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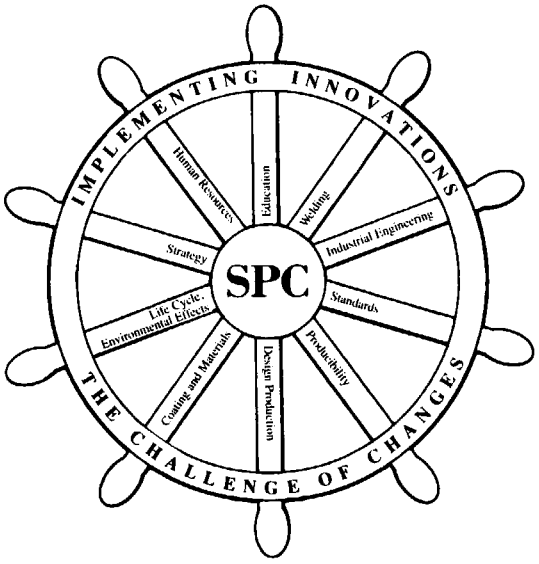

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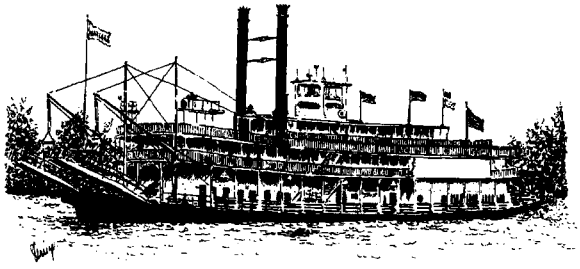

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The Shift to Formalized Shipbuilding Standards

No. 6A-2

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ABSTRACT

In today's shipbuilding environment it is important for United States (U.S.) yards to adopt a philosophy of constantly improving systems of both production and service. For years our industry has depended upon a "captive market", that of the U.S. Government. With present cut-backs in military spending the U.S. shipbuilding industry must become a competitive force in the world marketplace. To achieve this goal there are many areas our industry must address; one of these are implementing improved shipyard standards. Time and again U.S. yards "reinventing the wheel" as they face a new contract, while our foreign counterparts have well known, commercially viable National Standards. The lack of such standards in the United States, be they internally generated by an organization such as The Society of Naval Architects and Marine Engineers (SNAME) or adopted from an internationally recognized body, such as the International Organization for Standardization (ISO), is an area that must be addressed by our industry if we are to remain competitive in today's marketplace.

INTRODUCTION

Every shipyard has a standards program. It may not be definitive or conventional, and may exist at the lowest levels of the shipyard organization, but every shipyard does have a standards program. It can be something as simple as two laborers over a brown bag lunch deciding how they will work together on a fitting problem. They may have ignored, or not understand how their actions affect the company, they have developed a new standard. It may not be a definitive program, it may not be conventional, but every shipyard has a standards program.

HISTORY

Trinity Marine Group's (TMG) formal Standards Program began in February of 1991; so this group of yards are very close to the theme of the SNAME 1992 Symposium "Imnlementing Innovation: The Challenge of Change." Before the process of how this group of yards develops its standards some understanding of how this group grew into ten shipyards is important. The history will help in understanding why the methods used to implement a standards program were chosen.

Fig. 1 Shipyard Locations

Most of these yards are located along the Gulf Coast. The early growth of each individual yard can be directly attributable to the growth of offshore oil needs, the "Oil Patch." As the Oil Patch prospered, so did local shipyards.

In the early 1980's when the oil boom went bust, so did many shipyards along the Gulf Coast. Long term investors with the patience, foresight and money, seized an opportunity and saved many struggling shipyards from financial ruin. While this consolidation of the industry is good it was not without problems. Suddenly, yards that were once fierce competitors, were now suppose to act as partners under a common banner. One of management's earliest goals was to make this substantial group of facilities function as a team. This was not always an easy process; one does not go from competitor to team member overnight.

The experiences of the early 80's taught a valuable lesson to Oil Patch yards; never depend on any one sector of the marine industry for survival. Off-shore support vessels were the bread and butter of these Gulf Coast yards. Each depended on the Oil Patch to supply them with the orders needed to survive. Today that is no longer the case. Since the early '80 these shipyards have diversified their product base and today build in composites, aluminum or steel for clients as diverse as individuals wanting mega-yachts to the U.S. government to commercial interests. This diversity can been seen in Fig. 2.

THE CHALLENGE OF CHANGE

Such diversification of product base brings enormous challenges to a standards program. This means standards must constantly evolve to survive. This is true for small yards as well as large shipyard groups. Programs that have become static, by their very definition, are going nowhere. A standards program must be dynamic to take advantage of advances in new materials, new methods, new technologies, even new regulations. The world is full of change and shipyards must change with it or be left behind. Change is inevitable, if not embraced and managed the changes that take place will simply leave behind, those individuals, those companies, and those industries which resist change. The challenge of change is to both embrace it and manage it, and yet not change simply to be changing. Change without an overall purpose becomes chaos.

PURPOSE OF STANDARDS

All shipyards are striving to achieve certain goals they consider important. At the same time they need to preserve aspects of their particular

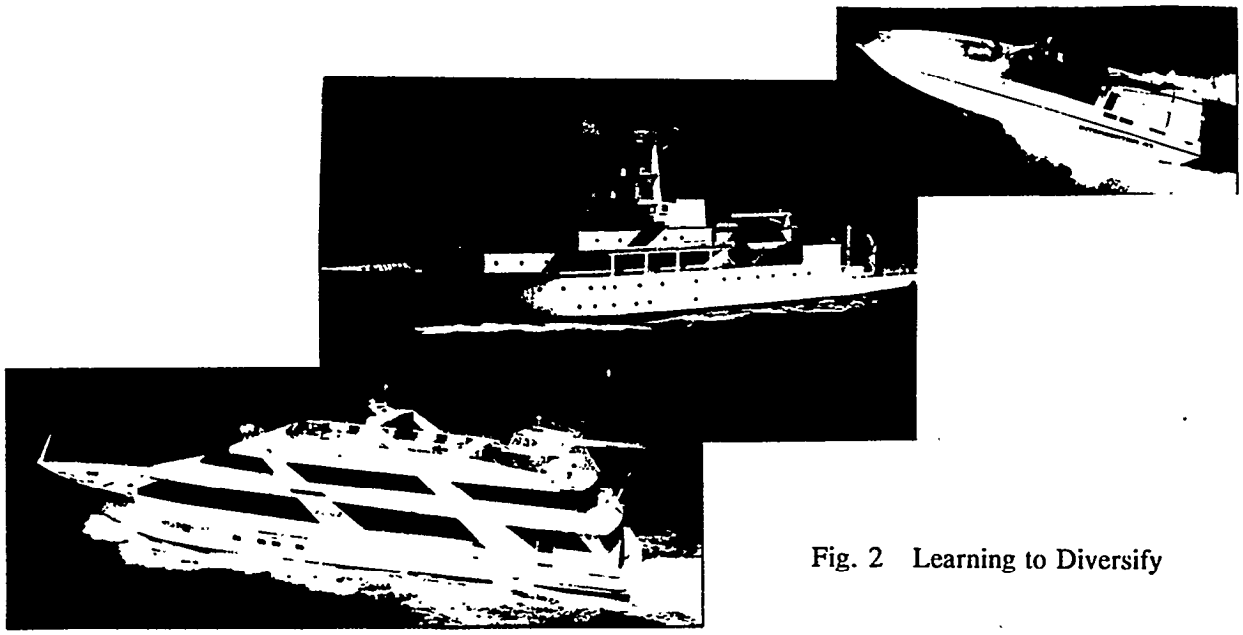

Fig. 2 Learning to Diversify

business which give them a competitive advantage, in the marketplace and of course, avoid problems where possible. The main purpose, and anticipated primary benefit to be derived from a formal standards program, is improved communication between the various shipyard disciplines. This improved communication will be an important factor in the accomplishment of these goals and desires.

GOALS TO ACHIEVE

By improving inter-departmental communication, overall effectiveness improves. People must do the right things, at the right time, in the right way to reach and maintain peek effectiveness. Effectiveness translates into productivity.

All shipyards have a rich pool of "corporate knowledge" that should be tapped. Most Gulf Coast shipyards have a heritage of father teaching son the boat building business. That is a legacy shipyards should strive to utilize, and foster as this is an important resource for the future of the shipyards, their employees, and greatly benefits the shipyards customers.

Shipyards of course, want to preserve certain things. Most yards have a long tradition of building quality vessels and in our day of increased competition quality is not an area anyone can afford to slight. Shipyards also want to preserve the lessons learned. Yards in the Gulf Coast area have built tens of thousands of vessels of various types; and during this process these yards have learned a good deal both from their successes and failures. Intelligent management definitely want to preserve those lessons learned so they are either repeated or avoid as prudence dictates, and a standards program is one way to preserve this knowledge.

There is also one thing that must be avoided in the development and implementation of a standards program, "Turf Wars." Many times yard personnel are all for standards, as long as they do not have to change the way **THEY** build or do something. This is the way standards are approach so many times, we are willing to comprise if "...we can do it our way." To avoid "Turf Wars," **it** is important for all involved in the process to approach standards with an open mind, and that open mindedness is maintained.

ORGANIZATIONAL APPROACH

Many shipyards have set up independent standards groups. There is absolutely nothing wrong with this approach, however, since a prime objective was to avoid "Turf Wars", it was decided not to establish an independent group that might add to the problem. Instead a Standards. Committee was set up.

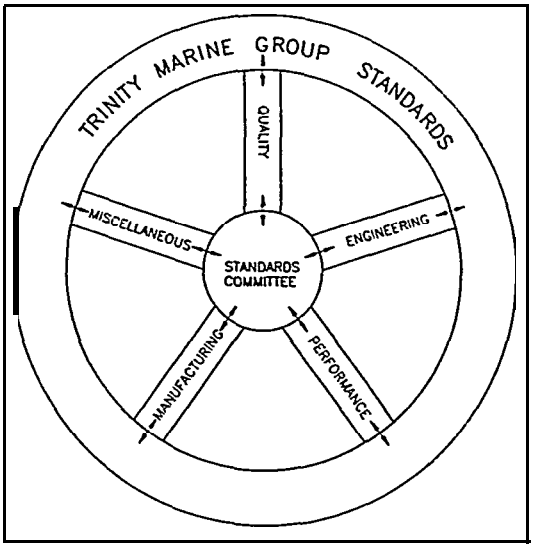

Fig. 3 Standards Organization Model

The idea behind this organizational structure, is to set the Standards Committee as a focal point, not a hierarchical organization with other people reporting to the standards group. The Standards Committee is to act as a forum for people to exchange ideas.

As figure 3 shows, information flows both ways, both into and out of the Standards Committee. By working as a team; objectives will be accomplish allowing development of a total body of standards useful to the shipyards and its customers,

The membership of a Standards Committee can be fluid. The advantage of this approach is to allow those with the appropriate experience to maximize their contribution to the organization. The group's basic structure consists of five people the Chairman, Engineering Manager, Operational Manager, Yard Manager and Warranty Engineer. Each of these people were chosen for a particular purpose.

The Chairman acts as interdepartmental facilitator. The important objective for the chair is to see that the process stays on course and that input is received from all those affected by the proposed standard.

The Engineering Manager acts as regulatory expert to make sure no design or production standard under development violates the many regulations shipbuilders face. The engineering department is responsible for writing/producing the standards along with maintaining the standards library and acting as publisher and distributer for standards within the company.

The Operational Manager's purpose is to make sure any standard developed are reasonable and buildable. This person, because of the position, has a global view of what each yard's capabilities are and must be assured that what has been designed is not the perfect solution that can not be built. This process of feedback is important to avoid wasted effort.

The Yard Manager was initially a planning sore spot. To pick one manager from a group of ten could have easily lead to the "Turf Wars" that are so counterproductive. Yet the viewpoint of a Yard Manager was critical to insure acceptance by the production group. Initial concerns proved to be unfounded, the Yard Manager has turned out to be one of the most valuable contributors to the standards process and there is a definite advantage to having the Yard Managers involved. Rotation of Yard Managers so each can serve on the Standards Committee is a definite possibility.

The Warranty Engineer is a hands on individual who actually fixes problems. What can happen with a standards group is they develop a standard that looks good on paper but simply does not work, for one reason or another, in the "real world." Without some mechanism in place the standards group gets no feed back and it is difficult to expect a problem to be corrected if the problem is not known to exist. The Warranty Engineer is able to provide the needed feedback to correct, or even improve, existing standards.

WHY A COMMITTEE?

There are certain advantages to having a committee. There is a diversity of knowledge, the committee is looked upon as an impartial body, since each member will naturally see things from a slightly different viewpoint there is the advantage of collective judgement, and as the team begins to function together an open mindedness to different methods arises.

The goal of this team building effort is to achieve synergy. Synergy is simply one plus one equals three. Doing more with less. The results are greater than the sum of the parts.

Another added advantage of having a committee, instead of an independent standards group, or a group attached to engineering, which is the more traditional approach, is that a standards committee does not need to justify its existence economically, the activities of the Standards Committee become an overhead function. Original estimates indicated about 1.5 million dollars, would be required to set up a special group to do standards; most of that as one time charges, to hire the necessary people, set aside office space, install computers and add support staff. The decision against this approach saved $1.5 million for use elsewhere.

THE PROCESS:

At present the committee identifies needs for standards and then proceeds to develop them. This is viewed as a temporary phase, since it is desirable for most requests for standards to come from yard personnel. To date about fifty (50) requests have been received from the yards for standards. This is more than enough to keep the Standards Committee busy for the near future however; it is only a very small portion of the overall picture of needed standards within the group.

To achieve effectiveness every request for a standard received by the committee, is given a classification code. This is done by using the classic Pareto Principle. Vilfredo Pareto was an Italian economist, who was first to recognize that 80% of the wealth in Italy was controlled by 20% of the people. The Pareto principle has become known over the years as the 80/20 rule. This 80/20 rule is used to concentrate on, and receive maximum results with minimal effort.

When a proposed standard is received the Standards Committee group it into one of three classes, as shown in Fig 4.

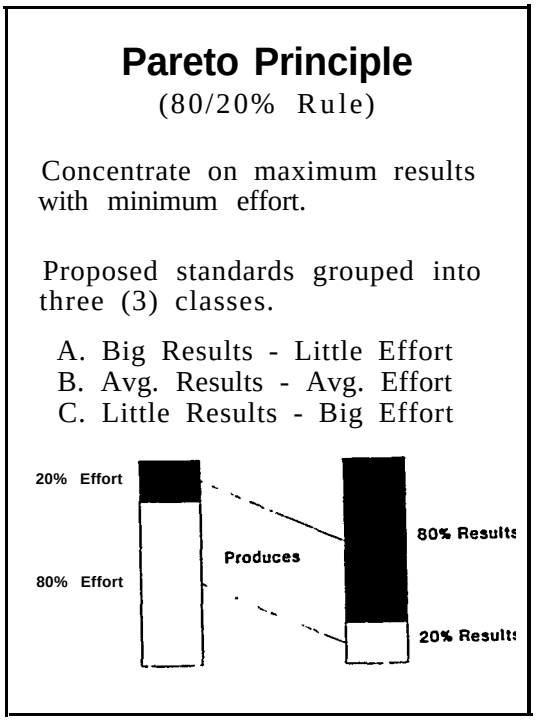

Fig. 4
Pareto Principle Applied to Proposed Standards

A proposed standard which is classified as being an "A" standard, is one from which big results are expected with very little effort; a "B" classification means average results are expected with average effort needed and a "C" classification standard is expected to give little *results* in view of the effort needed to accomplish the standard. There is no reasonable way of actually gauging in advance, the result, or the effort, that a particular standard will require so classifying proposed standards is a judgement call on the part of the Standards Committee.

After assigning a priority, based on the preceding classification method, the formalized process needed to both develop and reach final approval begins as shown in Fig. 5. This development and approval processes is a complex cycle of interconnected contacts and communications designed to insure that all those that the standard will affect can participate in its development and that maximum feedback is obtained by the Standards Committee.

This process is designed to enhance communications within the group - not get standards done quickly. The participation process is very important since standards not agreed to will quickly die without constant policing.

Fig. 5 shows this flow which starts with the need for the standard being identified. From there it goes to the Standards Committee where it is logged in, and prioritized. The standard is then assigned to the necessary people for review and comments. The Standards Committee then receives the reviewed standard and makes changes as needed; a draft standard is issued and, as shown in Fig. 5, goes round and round until the draft standard is finally "approved" by the Committee. This "approved" standard is then distributed to yard personnel for further review and comments. The comments received from the individual yards are incorporated into the proposed standard and the process begins again. This cycle continues until the concerns of those involved are addressed.

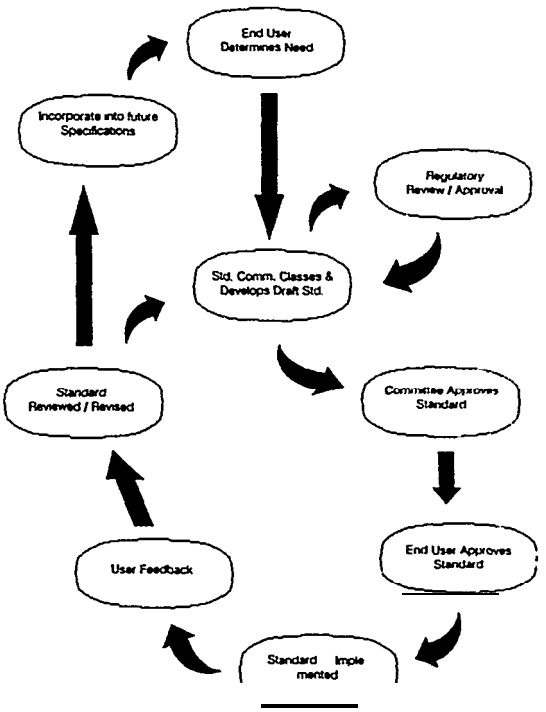

Fig. 5
Standards Development and Approval Process

This process is designed for maximum input from affected users and is critical for acceptance. Such an elaborate system helps in avoiding the "Turf Wars" which can so easily spring up.

With ten shipyards even the simplest things can cause problems. One of the first standards needed was the method used for determining Molded Lines.

Molded lines, on the surface, are not highly technical; they are however; an important communication tool. SNAME has produced a standard for molded line configuration that is excellent but as mentioned before, with many yards coming from different backgrounds and having different methods of doing things, over the years each developed unique standards for molded lines.

With the advent of Computer Aided Design and Drafting (CADD), and with the primary purpose of the standards program being communications between yards, molded lines were a priority. The process was given its first real test and after a few iterations the Molded Line standard was approved. Not advanced technology but an important communication tool that did not previously exist.

APPROVALS

An important part of this standards group is the final approval process. This is where every Yard Manager, not just those on the Standards Committee, must sign the final version of the standard to show their approval. Their signature shows they agree with the standard and that they will use the standard. This is a critical part of the process as maximum participation is important.

The forgoing process would all be for naught if not for what is the most important part of any Standards Program - Executive Managements Support. This support is the only thing that will give a Standard's Program a chance of reaching its potentials. Management must see the benefits for both the yard and for their customers. Standards can help yards build vessels at a lower cost (no reinventing the wheel) and to a higher level of quality (repetitive process limits learning curve problems). Both these result in a more competitive shipyard which benefits shipyard and customer alike.

CONCLUSION

Standards are only one weapon in the arsenal needed to be competitive in today's market place. It is a discipline that can run throughout the organization and have either a positive or negative impact on overall competitiveness. A standards program is necessary to take advantage of a changing environment. The cliche that standards will limit creativity is valid only if a limited view of what can be accomplished through a standards group is taken.