of the things that are going on at the office of the Chief of Naval Operations. One of Admiral Tuttle's points was that management needs to make a commitment to this philosophy called TQM, or TQL, as the Navy is calling it. I would like to emphasize to you that the Navy has made that commitment. For over twenty months, there has been a group of rather high leadership within the Navy that has been meeting and talking on a monthly basis about Total Quality Management/Total Quality Leadership. It is the senior management of the Navy. In fact, it is the only subject matter that this group meets on. Total Quality Management is discussed with both the Navy and the Marine Corps being present, and with all of the involved action and command decision people. There are no Commanders-in-Chief of any operating forces



there. The original decision was to implement TQM in the Navy on the shore establishments because we weren't quite sure how it would work in an operating force environment. One of the precepts of Total Quality Management or Total Quality Leadership is that you have a customer/supplier relationship. When you have a ship, you are a prisoner; your customer/supplier relationship is kind of limited. Who is your customer, the enemy? This brings into question the viability of implementing Dr. Deming's 14 Points and 7 Deadly Sins on shipboard.

This group has met for eighteen or twenty months and just had their first four-day off-site meeting in Pensacola, Florida, less than three weeks ago. The results of that session, where they were doing strategic planning for the entire Navy, has not been made public yet. They did not address where TQM in the Navy is going, but where the Navy is going over the next ten to fifteen years. They were looking at operating principles and the mission and the division statements for the Navy.

Under discussion during that same period of time was, "Where are we taking Total Quality Management?" One of the things that has come out of this group is that they have decided to do as much internal training as possible, so we are developing the courses in-house to train our senior managers in Total Quality Management, with the implementation within the Navy. They have also been looking at specific problems, such as the rating system within the Navy, and other issues such as: How do you disseminate the word? How do you train a million people--the current Navy population, counting both military and civilians? These are very serious questions to ask because you've got a culture out there that is spread all over the world--it is absolutely huge. Ford Motor Company has, what, 130,000 people, if that. They've been at it for 10 years and they are no more than 25 or 30 percent implemented. So the questions that this group has been acting upon and looking at for 20 months have been very

significant, and they have made major progress. They have identified, I believe, a grand total of 6 courses, all of which are under development. They will start by presenting them to Commanding Officers and facilitators and trainers, so the Navy can do its own internal training. As you can appreciate, it is a massive effort. Management is committed by not only developing the courses, but by providing the resources to develop the courses. We recognize that it is a long, slow process.

The second part of this is that the Chief of Naval Operations has also made a commitment to this. Admiral Kelso came on board as CNO this past July, and one of the major things that he wants to accomplish between now and the time he leaves in four years is to implement Total Quality Leadership in the fleet, in the operating forces, onboard ship. The amazing part about this is that there are a lot of ships out there that are already doing it. The YORKTOWN was in Philadelphia Naval Shipyard over the last nine months or a year, and the YORKTOWN has taken it up and has started working on it. So the Navy has already started working on implementing it in the operating forces. The emphasis is shifting a little bit there because we are not quite sure what it is going to look like. Nobody has ever tried this before in the operating forces. In a strictly manufacturing sense, yes, it has been done in many places. Motorola won the Malcolm Baldrige Award two years ago for it. Cadillac, Federal Express, IBM and one other company won it last year. Last year, the Florida Power and Light Company won the Deming Prize for implementing Total Quality Management. Obviously, there are plenty of organizations in manufacturing and service sectors that have been doing it. But here you are talking about a war-fighting instrument called a ship. How do you implement it there? There are some serious questions and some serious revisions that we feel are going to have to take place before it will work.

The difference is that shipboard activity is more process-oriented than anything else we've got. The communications field is not process-oriented. Their major emphasis is to get messages out and make sure that they get to the right people. They don't care how long it takes as long as it is as rapid as possible. What happens aboard ship is probably a little bit more critical, particularly in a wartime scenario. However, the commitment has been made by the CNO. A rather unique scenario has been organized to address this. We have five suppliers to the fleet (the customer is the fleet) and the management policy-makers including the CNO, two Fleet Commanders and the Vice Chief of Naval Operations, who will all be meeting together to discuss the issues. Commitments have been made. The resources are being put together. The first meeting for this will take place at the end of October. Admiral Kelso has said, "If we have to meet on this every month for the next four years or for the next twenty years, I'll establish the policy and procedures by which we do that."

The message for you is that Navy leadership, from the political level through the military level, has taken this on as something they are dead serious about doing. They have seen some benefit for the service in there. As more and more information comes out of these groups, more and more direction will be put out to the fleet, to the shore establishments and so forth. That is when things will start impacting on our suppliers in the private sector. Whether that will impact you, I'm not sure, but it might well be that you'll wind up with people asking more questions and demanding more information and being willing to share more information with you.

Over in the Air Force, they couldn't understand why it took nine months from the time a contract proposal was bid and actually awarded. They found out, through analyzing what was going on, that the sticking point was that when they put an RFP on the street, it took forever to get everybody clear

on what was in it. The Air Force, through legitimate means, brought in private contractors to write the EFP. By doing that, the actual time of process was cut from nine months to something like four. There are ways that we, as customers, and you, as suppliers, can work an arrangement within the law. Those are things that will be happening and they are what will be going on between Navy leadership and their providing TQM/TQL to the rest of the Navy. It is going to be a long, drawn out process. The commitments have been made and the top leadership is in there.

Tomas Sotir Thanks Bruce. I'd like to pick it up now and talk about implementation of Total Quality Management in a private shipyard, Electric Boat. We have been into it now; on a formal basis, for about a year, although I was assigned to this initiative back in April of 1989. At that time, my general manager's direction to me was, "Go find out what it's all about, develop an approach and bring into the shipyard what makes sense for our application." I spent the first six months attending Deming seminars, visiting the Juran Institute, dusting off the old Feigenbaum textbook that I used in college. I also went back to my old General Electric notes, because when I joined GE in 1959, Feigenbaum was the Vice President of Quality Control.

The model we used at the shipyard was a pretty simple model. It deals with getting to Total Quality Management on three planes which you should always consider to be co-equal and co-extensive--awareness, commitment and, of course, implementation.

In the awareness phase, the vision statement gets handed on down. This is the education process, getting people to think in terms of process thinking, and awareness of the tools and application.

Commitment includes developing the support structure, determining

process capabilities, thinking again about processes, the resources, the training and finally moving into action with Process Action Teams.

Implementation involves actually doing the process improvement, bringing about the cultural changes that are necessary and recognizing accomplishments, an area we have to get into more.

So where are we? We are into all three of these phases right now. They are continuous. To say that one is complete is not so; we are into all three simultaneously. What we are trying to bring about--and the approach we have been taking--is for our people to pursue that new strategic thinking along three lines:

- o Thinking in terms of the culture of process thinking;  
that is, thinking of everything that gets done in terms  
of a process,
- o Thinking in terms of continuously improving the process,  
and finally,
- o How do you manage that Total Quality Management oriented  
workforce?

Key to selling, key to bringing this about, key to really getting the commitment was to tie this all together in what I call the alignment. How does TQM fit into the business picture? How does it fit into what you are doing? How do you sell it to your Controller, who is still caught up with, "Where is the ROI, Tom, on the training? Where is the ROI in the time that the process action teams are going to be meeting?" And, notwithstanding the Deming philosophy and some of the others, it still comes down to Where is the ROI?" And there is a tie-in; that is, there is an alignment.

Our approach was to create a, yes, vision statement at the corporate office. I was part of a meeting with all of the executive vice presidents and

vice presidents and general managers of the division in attempting to develop a vision statement. Picture, if you can, getting 25 war horses in one room and trying to get them moving in one direction. It was a heck of a task. In the end, the chairman, the CEO and the president developed the vision statement that was handed down. Again, the alignment puts it into perspective. From there each division develops its own mission statement. It is not a case of the division's achieving the vision of the corporation, but rather, how does each division achieve its own vision? That's the tie-in.

Let's examine the strategic planning process. Within our yard, we develop a ten-year strategic plan. This is our long-range plan--to meet our mission and achieve the vision that was set in place by our CEO. With that, on an annual basis, we develop an operating plan that is continuously reviewed, updated and analyzed. That operating plan is in line with the strategic plan for where the business is going to meet its mission and accomplish the vision. Then we have the functional breakdown and the functional development of goals and objectives. If we establish our goals and objectives correctly, then those are the goals that need to be met, that need to be achieved, to meet our operating plan. If we do that, we are going to hit our strategic plan and accomplish the mission and the vision.

Historically, that is where the process has stopped. What TQM has brought into it is this culture of process thinking and, I feel, this is the selling point to our management structure and also to the controller and his concern about ROI. The point is to think in terms of what processes now need to be changed, need to be improved, in order to achieve your goals and objectives. Generally what happens is that you set goals and objectives and, about once a month or once a quarter, they get reviewed on how you're doing. So what happens traditionally is that you set goals and objectives that you have a 70 percent

chance of meeting, especially if your merit rating is based on it. The change that was necessary was to get people to think in terms of what processes have to be dealt with in order to meet the goals and objectives. If we pick the right processes to support the right goals and objectives, it's just going to fall in line. That is where the process improvement initiative pays off. That is what the ROI is and that is what we use to sell, if you will, the controller.

In starting on this, in implementing it, we built on initiatives that were on-going in the yard. We built on some "First Time Quality" initiatives that were going on in our manufacturing operation; we had some concurrent design activity going on with the SEAWOLF design; we had a lot of SPC training activity going on; within our engineering organization, we had a program called "Engineering Quality Improvement Program" that focused in on processes; we were doing a lot of training in problem-solving techniques and we had a very heavy IMS activity going on that focused in on twenty-plus business processes. We then built upon those current initiatives and added to them awareness. Awareness for our salaried employees started in late 1989 and is still continuing into this year. We need to determine where we are with our hourly workforce. You are never are going to get TQM fully implemented unless you involve the total team. That still has to be determined.

We have some change activity going on, starting at our senior management level. We are using some outside consultants to help bring about this cultural change in managing the TQM-oriented workforce. We have moved into identifying critical processes, those processes that are key to our functional goals and objectives. In addition, Process Action Teams have moved off. We have deferred supplier activity until the end of this year into the next. We felt that we first needed to get started and get going internally.

In a meeting with our senior management staff, we set out to identify

which critical processes are key to achieving our business objectives. The meeting went on for about four hours one morning, with all of the vice presidents of the different functions. We set out to determine what a critical process is. We determined that it is a process whose success is essential to the survival of the organization. It is in alignment, if you will, with our strategic and operating plan. It is a process that may consume excessive resources, has a major impact on delivery of service or is something that our customer needs and expects. Using those criteria, we developed a list of twenty-plus processes. We then whittled that list down to what we considered to be Electric Boat's nine most critical processes. For each of those nine processes, we assigned a functional vice president and said, "You own that process." In some cases, it was not the functional vice president who became the owner of the process. The process owner was charged with leading the action and leading the Process Action Team on improving that process.

We talked about developing process benchmarks. Benchmarking came into our process thinking as a very significant element. Why? As Deming says, "You ought to be able to measure any process, you ought to know where you are going." If you know where you are, you've got to know where you're heading. That's your benchmark. And that may be over a period of time--months, years, whatever it is. But where do you have to be (when we talk about World Class Manufacturing), where do you have to be, to be the best in that activity? Where does that process need to be, where does that measurement need to be? That is the thinking we put in place and that's the path we have embarked on.

The training we put in place--besides training on what processes are and thinking in terms of processes--is training on continuous improvement that focuses around the three key elements of customer, process and data. And our training is Just-In-Time training. Again, awareness is ahead of the game,



training on the methodology is Just-In-Time. As we set Process Action Teams in place, we are putting them through training. We're trying to get them to think in terms of characterizing the process and asking the key questions, "Who's my customer? What do they need and what do they expect? What do I do? How do they measure? How do I measure?"

In terms of some of the tools of TQM, we are into flowcharting, data collection, analysis of data, identification of root causes and, again, determining the process capability. This step is very essential in this methodology because, traditionally, when you set a team in place, they go from problem identification right into solutions, skipping this step. We do give them training on the solution mode--what we want them to do, what kinds of things we want them to analyze in a process and, of course, thinking of automation as the very last step in the process and then implementation.

The tools that we teach them in the specific training is, again, nothing more than the process improvement tools that we read about--the flowcharting, the cause-and-effect diagram, the Pareto principle, histogram check sheets, and the rest of it.

The other thing that we are emphasizing--emphasizing throughout the organization--are the kinds of things that world class manufacturers are emphasizing. We're looking to drive out waste and to eliminate redundancy. And these, very frankly, are the things that world class industries are focusing in on. Reducing the number of part numbers is our challenge to our engineering organization; that is, capturing or reducing the number of engineering change notices, and you go right on down. There are things that make sense, but they are things that are setting businesses apart and are things that, hopefully, will set our shipyard apart from other shipyards. Just basic industrial engineering, I suppose, but these are the kinds of things that we want to take

out, the non-value-added task. With that, I turn it over to Captain Felton, who will talk about implementation of Total Quality Management within a public yard.

Captain Lew Felton I have been working in the process of TQM--or some sort of changing the way we manage--for about five years, basically because the way we have managed shipyards in the past is not working. I have seen several different approaches. I want to tell you that it is an incredibly complex thing that we are trying to do. If you think for a minute that you've got it all wired, that you've got it figured out, that you follow this particular methodology, I'm going to tell you that you don't have it figured out. I don't believe that I have.

There are two or three things that I'm absolutely certain that I have figured out. I can tell you that if you don't have them, it's not going to work. And those are the things that I really want to tell you about today. I've got lots of details, I can talk forever on this thing. Like the Admiral earlier, I will tell you that I am, without a doubt, a convert now, because I am tired of the frustration that I've experienced for years and years of not being able to do my job; not being able to get submarines overhauled to satisfy the customer; not getting them out on time; having them cost too much. And I am satisfied now that some of the methods that we use in TQM can actually solve those problems because I have seen them work.

If the man at the top in your organization is not committed, you've got your work cut out for you. Either go find another place to work or get that guy committed. I am pleased to see the Navy, from the man at the top now, beginning to demonstrate their commitment. In naval shipyards, I have seen programs start and stop and be turned off and start again and be turned off. Within the last three years or so, I am seeing uniform growing support. As a

perfect example, if the man at the top is not committed, you'd better turn him around or go find another place, because you are not going to survive in the competitive world.

Portsmouth Naval Shipyard, if you didn't know, is a government-owned public yard in Portsmouth, New Hampshire. Right now, it employs around 8,000 people. Its sole work is nuclear submarine repair and overhaul. It's on an island in the Piscataway River. To people who live in that part of the country, its debatable whether it is in Maine or New Hampshire, but right now the world believes it is in Maine. The people who live in New Hampshire and pay taxes in Maine think that it is in New Hampshire.

The principal driving force at Portsmouth Naval Shipyard, and I think, the other five nuclear shipyards, is survival. In the future, the workload goes down by about twenty percent and stays there for a period of time. Twenty percent of six works out really quickly, in a rounded out fashion, to one. If you apply that, it says that in the not-too-distant future, there's no need for one naval nuclear shipyard. Now this is not naval policy, I'm not stating that to you now, but I am stating what I tell my shipyard is a reason to go make some dramatic changes.

Portsmouth is the oldest naval shipyard. It has been around 190 years. It is in a parcel of real estate that would never be able to be brought back online, so to speak, if it went away. It has a collection of skills that would take years and years to redevelop. It is truly a national asset, as far as I am concerned. It is absolutely a part of the community and has been, as a naval shipyard, for 190 years, and as a shipbuilding yard for far longer than that--going way back to the British times. So it is part of the culture in the area. If it goes away, there are so many things that will change in that area. Why do you want to keep it? Why do you want to do TQM? Why do you want to

change the way we are doing business? Survival, plain and simple.

Maybe it's just my nuclear mentality, since I have been in that business for a long time, but I've got to have a procedure to follow. In fact, however, I don't think that that's just my case; I think it is everybody's need. You have got to have some sort of methodology to follow or else you are going to lose track somewhere along the way. I also believe that that needs to be customized for the organization that you are in. I have seen that virtually every place; for example, at Ford and EB here. In general, everybody customizes it a little bit to fit what their particular activity feels is important.

Portsmouth Naval Shipyard has this thing that we call the "model". It is the plan. It starts at the top with the leadership, the commitment, the involvement and the knowledge. And, as I told you, I think that is absolutely vital. If you don't have that to begin with, give it up, because it is not going to succeed. Leadership is not what comes out of your mouth, either; it is the way you do your daily business. It is the way you support. It is the way you demonstrate, through all of your human resource capabilities and methods, whether you actually support improving and allowing the people who are doing the work to make improvements. And that has got to come from the top.

In our particular case, for training, we use Conway. There are several methods that you could use for the specifics and the tools, but you have got to have something. This is the common thread that we are using right now and we will develop our own training plan eventually.

Basically, you've heard the business about doing work by teams. It means two things to me. It means training some of the teams in our shipyard to understand what working as a team really means and what methods they can use, but it also means improving teamwork for the whole shipyard. I'm sure nobody else has problems that we have, like engineers not talking to the waterfront, or

the comptroller not talking to everybody else, and the planners not talking to the people who actually do the work. I'm sure nobody else has that problem, so we're the only ones who have to resolve that big teamwork issue. Clearly, when you hear people talk about teams, it means two things. It means teams to accomplish a task, but also means one great big team, the whole organization.

You must have quality in daily work or daily work management, or something like that. You've got to have something that concentrates on daily work. If you don't, in general, people will feel that, gee, you're throwing out everything that you have done in the past. What have we done in the past? What have I done in the past? In general, what I have done in the past is concentrate on very short-term goals, concentrate on daily work, concentrate on outcomes. Yesterday, we wanted to accomplish this thing on this boat, but it didn't happen. But why didn't it happen, and what do we have to do to make sure we do it tomorrow? Very short-term thinking. You cannot throw all of that away. You cannot concentrate continuously on it. So make sure that whatever you are doing has something that concentrates on the short term, the quality of daily task. We have a program that will do that.

You have got to concentrate long-term. And, in general, you have got to think in terms of breakthroughs. That ties in very nicely with your mission, vision, objectives, Paretoize and priority thinking. Where are you going to make your breakthrough that makes the biggest gain for the organization? Breakthrough management.

And the voice of the customer. I will tell you that if I go ask my customers what they want right now, I think that they will tell me that they understand what they want, but, in fact, there is a process of even educating the customers to tell me what they really want. They will tell me very simply that they would like to have something that costs less and comes out faster, but

I don't exactly know what that means. What does that mean in terms of how I take care of the crews? Do they really want it faster to the point that, by the time they get what they want, the crews are all quitting because I have just killed them, running them through an overhaul? So there is a process in my business of going to the customer and really having him examine what he wants to tell me, so that I can go align my mission, vision and objectives to match and to really give him what he wants. There has to be that customer/supplier relationship there. That is top-level. Very definitely, within the shipyard, there has to be a customer/supplier relationship in order to improve the teamwork. And it is incredible how poorly we understand that internal customer/supplier relationship.

I want now to tell you of some of the mistakes and some of the things that I think I have learned over the years trying to do this. First off, it is incredibly complex. I thought initially that it was something that was very simple; this business about people talking about "peeling the onion" to solve the problem. I think building TQM is actually quite the opposite. You start out with quality circles being a good idea, or you go way back to systematic thinking. You take a little idea, and you add on to it some good human resources management, listening to the people. Then you decide that you need a path so that everyone is going in the same direction. Strategic planning. Then we realize that we really are making some decisions without good data. Maybe we need some statistical process methods to understand the facts that we are generating and what kind of problems we are solving.

The building of TQM, a completely new way to manage, is really an additive process. There is not just one big book that somebody is going to come and drop on your desk and say, "Follow that and you've got it." You have got to take a little from here, a little from there, keep adding it all up, and

eventually, maybe, you will find the ultimate TQM solution.

At Portsmouth Naval Shipyard, the history has been to experiment with some kind of methodology for a period like three years, then there's a hiatus for three years where they didn't do much. Then going back seven years, they tried and, my read of it is that the Commanding Officer changed and the initiative died. That is why I believe in leadership from the top. A new guy came in and he didn't quite believe in it and it died. Very small pockets of it remained. It has got to come from the top.

Secondly, the human relations aspects of this are incredibly important. We have a workforce that is extremely good. They are smart. They know where the problems are--lots of problems that need to be corrected--and they would love to have them corrected. If you hand them a blueprint that says, "Here is how we are going to fix all of your problems, make you more successful" and then walk away from it and don't deliver, you have got a real problem. And we have done that in some areas. A major mistake. I think we can recover. But if you lose the ideas that are coming from the people who are actually performing the work, then once again, this is a senseless drill. It has got to come from the top. The ideas and the problems have to come from the bottom. And the people in between have to understand that it is their job to make the changes and empower the people who are doing the work to make changes. We haven't done a very good job with the human relations aspect of it. Other than that, I guess the only mistake that we have made is that we just need to move faster.

## Individual Pursuit of Continuous Improvement: The Key to Successful TQM

Lyn Haumschilt Professor Howard Bunch is NAVSEA Professor of Ship Production and Science in the Department of Naval Architecture at the University of Michigan. He is a research scientist and head of marine systems at the Transportation Research Institute at the University of Michigan. He is Chairman of the Journal of Ship Production and the Chairman of the Panel SP-9, Education and Training. He co-authored the textbook Ship Production. He has been in research and teaching for over thirty years. He is currently Special Assistant to the Under Secretary of the Navy.

From 1986 to 1988, he went on 8 two-year sabbatical from the University of Michigan and worked at the Philadelphia Naval Shipyard and the Pearl Harbor Naval Shipyard. He has also spent a considerable amount of time in China and in Japan at the Kawasaki Kobe Yards. He has been a consultant to industry. He has made over fifty trips in strategical and tactical planning over the past twenty years. Howard and Panel SP-9 are largely responsible for Panel SP-5's existence. It was Panel SP-9 that initially took the position that the Nation's Shipbuilding Research Program needed to explore the new efforts underway in Japan, Norway and elsewhere, in what was then being called social technologies. While the panel recognized the need, they also believed that social technologies was beyond the scope of SP-9's charter. In order to test the thesis that research into the area of social technologies was needed, Howard conducted an exploratory workshop on May 3, 4 and 5, 1983, right here in this room. As a result of that workshop, in October of 1983, the Ship Production Committee was persuaded to establish Panel SP-5. Because of his efforts in this area, Howard is fondly acknowledged as the godfather of Panel SP-5.



Professor Howard Bunch I think one of the interesting aspects of this particular presentation is that, when I was called by Frank Long to see if I would be willing to make a presentation, like all people in academe, I wanted to make sure that my title somehow imparts some profound quality of clairvoyance. The fact is, it is a scam. Although the title of my presentation is "Individual Pursuit of Continuous Improvement: The Key to Successful TQM", what I really want to do is to share some thoughts and observations that I have developed from studying manufacturing change in the United States and abroad over the last 20 years. My story, relative to this discussion, actually starts in about 1970. I had the opportunity to be the head of a negotiating team from the United States that was trying to put into place--and ultimately did put into place--a joint venture with a Japanese firm to manufacture and sell sophisticated scientific instrumentation in the United States. I was the head of the American team that included myself, as the executive officer from this company that I was with at the time, my chief engineer and my vice president of Marketing. And the three of us negotiated with probably 4,000 Japanese people (at least it seemed like 4,000) in a certain firm. We came away from that wrenching experience totally humiliated about our ability to deal with issues that relate to quality and to precision, and how we were going to define many of the critical aspects of our joint venture. And in the process of this month-long intensive negotiation, we had an opportunity to observe the procedures and methods that the Japanese firm had used, and was working with, to manufacture instruments. Sort of as a footnote, we did actually put the joint venture into place. We went into a market that, at that time, was dominated by Bectin Instruments. Within five years, the joint venture had achieved almost total domination of that market. They achieved it on the basis of being able to put into the marketplace a superior set of instruments at a price that reflected incredible savings for the

automobile industry. As a second footnote, one of our major customers at the time was Ford Motor Company, because they were in the process of putting into place significant research facilities to do testing and evaluation of engine exhaust systems. They became very enamored with the process of manufacturing that the Japanese were utilizing. Concurrently, the company I was with also became involved in a joint venture with a subsidiary of Sumitomo Chemical and, incredibly, the joint venture contribution on our part was a transfer of technology, if you will, back into Japan. The interesting thing about it was that the Japanese firm utilized the process and the methods to disperse the technology that we were transferring back into Japan throughout their subsidiary and put it into place within their organization.

We find that it might be appropriate for us to look at some of the history relating to the processes that we have had in the United States, and at the status of manufacturing over the last forty years. In fact, we could go back much further if we wanted, before we ultimately deal with all of the cultural aspects that we must work with.

All of us in this room, I think, were aware of the manufacturing situation in this country, certainly up until 1960. That was, to put it mildly, what we would call the "golden years". There were some key players who were involved in that system. These are only examples--you could put a room full of names up there--Knudson from General Motors, Samuel Gompers of the Garment Workers and Henry Kaiser at Kaiser Industry. Our factory focus in those days was, essentially, on the reduction of labor through some kind of an automation procedure. We were trying to take direct labor content out of our products. And we did that, primarily through the heavy investment in equipment. I was going through engineering schools during those days and, when we were talking about analysis of plants, we were basically talking about the solution of

problems relative to labor content as a solution that was arrived at through emplacement of equipment. Coming out during that period, we saw manufacturing management that had very complex production staffs. We saw a tremendous overhead growth, particularly since the Second World War. Some of that was related to staffing to enhance planning, but some of that overhead growth was associated with causes that were not associated with value added, relative to the product.

With respect to shipbuilding, we saw at a typical shipyard overhead growth multiply approximately 2 to 2-1/2 times from after the Second World War to the early 1980's. Much of the overhead growth was a result of government-mandated programs that were imposed onto the system. And, interestingly, during those years, the major customer for the shipyards, both private and public in the United States, had dependent variables other than cost that were driving its decisions. The major dependent variable on the part of the Navy was not cost, but was meeting a schedule. The Navy attempted to achieve that with contracting mechanisms like "cost plus fixed fee" and so on, in which worry about cost comes later. As recently as six years ago, I had a discussion with the vice president of a private U.S. shipyard about why they were not putting into place some of the things that we have been talking about in this room. When he had had all of me and my academic baloney that he could deal with, he literally grabbed me and he took me to the window of his office, which overlooked the shipyard, and he said, "Howard, the thing that drives management in this shipyard is not reducing cost; the thing that drives management is getting as many direct labor hours into that yard in an eight-hour day as we possibly can." They were being paid, and their profits were being determined, not on the basis of driving down costs, but upon the basis of percentage of direct labor hours that they were presenting to the government. So we had those kinds of factors driving our shipyard

management. The organizations ended up being very large, with specialized staffs. And in many instances, they still are.

Incredibly, in the shipbuilding industry in this country, the organization that we're talking about is not within the corporation itself. The enterprise that we must deal with is, essentially, a multi-faceted enterprise that includes the Navy, the design agents, the shipyards themselves. The enterprise that we are dealing with is a different type of enterprise than what you typically would find when looking at many of the examples that the manufacturing industries in this country have.

There was and still is, to a large extent, management and labor separation. What we have found was that the size, the make-up, the factory, the shipyard and the overhead personnel created a conservative, risk-averse bureaucracy. And that was what was in place, essentially, at the end of 1960 when this period ended. By 1960 the plant and the yard staff each described itself within the very limited context of its own experience. Functional groups failed to see the whole process and often duplicated or offset the efforts of each other. Our competition in the shipbuilding industry and within the industry, in general, was largely a national competition. It was based on a customer satisfaction that was driven in large measure by manipulation--marketing, public relations, etc.

From approximately 1960 to, essentially, the 1980's decade, we had what I am calling "the decline". There really are no key players to identify or, at least-, who want to be identified, because no one wants to be associated with that decline period. The fact is, it was all of us. It was the culture that we were bringing with us from the earlier days. What we were encountering was an inflexible, hard-wired manufacturing system that was obsolete. We began to see, though, the increased use of computers. We were still very short-term

oriented in our management thinking. Some very vivid examples of that are in the book *T&E Reckoning* by David Halberstam, in which he compared the Ford Motor Company operation with the Nissan operation through those periods. The Ford Motor Company was being driven by a very short-term, finance-directed orientation. The Japanese, conversely, were driven in other ways. Our organization was a bureaucracy, typically, and in fact, our manufacturing operations were isolated. Those who were coming onstream in those days, as young engineers, knew that the way to get to the top in your corporation or their enterprise was definitely not to go into the production side of things. It was to go other ways. As a footnote relative to that, just recently General Motors, for the first time since Charlie Rnudson, has put an engineer back in charge of that company. For the last forty years the Chief Executive Officer of General Motors has been coming from either the finance side or the marketing side, primarily finance.

I was in Detroit in those days and was privy to some of those things going on in the automobile industry. Ford Motor Car Company began making comparisons between the costs of their engine plants and some Japanese car manufacturers. They found that Toyota, for example, had a four-to-one productivity factor over Ford. Not only that, they were operating with approximately one-half the capital investment per unit of output. Detroit's answer--and I remember it very vividly--was the typical response to any catastrophe. First was denial that it existed, that the numbers that were being put in front of them were wrong. Then there was rage, which took many forms. Then, finally, was recognition of the problem and, ultimately, a belated response.

In our shipbuilding industry we began to establish our NSRP to try to begin the long and arduous process of making our shipyards more productive. In

the beginning, we focused on hard sciences like welding, facilities, production aids, painting. It was not really until the 1980's that we began to talk about those things that are related to the organization of work, like education and training, human resource innovation, standards and industrial engineering.

Interestingly, we began also to see cost competition hit us from overseas, because of the awakening awareness of the U.S. customer that better-quality products were coming into this country. In shipbuilding, we were totally dependent on subsidy construction. It was a catastrophe to our industrial system, to our shipbuilding system, at least for commercial ships, when that subsidy was removed. As you all know, that basically put us totally at the mercy of the monopsony of the Navy.

From 1980 onwards, within this industry, there have been remarkable changes. Particularly, changes have been occurring in the last two years. We have also recognized some of the problems. A cross-section of some of the key players, in addition to those like Deming and Juran who have been cited by other speakers, would include Crosby from the United States and Malcolm Baldrige. I list him, because he, as Secretary of Commerce, was very instrumental in trying to make a national initiative of bringing TQM into place.

We have begun to recognize our problems, particularly with respect to the separation of the functions, and especially in the area of design/production. We have also realized the importance and the effect on our industry, at least, of the monopsony-driven market that we are dealing with. We also have recognized, finally, that solutions are not quick fixes. Someone asked the question, "Why is this one different, as a quick fix, from all of the others?" Some of the quick fixes that we've experienced over the years (and everyone in this room has had their exposure to them) would include entrepreneurial management that focused on short-term payback; the real time-

value of money as the basis for decision making; the messianic leadership that we have had in some of our shipyards and throughout our industry; technology fixes; robotics and automation. We recognized that what was consistently wrong, or what we were consistently overlooking, in all of those fixes and--what makes what we are talking about today so totally different--was that those aspects were focusing on the wrong thing in many respects. Again, the dependent variable that was driving them was not quality. Quality control was directed only in meeting the requirement of building-to-print. It was not directed toward the requirement of improving the process. And number two was that the decisions that we often made with respect to our whole system were based upon the product at the end of the line. They were not based upon looking at the process itself and trying to make our decisions on the basis of hard, quantitative numbers. The two differences that we are looking at with respect to the other things are, (1) focusing on quality of the process and (2) making the decisions of what to do on the basis of hard facts and hard numbers. And associated with that, ultimately, is putting into place a process of continuous improvement.

In the last few years, I have had the opportunity to view what has been going on in the shipbuilding industry. The NSRP began initiatives relative to processes in 1981. We actually had some one-week seminars relative to Deming's 14 Points. We went through the whole process. We watched Deming's tapes. It was a classic example of learning by boredom. If any of you have ever sat through the Deming tapes, you know that they are a real dozer, as somebody referred to it today. Ford Motor Company used to have him up there, not so much because people understood what he was saying, but because he was there. It was he, Deming, who put into place the mechanisms that turned around the Japanese system.

We find that progress is being made in our industry. The Navy, for example, has major efforts underway to redesign their design system to where they can bring the production aspects more into play. The private as well as the public yards (and certainly the private yards), are being involved very heavily in the design processes--the feasibility and early design processes--to a much greater extent. The SEA WOLF is a classic example of things to come in that regard, as I see it. We are beginning to define and focus on markets of the future. We are recognizing that the commercial market is the market for survival, at least of the private shipyards. And importantly, we are beginning to adopt Total Quality Management throughout our system, at the Philadelphia Naval Shipyard and at Electric Boat plus the fact is that the Baldrige Award is making headlines. The headlines in recent editions of many newspapers was the award of the Baldrige prizes to three companies in the United States this year.

For the next few minutes, I will talk to you about the basics of TQM the basis of my observations as a teacher and as an observer for the Navy. I will discuss what I consider to be the most critical elements. The most critical element is, in fact, the individual. Then I will conclude my thoughts with what I think some of the requirements for a successful program are.

When we start looking at a Total Quality Management program, we find that we are, in fact, looking at a program that emphasizes one of three things. First is the process. The product or service is created through some performance process. The Deming approach is typical of that. Second, the outcomes. We focus on the outputs of the process. The Taguchi techniques of lost value functions and the Crosby techniques tend to focus on what those outcomes are going to be. Third are those approaches that look at the consequences. My quality definition goes beyond that. We see the errors that are there, that are essentially the people, and people are the linking elements



for these processes, and for the outcomes and the consequences. Regardless of their different perspectives, these five experts--and almost all of the others that I have looked at--agree on the principle that to convert an organization from a traditional management practice (management practice being quantitative in its decision content; the basis for the decision being largely qualitative) to Total Quality Management practices requires fundamental changes in human attitudes and behavior. And that is why, as Captain Felton said, it is a complex process. We are dealing with something very fundamental that has been created--a culture that has existed over many years in our system. The idea is that if some alteration occurs, then traditional performance processes will yield to improved performance processes, with the added dividends of encouraging the search for even greater outputs, over and over again. This insures better and better outcomes, which increasingly add to satisfactory consequences. It takes time to think of quality as a human pursuit. You and I traditionally have thought of quality as it relates to processes or outcomes or consequences as a noun. That ship is high quality--a noun. What we are asking you to do, and what the fundamental uniqueness of the TQM process is, is to think of quality as a verb, an action, with individuals doing that action. How do you measure this quality? Deming's 14 Points provide the departure points for measurement, and so does Crosby's Maturity Grid.. All of them have some method, and some of them have been pointed out today.

I was out at Pearl Harbor for six months, at the request of Secretary Goodrich, to try to document what Captain Traister, now Admiral Traister, was trying to put into place with the program. It was a fascinating experience. We saw an organizational structure on how to put into place what they called the Shipyard Quality Improvement Process, SQIP, which is really TQM. There were two aspects. The first was the task side, which was the side dealing with the

techniques of continuous improvement, including Pareto charts, control charts and histograms. Also included were techniques on gathering and developing data, and analyzing data, so that you can focus on the most likely causes of a problem. And then the development of the data to give you the statistical base from which you can make qualitative, analytical, rationally-based decisions to try to improve that process. In that regard, they had implementation committees; they established specialist committees. The objective, ultimately, was to train every person in that shipyard, 7,000 people as I recall, in the techniques of process improvement--the hard aspects of how to look at and analyze a process. That does not come cheap, as people have indicated. In the first 2 to 3 years, that training amounted to from 5 to 10 percent of Pearl Harbor's payroll. It is only after 3 to 4 years that improvements resulting from that training will offset some of the training costs. And, importantly, those training costs do not go away; it is a continuing process, forever.

The second aspect was what they called the "people side"; removing barriers, changing culture, getting people to think in terms of the new rationale. And what they did, very interestingly, was to take Deming's 14 Points, one by one, and set up teams within the organization to look at each one of those tasks. Before I came here, I went through my notebook on some of the stuff that I gathered while I was out there. I grabbed two, almost at random. One of the things Deming said was, "What you want to do is eliminate slogans, exhortations and target dates for the workforce." The people on the teams (there were about 8 or 10 people on each of those teams), went through and looked at that task, and they said, "What is the significance of this task to this organization?" Some examples of what they came up with are: (1) Dependence on proper procedures, training tools, and equipment to perform their work: a need to increase the emphasis on training, to educate employees on proper

methods to perform work. What this principle means to the people in the organizations is that slogans and posters will not be used as a method to increase productivity, because they don't. (2) Improved and stable work processes will be established to help workers do the job correctly and more efficiently. Improved morale will occur. And then they went through some mechanisms of the processes that they will put into effect to try to educate the individuals in the shipyard, relative to how this principle relates to them specifically. Another principle, "drive out fear"--they went through a very elaborate process on that. Over a period of time, Pearl Harbor put into place a training process to attempt to train all of their people relative to the cultural changes that would occur.

As a result of that, we found that commitment is the key to success. Several people have alluded to the fact that, over the period of time, it has been tried and it has failed. I say that the reason it has failed has been the lack of will, rather than the lack of ability. Every shipyard that I have been in has had very capable people in positions to understand what to do. The problem has been that there was just not the coalescence of will to do it. We can say that willingness and ability are necessary ingredients, but it cannot be started, nor can it succeed, without a special willingness that we call commitment. I also call that commitment "zealotry" to distinguish it from 'endorsement'. I define "zealotry"<sup>8</sup> as being the obsessive insistence on a relentless pursuit of continuous performance improvement.

But I have also found, by looking at people who have put TQM into place, that in certain situations, you don't have to have that degree of commitment at the beginning. It is unreasonable to expect top management, coming directly out of the chute, to have that obsessive commitment. Admiral Traister at Pearl Harbor didn't have it at the beginning. In fact, he looked at

it as a device that he grabbed out of thin air, to try to stabilize the problem of low morale in his shipyard. It was only after he had been in it for nearly a year that he began to become a convert. Henry Ford II at Ford Motor Company had no such commitment at the beginning. He endorsed it, as did Admiral Traister. At the beginning they said, "I've got another agenda, really, but I'll give you guys a shot at it. Go ahead, I'll give you some support, but I'm not going to be a zealot." The Chief Executive Officer at Florida Power and Light did not have a zealot's commitment at the beginning. He simply endorsed it.

The quality process does not have to start with a zealot's commitment from the top at the beginning. The initial endorsement to go ahead and give it a try is sufficient at the beginning. I also say, though, that before you get into it for a long period of time, that chief executive does ultimately have to make a commitment. If the zealots underneath him are in fact zealots, he will make a commitment. The commitment from those at the bottom will ultimately convert the top management to be committed as well.

#### Gainsharing Plans in Naval Shipyard8

Lyn Haumschit Mr. Doehnert is employed by the Department of the Navy, the Naval Sea System8 Command--NAVSEA 07. He is the Industrial Engineering Branch head. He ha8 the responsibility for industrial engineering and productivity-improvement application8 in the eight Naval shipyards. During the period from 1987 through 1989, Mr. Doehnert also served as the Department of Navy Gainsharing Coordinator, which, you can see from your Agenda, is what he is going to be speaking to you about. He managed the development and implementation of the Navy-wide gainsharing policy and initiatives. He received the Department of the Navy Productivity Professional Award for hi8

accomplishments. He has authored papers and spoken on gainsharing at a variety of conference<sup>8</sup> and workshops.

Kurt was employed at Mare Island Naval Shipyard from 1978 to 1984. He is a member and former Vice Chairman of the Nation<sup>81</sup> Shipbuilding Research Program Panel SP-8 on Industrial Engineering. He has a Bachelor of Science in Industrial Engineering from the State University of New York at Buffalo. Kurt also received the Institute of Industrial Engineers 1990 Outstanding Young Engineer of the Year Award.

Kurt Doehnert I guess the reason that I am here, in addition to wanting to attend as the NAVSEA 07 representative, is that I am also an affiliate member or associate member of Panel SP-5, which means I'm on the mailing list. Unfortunately, however, we don't have enough travel money to participate in the meetings. In a review of one set of minutes of an SP-5 meeting, I noticed that there was a proposal, or an idea, about looking at gain sharing as an SP-5 project. So I called Frank Long and said, "By the way, did you know that we in the Navy have been doing many things with gain sharing over the last couple of years?" His response was that he didn't necessarily know about that, but how would I like to come and speak at this Workshop and tell you all about it? So, I'm very happy to be here to do that.

I would like to make a quick program correction. The Agenda says "Gainsharing Plans in Naval Shipyards". First of all, we in the Navy, for whatever reason, use gain sharing as two words, not one. We heard we might get sued if we used it as one word.

What I am going to talk about is the Navy's philosophy of gain sharing, our textbook, how we view gain sharing and some of the Navy applications of gain sharing, including in the naval shipyards. The Navy, as I

mentioned, has been the leader in Federal Government gain sharing for about the last ten years. Our concerted effort began in about late 1986 or early 1987, when I had the fortunate opportunity of working with the Office of the Assistant Secretary of the Navy on getting this going Navy-wide.

By the way, I do want to thank my set up men for my presentation here at this conference. First was Mr. Klinges, who talked about the Shipbuilders Council of America Board of Directors and their eight steps. Step eight was last, but not least, to improve the management of human resources, including finding a way to motivate people to work together by sharing results. That is gain sharing to some degree. And also, Mr. Spring from the Department of Labor, who in his CREED, his first "E" in CREED was "Equity", and that included finding a reward system to reward and enhance behaviors. I will take partial exception to something Howard Bunch concluded with, which was about TQM and focusing on the individual instead of the group. I agree with a lot of what Howard says, but when he makes that statement in the context of gain sharing, I agree with Captain Felton's statements about having two kinds of teams--individual teams plus the whole organization as a team, the whole entity as a team. Gain sharing is a group-team incentive approach rather than an individual-piece-rate incentive approach, as has been done in the past.

I'll mention a few quick random things that will not have connectivity until I get rolling on the presentation. First, you all may know, especially you Panel SP-5'ers, that back in July of 1987, SP-5 issued a report documenting an SP-5 project that was conducted at the Kaiser Steel facility in Vallejo, California, entitled "Gainsharing--Employee Involvement in a Shipyard/Assembly Yard". So, if you haven't ever seen that, you might want to call the library or Frank Long or somebody and get a copy of that document. I am very pleased to see that the title is "Gainsharing--Employee Involvement" because, as I am going

to emphasize, the Navy's philosophy is that gain sharing is not just an incentive system; it is really an employee involvement, team building, TQM tool system. This report basically concluded that it was feasible, it was practical, it was successful, but unfortunately, after 12 months, the workload of that facility in Vallejo dropped so significantly that they dropped a lot of the things that they were doing, including their gain sharing plan. But, in summary, the evaluation of this gave strong indications that, in the search for new ways of doing things in the U.S. shipbuilding and associated industries, an Employee Involvement/Gain Sharing program is definitely one means of breaking down the barriers of boredom and inefficiencies inherent in our traditional methods of human resource utilization.

"Productivity sharing is not an incentive plan: It is a philosophy of management...a way of life at the workplace." That's a definition of productivity gain sharing created by Mitchell Fine who developed and owns a commercial off-the-shelf gain sharing system called Improshare. You could substitute a lot of things in here, but productivity sharing is not an incentive plan; it is a philosophy of management, a way of life at the workplace, just like Total Quality Management is. That definition involves employee empowerment, employee involvement, information sharing--again, some of the important concepts that were touched upon by some of the previous speakers.

The following is a quote from Colonel Gartman, the Commanding Officer at the Naval Aviation Depot at Cherry Point, which is recognized as the Federal Government's premier and initial total TQM facility. "When you are willing to share some of the money with the employees, the intrinsic value of just doing that--of putting your money where your mouth is, if you will--is worth more than the amount of money that you share." You can talk about the value of money as a motivator, but gain sharing plans don't have payouts only in money. In fact, we

in the Department of Defense have authorization from Congress to grant paid administrative time off, in lieu of cash awards. So do you want your \$200 or do you want a day off, paid-administrative-leave-type option? So we're not just talking about money here, necessarily, there are other things, whether it's jackets and color TVs or paid administrative time off.

Some of our Navy activities have implemented profit sharing, which is a form of gain sharing. But we don't call it profit sharing because we don't make profits. The Navy philosophy and, in fact, the government philosophy, is customize, customize, tailor, tailor. Don't go buy any off-the-shelf gain sharing program. When we first got the gain sharing initiative going in the Navy, one of the responses from a lot of activities was, "Wait a minute. You're pushing another program on us. We're all out here trying to do TQM. Do you want us to do TQM or gain sharing?" That's like saying, "Do you want us to do TQM or Statistical Process Control? Do you want us to do TQM or invest in training?" It's all part and parcel of this management philosophy.

At the fringes, TQM is a management philosophy with focus on quality and process improvement. At the fringes, gain sharing is a way to share rewards, monetary or otherwise. They have all of the words and the other good things that you have heard from all of the previous speakers in common, so I won't run through them again. Gain sharing is an enabling mechanism for TQM. It is a tool to perhaps enhance TQM, if you find that it fits right.

This is the Navy's definition of gain sharing, as was published in a Secretary of the Navy (SECNAV) Instruction, issued on the 4th of January 1988:

Productivity gain sharing is a management process, utilizing incentive and employee involvement systems to improve productivity and utilization of resources. Gains resulting from the improvements are shared between employees and the agency.

This 2-1/2 page document did not lay out much in the way of



requirements. It says, in essence, if you're going to do it, here's how, here's this, here's that. Embedded in the Navy definition is that it be group-based. The Navy's philosophy, but not requirement, is that the group should include the entire activity, as it does all 3,000 employees at Cherry Point.

Getting back to the definition, are we talking about employee incentive? No doubt about it, but the major emphasis is on Employee Involvement. The process is designed to maximize utilization of resources; that is, to get the most bang for the buck, the best quality, and so forth, through sharing the gains from proven improvements in productivity. We're not talking about intangibles, we're not talking about cost avoidances, we're not talking about if's or maybe's. We're talking about proven and documented improvements and savings shared with the employees and the activity per a predetermined formula. In order for the employees, as well as the activity (the shipyard or whatever activity), to get some, it is Department of Defense policy that the maximum share that the employees can receive is 50% of those savings or gains. That's DOD policy, which the Navy is consistent with, per a predetermined formula. The seven major elements of the Navy's Productivity Gain Sharing (PGS) are as follows:

1. Money
2. Design options
3. The PGS formula
4. Productivity management
5. Involvement of employees
6. Total quality management
7. Strategic business plan

Elements 4, 5, 6 and 7 are separate and independent from gain sharing; elements 1, 2 and 3 are part of gain sharing. But you cannot do gain sharing effectively unless you are doing the elements 4 through 7.

Earlier speakers have discussed the importance of the strategic business plan. Gain sharing has to grow out of your strategic plan. What are

you trying to improve? What are you trying to measure? What are you trying to focus on? What do you want to do now and in the future with your organization and does gain sharing fit in with that? Hopefully, your strategic plan would embody the concepts, principles, certainties, etc., of Total Quality Management and all that goes with it, as we have heard about earlier in this Workshop.

Element 5, Involvement of employees is critical to productivity gain sharing as well as to achieving improvement. But in gain sharing, to look at it one way, you are dangling the carrot out there. If you do not enable the employees to reach that carrot through some sort of employee involvement system, then it won't be long before they determine that management is just doing it to us again, and there is no way we can get that carrot. The employee walks into the supervisor's office and says. "I've got a great idea that will improve productivity and make life better around here," and in the back of his mind, he says, "and result in cost savings and a gain sharing payout to me." If the supervisor says, "I don't have time for that right now, I'm dealing with today's crisis," or "Submit it in writing and put it up through the chain," and there is no chain for that person to submit it into, then that person is going to walk away and say, "Damn this gain sharing. Damn this whole management. Damn this place." Employee Involvement, so that the employee can cause an effect--an improvement-- and can see the cause and effect between what he or she is doing and the effect, which is a gain sharing at the end.

You have to be able to measure productivity if you are going to be making payouts on productivity gains. Again, some of the cliches have already been cited here, like "you can't manage what you can't measure, you can't improve what you can't manage", etc. Of course, this is very, very hard to do, and more so in some cases than in others. A lot of people will try to help you do that but that is hard to do. I use the following scenario to make my point.

This guy is crawling around on all fours on the street corner under a street light, obviously drunk. Some good Samaritan walks up and says, "What are you doing?" He says, "I'm looking for my car keys." The Samaritan asks, "Did you lose them here?" "No. I lost them in the alley." "Why are you looking for them here?" "Well, there is a street light here and it's really dark in there." That is what we tend to do when we look for productivity measures. We look under the light at what is really easy to grasp and not at what we really should be measuring. Think about it, because it is critical.

Our four steps to the gain sharing process include assessment, design, implementation and evaluation or maintenance. You don't take a gain sharing plan off the shelf and plunk it in. You look at your organization. Are we ready to do this? Do we have a strategic plan? Do we have TQM? Do we have Employee Involvement<sup>7</sup>, Do we have productivity measurement? Do we know what our goals and objectives are? Are our labor/management relations good or bad? You can do gain sharing in either case. I would say that with good labor/management relations it makes it a little easier to carry gain sharing to the table. If you have bad relations, some will tell you that you've got to fix those relations first; others will tell you that gain sharing is a good thing for either side to bring to the table, even in an adversarial relationship situation.

You have got to do a feasibility and readiness assessment. You must look around your organization, the culture, the climate, the systems in place, the measures in place, and so forth, and figure out if you can do it. Then, of course, you design it, you implement it and maintain and evaluate it. We have examined some potential timeframes for accomplishing the four steps. On the high side, we estimate three months in assessment, six months in design, six months in implementation with maintenance and evaluation ongoing. So this model

kind of says that it could take you a year and a half on the first cycle.

When you get into the design phase you have to consider the following: Why are we doing gain sharing and what are we trying to achieve? How are we going to design this plan? Is it best done by a team made up of labor representatives and management? Everybody in the workforce should, in one way or another, be represented on that design team. What is the scope in coverage? Again, the Navy's philosophy is all work, activity-wide. What are you going to measure? What are you going to compare against to determine if there has been a gain or a loss? What is your baseline going to be? It could be past performance; it could be a goal or projected future performance or it could be standards of performance. What is your gain sharing formula going to be? That is what takes those productivity measures and comes into a savings calculation. It says how those savings will be split up. The DOD policy is maximum fifty-fifty split, but it could go other ways. It could be thirty to the employees, forty to the company, while whatever is left over goes back to the customer to encourage him to come in and get more work from you. You should consider a reserve pool, where you pull some of that money out and save it for a rainy day, or save it in case you forgot to pay somebody or some other extenuating circumstances. How are you going to distribute the share? If it is money, are you going to pay it by check, by cash or put it into their bank accounts? How are you going to distribute it? What *is* your reward type going to be? I have already talked about whether it might be cash, time off or material things.

Other considerations would include performance periods. How often are you going to measure to see if you have had a gain or a loss? Will it be quarterly, monthly or weekly? In the shipbuilding/ship repair business, there are some other considerations to that. If you are running an assembly line, for example, and things are constantly dropping off the end of the line, it's a

little easier to measure on a weekly basis. When you are doing ship construction or submarine overhauls, it can be twelve to fourteen months or more. You may not want to look at a submarine overhaul and how we do on it from start to finish, because you are talking about a duration of twelve to fourteen months. The longer the time, the more muddy it becomes for the employee to see the cause-and-effect relationship of what he does in month one of this availability that might not result in a gain sharing payout for him until thirteen months later. So you get into all of those human behavior types of things.

Who is going to be eligible? What kind of eligibility criteria are you going to have? Will it be number of hours worked or what? One of the biggest controversies that I have been party to within the Navy is whether to tie gain sharing to individual performance appraisal ratings. Of course, we in the government have very structured and formalized individual performance ratings. NAADEP Cherry Point does not tie their gain sharing to their individual performance rating. So a person can have a marginally satisfactory, if not unsatisfactory, individual performance rating and, if they meet the other qualifications, they are eligible. And I have sat in some meetings and have heard some people argue this thing to death. They just cannot believe that Cherry Point would do that. Cherry Point has its own rationale. Although I didn't say so up front, in a lot of cases, there is no one right answer. This goes back again to the importance of customization and individual tailoring.

I have already talked about the need for Employee Involvement. You have to be sharing information with the employees; they have to know what's going on. You have to figure out how you are going to link gain sharing to other awards that you are making. We, in the Navy, continue to foster and encourage use of our other incentive program awards. How are you going to

implement it, how are you going to evaluate it, and what information do you need, both to design your plan, as well as when you begin to operate your plan? In the Navy, we espoused the principles of keeping it simple and involving the unions.

We call it "Productivity Gain Sharing", but we don't want to productively be producing junk or productively be producing good stuff three months late. So you have to have some checks and balances. It can also be argued that you are probably not going to be productive if you are making junk, because you are going to have rework. There is some truth to that. Traditionally, people have talked about "incentivising" people not to take sick leave; that is, setting up gain sharing for zero sick leave. If that fits into your strategic plan, and that is a major element that you want to focus on, then fine, so be it. I might suggest that some suboptimization can occur; that is, what you get focused on is what you measure; you get what you measure.

When the Navy decided that we were going to do gain sharing, a lot of people didn't even know what it was, so we had to have some training. We had the Naval Personnel Research and Development Center, a human resource, behavioral science think-tank out in San Diego that had a lot of expertise and experience in gain sharing, and they were available to assist us in a consulting capacity.

The following is a list of elements necessary for successful gain sharing programs.

1. Management support at all levels.
2. Employee participation systems to identify and solve work-related problems.
3. Definable and practical measures of performance.
4. Sufficient workloads to absorb increases in productivity.
5. Information sharing between participating parties.
6. Union participation where appropriate.
7. Availability of parts and materials to accomplish the work.
8. Continuous feedback to workers on their performance.

Sources of failure of gain sharing programs are these:

- o Management neglect
- o Poorly designed formulae
- o Poorly understood formulae
- o Autocratic style of management
- o Delays in responding to suggestions
- o Management attempts to limit size of bonus
- o Cheating by management or employees
- o Poor market conditions

The question arises as to when is the best time to institute these types of actions, be they TQM, PGS or others. Should it be when you are in first place, or when you are in last place, or when you are in third place out

of five? When you are in first place, you have to do some things to maintain excellence. Some people might argue that it is harder to sustain excellence than it is to achieve it. Once you get in first place, it's harder to stay in that position. But when you are at the bottom or approaching the bottom, you've got nowhere to go but up. You decide: you be the judge.

A study by the General Accounting Office (GAO) showed that where gain sharing plans are in place more than five years--in other words, after they have had time to get into effect with all of the other things--the average improvement that they found was 17 percent in all of the companies that they looked at. Those companies were in the private sector at that time, of course. Benefits to the organization and to the employees included improved productivity, improved competitive posture, improved labor/management relations, increased recognition, better communication, shared productivity benefits, increased opportunity for involvement, increased opportunity to promote and cause positive action and a shared role in decision-making processes. But the bottom line to us in the government, in the Navy, in the naval shipyards, is that we are facing a lot of the same challenges, pressures, issues as the rest of many other industries, including the shipbuilding industry, both public and private shipyards, and so forth. We can't continue in the business-as-usual mode. Therefore, we are doing things that some of the Navy speakers have talked about, including TQM and, when and where it is appropriate and will work, productivity gain sharing, and we need that flexibility to do that.



Employee Involvement/White-Collar Productivity at Peterson Builders, Inc.

Nancy Harris Mr. Rodney Robinson is Vice President of Robinson-Page-McDonough and Associates, a small consulting firm in Portsmouth, New Hampshire. He'll be speaking to us on employee involvement and white collar productivity at Peterson Builders, a project he has been working on for Panel SP-5. Mr. Robinson spent most of his professional career as a nuclear engineer in the Navy Nuclear Propulsion Program, where he worked under Admiral H. G. Rickover for nearly 25 years. He was head nuclear engineer at the Portsmouth Naval Shipyard and became the first civilian nuclear engineering manager in the program. His career spans virtually all of the nuclear submarine designs` from NAUTILUS up to the OHIO Class ships. Now retired from government service, Mr. Robinson has been involved in a National Shipbuilding Research Program since 1977, and has carried out several projects under its Panel SP-8. He is also active with Panels SP-1, SP-3 and SP-5.

Rodney Robinson A comment by Captain Felton yesterday is particularly appropriate for the subject matter of my remarks today. Captain Felton said, and I quote, "Portsmouth is the only place where the engineers don't talk to the waterfront." He had his tongue in his cheek, I'm sure, when he said that. But if you think about it for a minute, you can convince yourself that every one of us has that problem. I can speak from first-hand knowledge about the Portsmouth Naval Shipyard backwards from ten years ago. The engineers, indeed, had a problem talking to the waterfront.

The project that we are going to be talking about today addresses the white-collar workforce, whatever that is, and attempts to improve the productivity of that group in a shipyard. We are about mid-stream in the project and don't have a great deal of meat to share with you yet, but if we

have our Fourth Annual Symposium next year, we'll come forward and share some meat with you at that time.

The RFP for this thing came out last October and called for an investigation and measurement of shipyard white-collar workforce productivity - the first initiative, as far as SP-5 was concerned, in the hallowed halls of the white-collar world. Having penetrated that fortress, we were to develop and test the application of redesign innovations produced by the employees themselves. And we've heard a number of arguments in that direction over the last couple of days.

One feature of the project, so far as our proposal was concerned, was that we insisted that it be done in a small shipyard. The reason for that was that we wanted to involve a broad segment of the white-collar workforce, rather than that in a large shipyard, where we felt we would be constrained to a very narrow group, given the number of people that we could accommodate within the constraints of the project. That really determined where the project would be done. Before we talk about that, however, let's get on with the rest of the considerations in the proposal. We wanted to be sure of the support of senior management because otherwise, whatever we decided to recommend by way of innovations would fall by the wayside. We wanted a blank check going in. We also wanted promises that we would not have any sacred cows. We wanted freedom to work in any white-collar area we felt like working in. We were encouraged to utilize some material from the American Productivity and Quality Center at Houston, and we availed ourselves of that material and are continuing to do so. They have a six-phased program, but our initial analysis of their approach would suggest that the upgrading of productivity would be done within that group itself, without regard to the outside world. I'm not sure I came through very well on that point, so I'll try again. Kurt Doehnert said yesterday, "We don't

want to be productively producing junk." Well, that suggests that the output of the white-collar world has got to be usable by the users: it has got to be appropriate to the needs of the users. Otherwise we have improved the productivity of a group--say estimating, or planning, or scheduling, or what have you--and all we've really done is get them better at producing stuff that the users cannot use. We did not want to do that.

Rather, we felt that the full involvement of the production people, who are the users, would be necessary. And I guess I should explain to you at this point my view of a shipyard. It consists of a production worker, who is the principle entity in the shipyard. All the rest of the people in the shipyard are support to that production worker. That is a biased view, I realize. To quote my former boss, "That god-damned Robinson is soft on production", which is what came over the phone in a blue flash one day. But if you ask around, I think you will find that Robinson was one of the sternest taskmasters as far as production is concerned. I beat the daylights out of those people in my role as head of the nuclear engineering effort at the Portsmouth Naval Shipyard. On the other hand, I did recognize the point of view of that part of our workforce and continue to do so. And I can tell you, ladies and gentlemen, that, until we harness our workers and allow them to produce what they are capable of doing, we are not going to improve our shipyards.

This project has a twelve-month timeframe, which says, "Don't get in too deep and don't go too widely or you won't make it." In the first three months, we would measure a productivity baseline. How do you do that? We picked up several indicators. The particular shipyard that we are at, Peterson Builders, had an ongoing analysis of production change requests, which is the vehicle with which the production people speak to the white-collar world. The quantity of those change request, the nature of them, and the response times

associated with them are good indicators of whether the white-collar side is cutting it. Similarly, we could comfortably monitor and get a handle on the frequency and magnitude of revisions to drawings, so far as the posture of that particular indicator was concerned. We also were able to do a study of the migration (for want of a better word) of the white-collar people, to see if they sit religiously at their desks all day long and whether their hardhats have a couple of inches of dust on them, or whether, on rare occasions, they venture out into the real world and stumble down to where the action is and interface with the people that they are there to support. We did a survey of personnel on both sides of this question to sample their attitudes about each other and about the common lot at Peterson Builders.

We promised to look at compliance with schedules, but we knew we wouldn't be able to do that, not so much because people didn't comply with schedules, but because the schedules weren't worth a damn, so compliance with them did not really mean much. We also took a look at the idea of procuring material for the lowest installed cost, not purchase price. This presupposes a good exchange of information from the user back to the buyer. For example, if production takes 3 days to put up a door closer that costs 25 dollars, but can put one up in 20 minutes if it costs 50 dollars, we certainly ought to buy the more expensive door *closer*. But the people buying the door closer don't know that, because they don't have that closeness of communication with the guy installing the door closer. Once again, an indication that we have got to bridge the Grand Canyon between the white-collar side and the workers.

We would spend a month analyzing the data that we had collected and then pick an area for getting on with employee-developed improvements. And those innovation development efforts would last about three months. We would hold no area sacred, and would attempt to come out with recommendations to the

management of what we ought to try for improvements. Having put those improvements in place, we would let them run for two, three, four months, capture the improvements or lack of them, write all that mess up following the usual NSRP procedures and report back to SP-5.

Now let me tell you where we are. Finding a small shipyard with the right kind of workload is difficult enough, but finding one with the right kind of work-mix to support a reasonably-sized white-collar group is an added dimension. There is only one that I know of, and that is Peterson Builders. I was not at all disturbed about going to Peterson Builders--I've been there before, and felt that obtaining the full support of the senior management in that location would not be a particularly difficult task. And as it turns out, it was not a particularly difficult task. The management up there is quite enlightened and is interested in getting on with improving their lot. The general manager, Tom Kerley, and the people under him--his operations manager, his head of planning and scheduling, and what have you--are all tuned into this project and can hardly wait to see what we are going to be able to do with it.

We have already interviewed the representative segment of both sides, as I mentioned earlier, and have a reasonable baseline from which to measure those improvements. In analyzing the data, we found evidence in place already that, in those isolated areas where the white-collar people are talking to the workers, there already is substantial improvement in the productivity at Peterson Builders. Unfortunately, that is happening only in a very narrow segment of the shipyard. But the evidence is overwhelming that, where these people work closely together and communicate faithfully across the gap, things are noticeably improved. We have, therefore, selected two areas (not very hard-to-find areas) where the people are not talking to each other. We have made up, ala TQM, a couple of action teams in each of those two areas.

There were several reasons for trying to piggyback on the TQM thing. Peterson has had the initiative going for some time and has had training underway on TQM. They don't call it TQM. They didn't like the "T", they don't like "Total", so they substituted "Continuous". They left the "Q" in there, so it is "Continuous Quality". They took the "M" out ; they didn't like the connotation that management had all of the "marbles" and so they put "Improvement" in its place. TQM, to Peterson Builders, is CQI, "Continuous Quality Improvement". And building on the actions they have already taken, and with the people who have already been through the training in these two offending areas, we have set up two action teams, consisting of about equal parts. On the production side, there are workers and their management and, on the other side, a broad spectrum of white-collar types, mostly engineering. But we have also included the material identification people, material procurement people, planners, and one scheduler (to whom all of this should be a real eye-opener). We have a pretty good group of white-collar people and a representative group from each of these areas from production.

We have selected the people and we have gotten their bosses to agree to let them participate. This is calling for a bit of investment on the part of PBI because the SP-5 project is not paying for all of the time and energy those guys are putting into this thing. PBI is, indeed, supporting quite well as the guinea pig, and very shortly--within the next few days--we will have our kick-off session for our two actions groups.

I hasten to point out that the prognosis for this thing, in my judgment, is really good. We have been able to have in our groups the "tough nuts" of both our specialty areas. We were encouraged to leave those guys out of the group because they have caused so much trouble. We got tough nuts on both sides. Our response was, "No, we want the tough nuts in the group because,

after all, that is what this project is all about." So we have the necessary people assembled and we are going to try our lot at getting them to talk to each other. I guess it was Admiral Donohue who quoted Vince Lombardi, "You can't win a game without doing the fundamentals correctly." Well, one of the fundamentals that we are going to try to deal with is people talking to each other and working with each other in a shipyard environment. If that isn't fundamental enough, I don't know how we can get much more basic. But that is what we need and that is what we have set out to do.

We should finish this first piece on time and, hopefully, within a matter of two or three months, have enough improvement or lack of it to be able to cite whether the project has or has not been successful.

#### Report8 of Breakout Sessions

Dr. Gaffney In our Breakout, we addressed three principle topics. I'll first run you through them very briefly, and then I'll come back and go through each one in more detail. In some cases, I'll try to give you a sense of potential solutions; in other cases, additional questions came up in the Breakout session, which we would hope will prompt further thinking on your part. so, I'll go through it really quickly and then come back and hit them one at a time. These are not in any particular order.

One issue that was raised is, what do you do if you've got key managers who just aren't on board? What we are talking about here is, in some large-scale organizational change effort within your yard, in most cases now under the umbrella of TQM or some similar approach, three of the four managers in the second level down from the CEO are resistant. Although the CEO is a supporter, in the next level down 75 percent of the top managers are not

supporters. The question is, what do you do? As we talked this out, the consensus was that having key managers not entirely on board was not that unusual.

Another issue was how to proceed with these large scale changes and still preserve craft pride. In this case, multi-skilling was the central concern. At the same time, there's this other stuff that is going on associated with TQM that might injure craft pride. The premise going in is that craft pride has served our industry well, and we don't want to lose that.

There were several union-related issues. By union-related, I don't mean that they necessarily were raised by trade unionists in the Breakout. The issue had to do with problems or issues surrounding this large-scale change in a unionized shipyard. There were four subsets, and one is that this Total Quality Movement appears to be top-down management-driven. The fact is TQM, Total Quality Management, is total and is management. Rodney Robinson just mentioned that Peterson Builders changed the name to remove that flavor from it. Generally, however, even if you change the language or the acronym, there is this sense that it is pretty much coming down on us. The question is, where and when does the union influence come in in such a top-down management-driven effort? Secondly, what's in this for union members; where's the goodies or where's the advantage or benefits for trade unionists? The third issue questions how you proceed when the current industrial-relations climate in the yard is not great or is, in fact, sour. Can you proceed, and if so, how do you proceed? And then, finally, the perennial question asked of either side is, what does management really want with this stuff? What is the hidden agenda in this Total Quality stuff? It wasn't apparent to some of the trade unionists in the Breakout session exactly what this is all about; is there something more to it that you're not telling us--you being management, us being the union?



So, those were the four main issues and what I'll do now is go back and hit each one and tell you what we came up with.

What do you do if the key managers aren't on board? In fact, this issue is similar to that last one in terms of what you do if the union isn't inclined to get on board. One of the participants in the Breakout pointed out that some companies that have done very well with this sort of thing--he mentioned Motorola and Corning and Campbell Soup--have revealed that, in fact, they did not have all of their ducks or managers in a row when they proceeded. It wasn't nearly as neat as you might think, looking at it in hindsight.

One solution that was offered was not to give IT a name. We should take Dr. Deming at his word here when he says that you shouldn't hang up banners and produce logos and slogans and all of the other usual stuff that is associated with productivity improvement programs and safety programs and other kinds of projects. It was suggested that if you don't refer to this change effort that is underway with a name and draw a boundary around it and produce a hierarchy of management to deal with it--if you don't make IT something separate from what is already going on in the yard--then it might very well be less threatening to some of these individuals who are resisting. It was pointed out that a lot of the techniques that were mentioned yesterday are techniques that had been used in the past and are characteristic of good management, good organizational behavior. The point is, if you don't make a big deal out of this and if, in fact, you want to do IT, since these are just logical, rational, good management behaviors and most of them are fairly invisible anyway, you can proceed without necessarily having your boss formally sanction it. At any level of the organization, you could do this and do better without having to make a big deal out of it. Do it sort of quietly.

Another point was to find out what the real problem is. What is it

that they don't like about the program? Alternatively, get them involved so you can find out what they *do* like or what they *do* want to get out of any change effort at the yard. If that makes any sense, and it is quite likely that it will, it could become one of the critical processes that the program addresses. That seems to be a common thread, a common part of any solution: Get these people involved in identifying what the program is supposed to do and the ways it might address the problems. Then they've got ownership of it, and they are not going to be resistant. So that is another possibility. It was also suggested that a diagonal slice of the organization be taken, to ensure that all levels of the hierarchy and all of the significant functions of the organization are involved in designing these change efforts.

As to the issue of how to preserve craft pride, it was pointed out that identity is very important in any organization. In Japan, workers have a very strong identity, not with their craft, but with the companies they work for. We don't often have that in this country. Another country that we looked to for having accomplished quite a bit in the area of manufacturing was Germany. There, workers do have very strong identification with their craft. They have a very strong apprentice program. The apprentice programs in this country have largely deteriorated, but in Germany, they have not. It seems to be important in our two major competitor countries. We talked also about the refineries and their use of these "ancillary tool agreements". These agreements contemplate that a craftsman can use certain tools, ancillary tools, of other crafts to proceed with his or her own work. A pipefitter is still primarily a pipefitter; it's just that he can use a few tools from the other crafts.

Another idea that was suggested was the formation of work teams or

task forces of multiple crafts. In that circumstance, the craftspeople work in a group of similar craftspeople, the mix of which reflects the technical content of the work at hand. It could be a ship module where a number of craftspeople work together off the same blueprint. You pull them out of their home departments--the pipefitter department, the paint department, or whatever--for the purpose of this task. When the task is completed, they go back to their home departments. In that case, they still have the identity of being pipefitters, but in terms of operational management or supervision, they will not be managed by the head of pipefitting, but rather by somebody who has responsibility for dealing with a number of crafts on an operational basis.

Another point was that in our schools today, unfortunately, if you do not go to college, a craft occupation is not very highly valued. In New York State, we cannot get kids to go to technical training schools. It is considered that you are a "retard" if you don't go to college. This is very unfortunate. The Germans do not seem to have that problem at all.

Next, let's consider some union-related issues. This first one is that, since TQM looks to be really management-driven, where is the union influence? It was pointed out that with the heavy training load that accompanies TQM, upwards of 5 percent of payroll, it clearly looks like there will come a point of collision. This continuous improvement stuff is eventually going to have an impact on the collective bargaining agreement. The question isn't, "Will it?" The questions are, "When will it? Where, when and how will the union get involved?" There seems to be this sense of TQM being rammed through. This is a deep concern to trade unionists. That was one issue. I don't know if we came up with any solutions to that one, except to get the unions involved.

Another issue is: "What's in ~~this~~ for union members?" Several things

were suggested. Managers should never respond by telling the union reps or members that it should be fun for them. The theorists, however, suggest that that, in fact, is part of it; that it is very enriching for workers to work in this kind of environment. Another one was that it's good for the country. If, in fact, we can produce these vessels for less than we otherwise would, then that is a good thing for the country, for the nation. Another one was the issue of survival. In those cases where the very survival of the organization is threatened, there is clearly a reason for trade unionists to get involved.

And then another one was the gainsharing that Kurt Doehnert mentioned. There are ways to enrich employees who really embrace this and make it work, and that is through a gainsharing program or possibly a profit sharing program or pay-for-knowledge arrangement or a bonus program, something like that.

One issue that was raised in gainsharing that we didn't have a really good answer for is: If you put in a traditional gainsharing program where the baseline of productivity is an historical baseline and you do better than that, then there is a gain and that is split. But if you have a continuous improvement philosophy, then next year what is your baseline? Is it still the historical baseline, or does the goal get moved up a couple of notches? It is suggested that it probably would be, given this view. That, however, is a bit different from the way gainsharing plans have traditionally worked. That is an issue that needs to be addressed.

We also discussed the issue of how to proceed where the industrial-relations climate is tough. One of the ideas suggested was to not give IT a name, the same as when the top managers are not involved. Don't make a big deal out of it. Another suggestion was to go slow and try to improve that climate. A third was through an approach to negotiations and contract administration called "interest bargaining". Interest bargaining involves some personal skill<sup>8</sup>

On the part of the bargainers, whether that be the bargaining committees in negotiations or the stewards and supervisors in the first steps of grievance processing. We also came to the conclusion that what is really essential to improve this is for trade unionists to get really smart about this stuff. In some instances, they know very little, because they don't go to these seminars and they don't read these books. But there is no reason why they can't read the books. There are places where trade unionists can go and get this information without getting it through management channels. Wisconsin has a program, as does Cornell, but ours is not ready yet. Cornell is still putting its program together.

The last issue was what does management really want out of this? At the Breakout, no manager volunteered what that hidden agenda was. So we have to conclude that either they don't think there is a hidden agenda, or that there is and, because it's hidden, we can't tell you.

Dr. Klein Let me start by mentioning the composition of our Breakout group. While we had a lively discussion, some might call it one-sided; we had all managers or labor-relations managers. Considering that the topic was multi-skilling, it is always interesting to hear people talk about what it means to do it to other people. What I would like to do is go through what our discussion was. You will see that we were talking about issues on which the group had some knowledge. If you really believe in Employee Involvement, however, and that the people who have the most knowledge about a particular subject are those who have to actually do it, then this was not the right group to be talking about it.

One general observation I would make is that everyone within the Breakout group (again managers) was in agreement that movement towards some form of multi-skilling was desirable to improve productivity. Notice I said,

"movement towards some form". I think it would be fair to say that no one in the group was ready to say they should have one trade classification. Maybe that is my observation, but I certainly didn't hear it from that group. There was definitely a recognition of many obstacles (underline many obstacles) both within the management structure of their own organization, as well as within the union structures.

Let me go through some of the key issues. We started out with three main issues, and Mike Gaffney really talked about the first two. One was jurisdictional issues. If you have multi-skilled people, what union do they belong to and who do they pay dues to? There are just some structural things that are going to get in the way. That was a major issue but, in recognition of the fact that it would be rather ridiculous for this group to address it, we moved on to the the next thing--craft pride. There was general recognition that that was a big issue. It is important to have pride and identity. There are issues as to both actual work and people pride. Different people gravitate towards different trades or crafts.

We spent quite a bit of time on the issue of supervision in a multi-skilled environment. Do you have multiple supervisors or multi-skilled supervisors? Does the supervisor have to know as much or more than the people he is supervising insofar as particular skills or trades are concerned? That was a question that I raised, based on my earlier work on supervision. The group found that there were several issues here. Let me just go through and highlight them.

Does a supervisor have to know all of the details of the trade? That issue goes to the general respect that a supervisor will get from his group. I have seen this with engineering groups as well as with trades. What the technical folks respect is technical knowledge. One of the best quotes that

I ever heard concerning the managing of multi-skilled engineers was: "A manager needs to know enough technical jargon to be able to separate technical issues from organizational issues, because technical people will always present problems in technical language, even if it is an organizational issue." If you don't know enough about the technical aspects, then you cannot really figure out whether there really is a problem. Similarly, if you are dealing with a group of craft folks, if you have different crafts there, how can you sort out whether it is a real issue or not?

A subcategory of that issue is the evaluation of performance. If a supervisor has multiple crafts reporting to him, how can he determine whether the work is good or bad if he doesn't know that craft. That is a real issue if the expectation is that the only person who can evaluate performance is a supervisor.

Closely related to that one is the issue of safety. Can a supervisor who doesn't know a craft make proper safety-related decisions as to job assignment or work?

Those are really issues coming from below the supervisor, and the supervisor is always the person in the middle. There are also issues coming from above. This is where we turned it back on the managers in the group.

One has to deal with the management's expectation that the supervisor can answer any question that is addressed to him. If, all of a sudden, you have a supervisor who has multiple crafts reporting to him, he may not be able to answer any of the questions addressed to him. Will managers be willing to tolerate a situation in which a supervisor is forced to say, "Well, I've got to go check that out?" And that is a problem.

Another is the measurement systems and the incentives for supervisors, particularly when you get into multi-skilling. If you are measuring your

supervisors on productivity, there is no incentive for a supervisor to provide cross-training *or* to rotate people from one job to another. It is simply a whole lot quicker and easier to just assign the job to the person who knows how to do it. We had a lot of discussion around supervision, partly because I steered the discussion that way because they were the people in the Breakout group.

There are a couple of other issues that were raised, but time did not permit us to talk them through. I thought they were worth posing to this group, however, for your consideration as to the extent to which you really want to do multi-skilling.

How many crafts do you consider for multi-skilling? Do you cross all crafts? I think the only thing we really concluded is that there are certain crafts that it makes sense to overlap but perhaps not all.

Education and training: Where do you start? How do you educate people? How, in fact, do you educate them to even think about this because it is a hot potato?

Being an academic I had to put the last issue into the fancy term-- "institutionalization". Translated, what that really means is, "How do you take what is really going on on an informal basis--a lot of teamwork, a lot of folks helping out one another--and try to formalize it. What I've seen in some companies in the manufacturing field is that people are really working as multi-functional, multi-craft teams. While they help one another out, there is real resistance to formalization. There is the fear that the minute you go and try to put it into contract language, you lose everything you've got.

Recognizing that those are real issues and the first three were major, we did get into some options.

Of the three options that we talked about, the first one dealt with



teams composed of multiple crafts. It is similar to what Mike Gaffney had discussed around the craft pride issue. It is interesting that we had a group of managers dealing with this issue in my Breakout and his group was made up mostly of union people. We kind of converged here, which is nice.

Another option that is similar but different would lead toward functional organizations, as opposed to trade organizations. Rather than having the pipefitters, welders and all that in separate groups, a company can do a major reorganization and have different crafts reporting to functional managers. This would have more application on a project-by-project basis.

The third option was partly the result of frustration. Toward the end of our discussion, we were saying, "This thing is so hard, why even bother to talk about it?" Then the comment was made, "Well, maybe we should start on engineering first." That really goes into the issues surrounding white-collar productivity, and there are a lot of advantages there. The thinking was that if you start thinking about looking at engineering, and at the link between engineering and the trades, there may be some opportunities for a win/win situation for everybody. That, in a nutshell, was the discussion.

Mr. Sotir The TQM Breakout group was led by the team of Bunch, Felton, Sotir and Worden. It was truly a cross-functional team that brought together the skills of those individuals who are involved in the process. The issues that we addressed were four.

The first issue is the lack of union involvement at Electric Boat. One of the reasons that there is no union involvement at this point in time is based on some lasting union/management relations problems that have been ongoing for a couple of years. Another reason is that I don't think that we are ready yet. For TQM to be truly "total", it is going to have to get down to the deck-

Splates level in the organization. It is going to have to involve everyone. Let me dwell on that for a moment. The reason that we are not ready for union involvement is that TQM is a top-down, top-driven process. The way that we and other shipyards are set up involves an organization structure that starts and flows from the top to the bottom. The gurus talk about the fact that 85 percent of the quality problems that occur in an organization are not the problems of the worker. Eighty-five percent of the problems that occur are the result of the process. And of course, typically, the way we address a quality problem is to beat the daylights out of the worker. What the gurus are saying is, "Hey, really, that is wrong. Look at your process. That is what is causing the problem." That leads you to consider who owns the processes. The processes are not down at the worker and the foreman level. The owners of the processes are at the top. Who determines the number of pieces of equipment, the number of workers, the time, the budgets, the processes, if you will? They are up at the upper levels of the structure. That is why our approach has been top-down, identifying those processes that are critical in the business and assigning the owners, the individuals responsible for making those determinants, to the Process Action Team as task owners.

In support of that position, let me ask, "Who determines the flow? Who determines the number of engineering change notices? Who controls the part numbers and the inventory?" Those items are not controlled at the deck-plates level of the organization. They are controlled at the upper levels where the ownership is and the flow-down process has to start.

Another reason why I do not think that we are ready yet is that the middle layer of the organization hasn't learned how to manage a total-quality-oriented workforce. Until they do, until they learn how to manage participatory kinds of approaches, until they learn how to involve their people and truly

learn how to do it, we won't be ready.

Let me give you an example. When I was conducting one awareness session, a general foreman commented, "Tom, I hear what you are saying about 15 percent of those quality problems, but you still have to have that old-fashioned discipline." And I said, "What do you mean?" "Well, let me give you an example. Last week I sent one of my workers to get six bolts out of the crib. Granted, the bolts were kind of heavy. When he came back, he dropped two of them and I can't discipline him." Well, the general foreman missed the obvious point. What was wrong with the process that he had to send someone away from the job to get the bolts? Why weren't they at the job site? If they were that heavy, what did he give the person to carry them? What was the process? I tried to point out that in that instance, responsibility did not rest with the worker. I agree that involvement has to go down to the deck-plates eventually, but it is not there yet, and I am not concerned about it. We have a lot of work to do at the top of the structure.

Another issue that was raised was using the number of Process Action Teams as a measure of results. I think that the consensus of the group, as well as the team here, including Captain Felton at his yard, is that just keeping track of how many teams you have going is not a good measure. How many Process Action Teams are active is not a measure of success. You may have a lot of activity, but it might be getting you nowhere. You may have a lot of activity on processes that are not really key. If you have people working on processes that don't contribute to meeting your functional goals and objectives, very frankly, you are not going to get the ROI that you are seeking.

Another question goes to the length of time before you see a return on Total Quality Management. This is the tough question. It is a tough one for the energy drivers in an organization to implement. It is easy enough to

philosophize and say, "Look, you don't understand the program if you ask that kind of question. Your return is ultimately going to be the meeting of your goals and objectives, achieving your strategic plan. You are going to be right in line with that whole alignment that I talked about and your business is going to be successful. If you manage it using this kind of a philosophy, you are going to be there." Well, in truth, what your controllers in the business, the people who are in charge of the corporation, really want to see is, where is the return on investing a lot of money, on doing a lot of training involving a lot of people's time? Unfortunately, or maybe fortunately, you do need to keep track of what the activities that are going on are. What are some of the efforts out of the team? How much time have you taken out of your total manufacturing and administrative process? How are your costs coming down administratively and manufacturing-wise? You need to keep track of those things.

The final issue--and I am just going to leave it as a big red question mark--is, what should the role of SP-5 be? We talked about the need for networking, the need for just creating the understanding at the level of individuals that are involved here. SP-5 can play a role, but that is an issue that I think is best left for the Panel to consider.

Editor's Note:

As noted in the introductory remarks, the Agenda was corrected to reflect that the Breakout session scheduled for Professor Bunch has been cancelled before the Workshop began.

The Breakout session scheduled for Mr. Doehnert did not take place because of an apparent lack of interest in further pursuing the matter of gain sharing plans in naval shipyards.

Additional copies of this report can be obtained from the National Shipbuilding Research Program Coordinator of the Bibliography of Publications and Microfiche Index. You can call or write to the address or phone number listed below.

**NSRP Coordinator**  
The University of Michigan  
Transportation Research Institute  
Marine Systems Division  
2901 Baxter Rd.  
Ann Arbor, MI 48109-2150  
Phone: (313) 763-2465  
Fax: (313) 936-1081