Marinette Marine Corporation
Internal Supply Chain Project

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Final Report Submission
Task 1 and Task 2 Summary

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EXECUTIVE SUMMARY/ABSTRACT

The objective of this CNST project has been to define and lay the groundwork for improved supply chain management system through the implementation of new business and material management systems that will be effective within Manitowoc Marine Group's (MMG's) specific business and product environment. MMG's environment is challenging because it includes multiple yards and major subcontractors simultaneously doing new construction and repair work for commercial, Navy, and Coast Guard customers. This report describes the Phase I requirements definition phase, and the Phase II pilot testing phases. The goal of this project was to understand the needs of the business and evaluate what industry solution would best fit those needs. The main objective is to reduce waste within the existing internal supply chain, reduce costs and provide better data for management. By achieving these objectives, MMG can thereby reduce costs to government customers on projects such as like the Littoral Combat Ship (LCS) program for the U.S. Navy.

During the Phase I of the project, the needs of the organization were determined by obtaining Voice of the Customer (VOC) from within the organization. From the VOC, system requirements were developed and sent to industry to see how well they could address those needs. A scorecard evaluation was developed from those requirement list responses to see where gaps existed and it set the groundwork for Phase II of the project.

During Phase II of the project, there were five industry solutions that were evaluated using ~~the~~ test scripts to create a pilot implementation. These five software vendors were as follows: IFS, MARS with Oracle finances, SAP, Vantage by Epicore, and INFOR's ERP-LN. There were several deliverables during Phase II. The first deliverable was the Pilot Test scripts that were the basis of on-site demonstrations by each of the software providers. The second deliverable was a summary of the Pilot Test evaluations of each of the demonstrations and the resulting scorecard evaluations. The third deliverable was the final team selection, a list of specific items and processes that would likely change as a result of implementing the new business system and lastly a listing of benefits and issues for each software. The fourth deliverable was an Implementation Plan for the proposed software solution that would identify the phases of the project, the deliverables, the project structure, project discipline, and other administrative aspect of the implementation. The last deliverable of this project is this final project report.

The process further described in the body of this report was a very thorough and logical progression of defining, measuring, analyzing and laying the groundwork to implement a solution to MMG internal supply chain issues. The final scoring taking all of the factors into account resulted in IFS coming in first followed by SAP. MMG is still doing some additional investigations, outside the scope of this project, by arranging site visits to European shipyards that are using IFS and SAP ~~in~~ during the week of March 24, 2008. These visits should provide final validation for the Manitowoc Company to support the capital investment for a new system. From the demonstrations, there is a strong business case for internal waste reductions, better and easier to access information which should arm management with better tools to manage projects. There should also be synergies and opportunities to realize material cost reductions that would have a direct impact on costs for existing government programs like the Littoral Combat Ship (LCS).

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BACKGROUND

Marinette Marine Corporation (MMC), a subsidiary of The Manitowoc Company Inc., is currently designing and building vessels for the U.S. Coast Guard, the U.S. Navy and commercial customers. In recent years MMC has worked with the U.S. Coast Guard to design and build thirty (30) buoy tenders, recently delivered the Great Lakes Icebreaker and is currently in production with the Response Boat Medium (RB-M). The US Navy work underway at MMC consists of the prototype of the U.S. Navy's Littoral Combat Ship (LCS) and Improved Navy Lighterage System (INLS). Planning is also underway for the production of Flight 0+ of LCS, which will potentially require the delivery of two to three ships per year from this facility concurrently with ongoing INLS, Coast Guard and commercial work. MMC has several commercial projects ongoing at the shipyard, to include such vessels as ferries and tugs. This mix of products, and the associated requirements, is unique within the U.S. Shipbuilding industry.

As a result of the volume of work, the mix of customers (Navy, Coast Guard, and commercial) requirements and the need to contend with design changes typical of a naval combatant; the performance of existing material management processes and systems at MMC has proven to be insufficient. Related issues we need to consider include:

- Initial design Bill of Material (BOM) definition,
- Integration of the design BOMs with work package BOMs and purchase orders,
- Development of material schedules,
- Material management and tracking within the yard, and
- Material cost performance reporting.

Substantially improved material management processes and systems are required to support the potential delivery of two LCS vessels per year together with ongoing INLS, Coast Guard and commercial work. These improved processes will dramatically impact MMC's ability to perform on both the LCS and INLS programs, with potential related savings estimated in excess of $1 million per ship for the LCS program. Both present and future Coast Guard programs will also benefit.

The ability of MMC and The Manitowoc Company Inc. to fund a substantial study to support such improvements was limited. The support of ManTech, through CNST, has enabled MMC to move forward rapidly and meaningfully with this effort. The resulting analysis, presented in this report, resulted in a greater understanding of the specific requirements of the organization as well as an education of what technology exists in industry today to better utilize the internal supply chain.

PROJECT OBJECTIVE

The objective of this ManTech project has been to define and lay the groundwork for implementation of new business and material management systems that will be effective within MMG's specific business and product environment. MMG's environment is challenging because it includes multiple yards and major subcontractors simultaneously doing new production and repair work for commercial, Navy, and Coast Guard customers. This report describes the Phase I requirements definition phase, and the Phase II pilot testing phases.

TECHNICAL APPROACH

The overall project was divided into two distinct phases. Phase I was the overall study of the internal supply chain. Phase II was the pilot implementation and eventual selection of a solution. Phase II concluded with a selection of a software system that best fits the needs when balanced with various other factors.

Phase I Internal Supply Chain Study

This first phase of the project started out defining the current state of the internal supply chain. After some analysis, it was determined that MMG needed to further investigate the needs of the customers within the internal supply chain. Voice of the Customer (VOC) was utilized to interview and establish requirements of a future system. These requirements were further organized into a large list of system requirements by department. MMG searched the shipyard industry, especially the mid-tier yards, for what software was currently being utilized. Site visits were conducted at Todd Shipbuilding, VT Halter Marine, Bollinger, and one large project company, Bucyrus International which makes mining equipment. The team interviewed personnel at each facility to investigate how their system currently supports their business and documented some of the benefits as well as some of the issues. The requirement list was then sent out to various software providers to see how well they could meet those items. The responses were analyzed and scored. The results indicated that not a single responder to the request could meet all of the requirements without some modifications. In fact, there were some 400 of the 3000 requirements that more than one responder could not meet. This illustrated that there would be some compromise required in the future, and MMG would really have to understand what features or requirements could be sacrificed and still have a system that provides the best solution to efficiently run the enterprise.

Phase II Pilot Implementation and Evaluation

Task 2.1 This phase built on the information obtained from Phase I. The requirement list was further refined and then prioritized. Each department was tasked to identify key processes in their respective areas that were essential to properly and efficiently operate. These processes were then distilled into test script scenarios. The goal of the test scripts was to try to differentiate the various software solutions from one another when the Pilot demonstrations were conducted. On some cases, MMG employed some outside resources to ensure that both present and future functionality was considered. As an example, ShipConstructor provided some insight on current and future functionality to export important design and purchasing data directly into an Enterprise Resource Planning (ERP) system. A Primavera consultant provided some insight into how data can be passed back and forth from a scheduling and cost management tool to provide accurate Earned Value Management System (EVMS) data. Lastly, a respected consulting group, Deloitte, was employed to provide software industry guidance and to ensure that the Pilot scripts were crafted in a way that the software providers could understand and interpret properly. Deloitte also helped identify the areas in our business that would be easy for software providers to execute as well as the areas where it would be more challenging to meet our requirements without modifications. This insight helped clarify the test scripts and to package the Pilot test

into an achievable two day demonstration that would be evaluated and scored by the MMG selection team witnessing the demonstrations. The final test scripts for the Pilot Implementation was provided as a deliverable as Task 2.1 to this project.

Task 2.2 The next step in this phase was to prepare data for the Pilot demonstration. Both shipyards provided typical data that could be imported into the various ERP systems and shown during the presentation. Using real data that looked and felt like outputs familiar to the MMG selection team was an important element to the evaluation. This information was provided to the demonstrators and it served another purpose. It illustrated how their systems could import data from excel documents. Each demonstration team used portions of the data to a greater and lesser extent. It also seemed that those who used more of the real data provided scored higher and the presentations were more positive. In this effort, MMG more closely evaluated the information in the current business system used at the facilities. At this time, an effort has gotten underway to purge the system of duplicate and outdated information and there is also a effort to determine what information will be brought over to the future system.

Task 2.3 The third step in the process was training. The original vision was to train personnel from MMG in how to use the software that was going to be evaluated and actually run the Pilot test. This proved to be too large a task in the amount of time. It was too much to ask for MMG personnel to become fully competent in five different software packages in various disciplines. The decision was made to have each of the software providers run the Pilot demonstrations themselves and to have the MMG selection team evaluate. There was training provided to the selection team in ERP terminology, presentation evaluation skills, and in consistent scoring. These training sessions were meant to better prepare the MMG selection team for the long days of demonstrations which were to follow. A market scan document was also prepared by Deloitte consulting. It was developed using software industry experts to evaluate the strengths, weaknesses, and financial viability of the software companies that were going to provide Pilot implementations. This market scan also provided other strategic information as to how many technical resources were available and how much each company invested in their products to continually improve and support their products. This document provided a sort of ‘scouting report’ for the MMG selection team prior to the Pilot demonstrations to better understand what questions to ask and the risks that may exist. The last item in this process was to agree upon a scoring methodology and scorecard. This scorecard utilized input from the MMG selection team and senior management to weight the various categories to better capture its impact to the organization. This final scorecard was then used for the evaluations in the next stage in the process.

Task 2.4 The fourth step in the process was the actual Pilot demonstrations. These two day demonstrations took place in the same off site facility. There was as much consistency as possible with the time allowed and the input and information provided to each demonstration team. During the Pilot demonstrations, the MMG selection team scored each test script item as it was being presented. Any major discussion that took the process off-track was noted and captured in a ‘parking lot’ for future evaluation. At the end of each day of presentation, the MMG selection team met alone to discuss the presentation of the day and identified areas that were good, bad, and areas that would need to be covered in the future. The software demonstrators appreciated the daily feedback and generally addressed the issues as best they

could. These presentations were video-taped for future use. MMG also arranged to have a single consultant attend each of the presentation for another objective viewpoint and scoring for reference later. Additionally, a consultant that was an expert in that particular software being demonstrated was also in attendance at MMG's request to provide the team with an honest appraisal of the presentation and to ensure that certain capabilities were not misrepresented or overstated. There was also a stenographer present to record the questions that were asked and the responses given to serve as a future record of what transpired. The scoring results were presented as a deliverable as Task 2.4 to this project.

Task 2.5 The next step was compiling the scores and notes from the Pilot Implementation demonstrations. The MMG selection team was asked to record beneficial features, issues, and document areas where the business would have to change in order to utilize the software being presented. The test script scores were compiled by name to allow for future data sorting and stratification. For future reference the information was tabulated by vendor and discussed with the group at later date. The scores were stratified and sorted into four categories for comparison purposes and discussion. The first sort was the whole group score (less the consultants). The second sort took the subject matter experts score in a particular area only (example is to use only program management to evaluate the program management section or the finance people to evaluate the finance area etc. The last sort was to compile the scores by the two shipyards represented by the MMG selection team. The last part of this step was to review the data, as compiled, and to vote on the ranking of the five Pilot implementations. The final results of this step were documented and presented as a deliverable as Task 2.5 to this project.

Task 2.6 The last step in the process was to develop and implementation plan. This plan was created with input from the MMG selection team as well as from examining the business case an understanding the impact to the two business units. The plan also drew heavily upon experiences of Deloitte consulting and the software provider that the MMG selection team considered the best fit. The implementation plan represents the strategy MMG intends to pursue in realizing the strongest business cases as early as possible in the process. The plan also sets the guidelines for handling the logical progression of implementation and identifies the deliverables of each phase of the implementation. The plan also identifies the roles and responsibilities of the parties involved in the implementation. The final results of this step were documented and presented as a deliverable as Task 2.6 to this project.

TECHNICAL ACTIVITIES PERFORMED

Additional contextual information for each of the items presented in this section is found in the deliverables provided in this project. Items are shown here to illustrate some of the technical information that was developed as a part of the project.

Phase I Technical Activities:

Sample Sheet of Requirements Document
This sample shows just some 20+ items of a total of 3000+ items in the overall document. This could be used by other future software evaluations in the shipyard industry if desired. The vendors later responded to this document as to how well they could meet each requirement. The results were documented and then analyzed in the next graph.

Hierarchy	Criteria	Priority	Baan	MARS	Oracle	IFS
1	**Financials**					
1.1	**General Ledger**					
1.1.1	**Parameters and Structuring**		--	--	--	--
1.1.1.1	Lean manufacturing accounting practices and methods (i.e., manufacturing overheads based on cycle time including labor)					
1.1.1.2	User-defined fiscal calendar					
1.1.1.3	User-defined calendar periods					
1.1.1.4	Calendar definition options: up to 13 periods, uneven periods, and adjustment periods					
1.1.1.5	Multiple calendars					
1.1.1.6	Multiple financial reporting entities					
1.1.1.7	Fiscal monthly period options for twelve or thirteen months					
1.1.1.8	Fiscal quarterly period options:					
1.1.1.9	User-defined calendar period organization					
1.1.1.10	Up to 999 user periods per calendar					
1.1.1.11	Calendars that span multiple calendar periods or fiscal years					
1.1.1.12	Base currency designation by financial entity					
1.1.1.13	Reporting entity definition and structure					
1.1.1.14	Entity ledger assignment					
1.1.1.15	Period calendar and chart of accounts for each entity ledger					
1.1.1.16	Calendar periods opened and closed by entity					
1.1.1.17	User option of real time versus data collection mode					
1.1.1.18	Sub ledger system					
1.1.1.19	Maintain unit and dollar amount postings in GL and sub-ledgers					
1.1.1.20	User defined criteria for system purges for general ledger transactions, journal vouchers, and accounts payable data based on the number of years or months of data required to maintain--each purge type has its own unique criteria					

Example of Requirements Document—Some 3000+ Items

Table 12-1 Requirements Listing

Original Requirement List Responses from Several Software Providers

This graph reflects the responses by each software provider. This indicates how well each can meet the requirement. The table also indicates what areas have the largest number of requirements that can not be met by more than one provider.

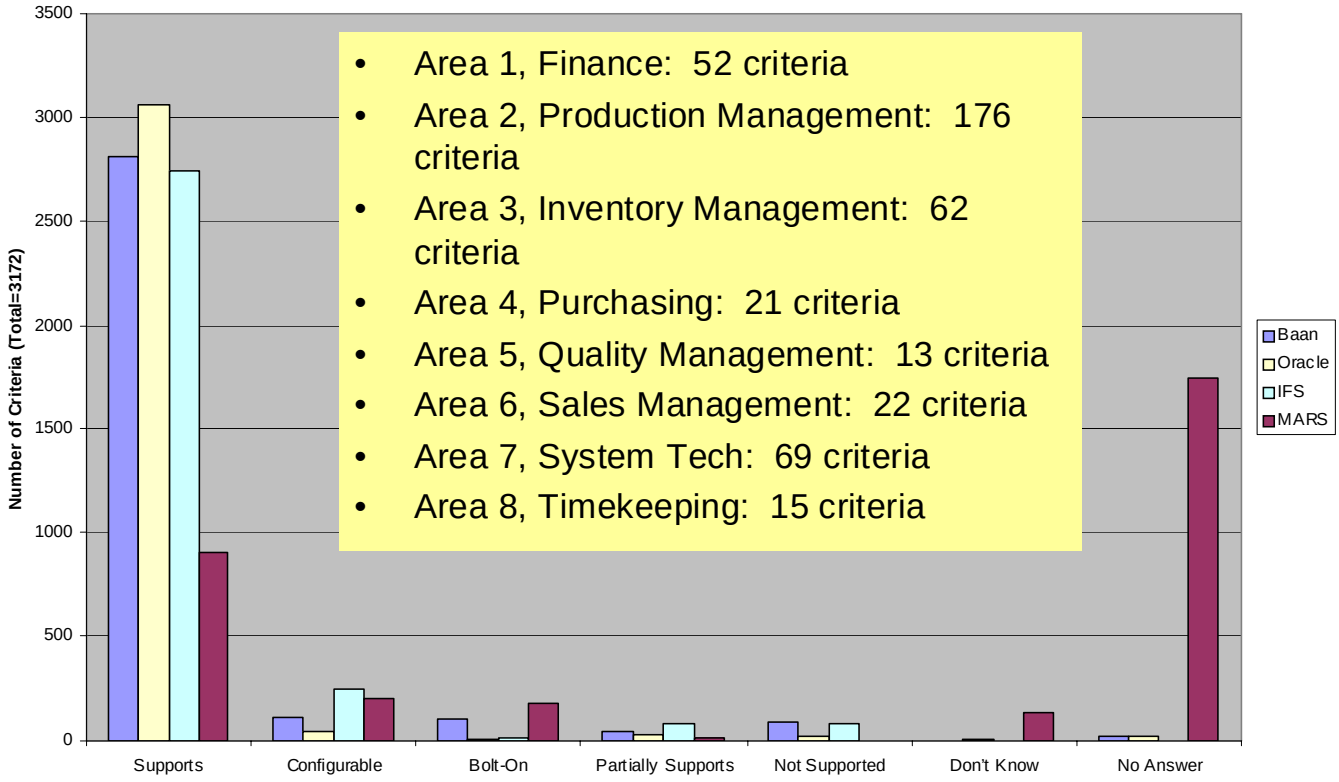

Figure 13-1 Software Compliance Graph

Phase II Technical Activities:

Task 2.1 Pilot Test Script (Sample excerpt)

This is a sample of the 20 page Pilot Test Script document. This is what the providers used and presented. Prior to the demonstration, they were to indicate if this functionality was a feature that was 'out of the box' or if any modifications or 'bolt-on's were required to meet this requirement.

#	Section Title/Requirement FINANCE	Capability Met (1,2,3,4)	In the Enterprise Demo?
1	Streamlined importing function - Data from BEST (Fixed Asset Management S/W)		
	- Time collection data if not integrated - Payroll Data		
	- Primavera Data for EVMS		
	- Bid information from Excel?		
2	Streamlined exporting function		
	- Data to HFM/Hyperion/Middleware (Financial Reporting to Corp) - Data to Cost Manager/Winsight for EVMS		
	- Positive Pay file - Export to Excel		
3	Create User Defined Reports/Templates - Financial Statements		
	- Projects/Estimates at Completion		
4	Inception to Date Data (labor/material)		
5	Open Purchases		
6	- EAC creation Input for Estimates to go (labor/material) Input for Estimates to Go		
7	- Time phased (multiple periods) - One-off reports as well as standard templates		

Figure 14-1 Pilot Test Script Sample

Task 2.2 Analysis of Current State Process (Sample excerpt)

This was a sample of current state mapping that was done to determine gaps in our process and help determine if they could filled by an ERP software system.

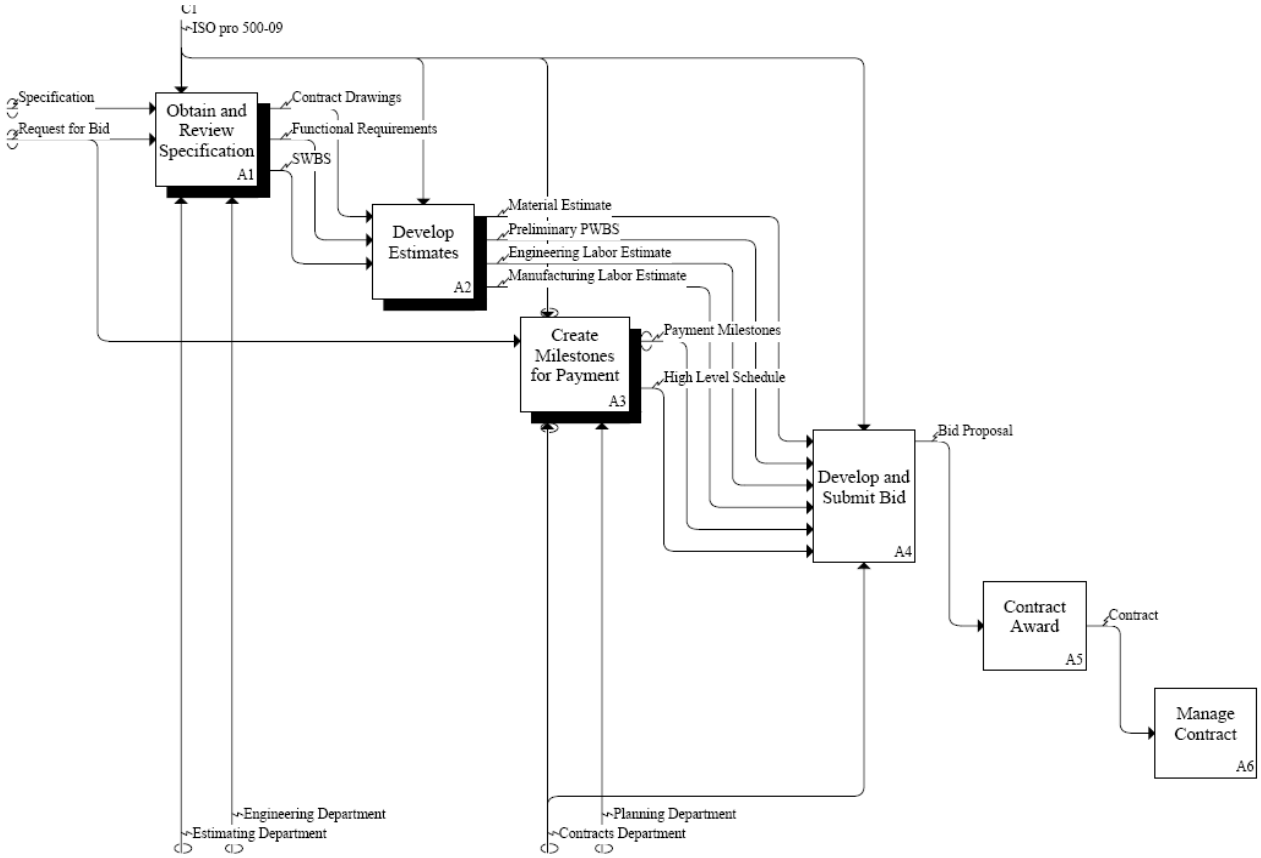

Figure 15-1 Current State Process Map Example

Task 2.3 Training

The Marketing Scan

The market scan was prepared by Deloitte consulting catered to fit the requirements of shipbuilding. The software reviewed was specific to this task as determined by phase 1 of this project. A higher score indicates that the software vendor is more likely to meet the requirements of that area. The results were as follows in a chart format against the various departments for our shipyard:

Departments	SAP	IFS	Infor ERP LN	MARS	Vantage
Finance	100%	60%	80%	100%	60%
Planning	80%	65%	70%	85%	65%
Scheduling	80%	75%	70%	85%	70%
Engineering	60%	45%	50%	95%	45%
Manufacturing	100%	75%	80%	90%	75%
Purchasing	100%	65%	80%	90%	65%
Quality	85%	55%	35%	75%	55%
Inventory / Warehouse Management	100%	60%	85%	70%	80%
Sales / Estimating	70%	65%	50%	85%	65%
Time Keeping	85%	45%	20%	100%	65%
Repair	95%	40%	35%	90%	65%
Integrated Logistics Support (ILS)	95%	20%	50%	65%	35%
Program Management	95%	50%	60%	60%	50%
IS/IT/Help Desk	95%	40%	50%	65%	40%
Overall	**89%**	**54%**	**58%**	**83%**	**60%**

The whole market scan is attached as appendix to Task 2.4 Deliverable to this project.

Table 16-1 Market Scan Results Table

Task 2.4 Score card summary with stratifications

Pilot Test Demonstration Scorecard/Evaluation

SCORE	IFS-Group	IFS-Sub-Exp	IFS-BSC	IFS-MMC	MARS-Group	MARS-Sub Exp	MARS-BSC	MARS-MMC	SAP-Group	SAP-Sub-Exp	SAP-BSC	SAP-MMC	Infor-Group	INFOR-SME	INFOR-BSC	INFOR-MMC	Functional Weighting
Function/Detail																	
FINANCE	1.47	1.23	1.43	1.71	1.88	1.59	1.95	1.89	1.63	1.45	1.58	1.89	1.95	2.25	1.92	2.28	10%
INVOICING	1.27	1.29	1.21	1.45	1.50	1.30	1.58	1.74	1.53	1.38	1.50	1.75	1.38	1.52	1.59	1.00	7%
PLANNING & SCHEDULING	1.36	1.36	1.39	1.54	1.44	1.23	1.58	1.36	1.65	1.41	1.69	1.58	1.79	1.61	1.85	1.93	10%
ENGINEERING	1.32	1.57	1.33	1.45	1.49	1.44	1.64	1.48	1.49	1.63	1.65	1.22	1.56	1.43	1.69	1.46	8%
MANUFACTURING	1.38	1.68	1.39	1.48	1.51	1.51	1.58	1.55	1.76	1.56	1.89	1.50	1.80	2.00	1.88	1.80	10%
PROCURMENT & MATERIALS	1.24	1.13	1.29	1.31	1.41	1.38	1.58	1.50	1.35	1.09	1.36	1.38	1.56	1.24	1.65	1.49	10%
QUALITY	1.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.50	2.67	3.00	2.60	2.00	3%
INVENTORY/WAREHOUSE	1.20	1.10	1.22	1.28	1.29	1.20	1.32	1.45	1.22	1.00	1.27	1.00	1.46	1.40	1.53	1.57	8%
SALES/ESTIMATING	2.18	2.67	2.17	2.08	1.83	1.67	1.92	1.83	1.92	2.00	1.83	1.89	2.33	2.14	2.42	2.17	7%
TIME KEEPING	1.73	2.00	1.67	1.88	1.31	1.58	1.32	1.28	1.75	1.64	1.64	2.13	3.53	3.50	3.50	4.00	4%
REPAIR	1.54	1.75	1.70	1.42	1.74	1.67	1.77	1.88	1.31	1.33	1.28		1.61	2.50	1.94	1.00	10%
PROGRAM MANAGEMENT	1.36	1.78	1.36	1.43	1.54	1.82	1.69	1.50	1.78	1.97	1.84	1.70	1.68	2.10	1.75	1.74	10%
ILS	1.36	1.67	1.50	1.22	1.28	1.33	1.00	1.33	2.00	1.00		2.00	1.00	1.00			3%
Average Score	1.42	1.56	1.44	1.48	1.48	1.44	1.53	1.52	1.58	1.42	1.54	1.50	1.87	1.98	2.03	1.87	
Average Weighted Score	1.42	1.54	1.44	1.50	1.44	1.47	1.61	1.57	1.52	1.45	1.53	1.43	1.84	1.91	1.86	1.71	100%
Sorted Area Listing	IFS-Group	IFS-SME	IFS-BSC	IFS-MMC	Mars-Group	Mars-SME	Mars-BSC	Mars-MMC	SAP-Group	SAP-SME	SAP-BSC	SAP-MMC	Inf-Group	Inf-SME	Inf-BSC	Inf-MMC	
Ranking by Subject Area	1	3	1	2	2	2	3	3	3	1	2	1	4	4	4	4	

Table 17-1 Pilot Demonstration Scoring and Evaluation Table

The results of the Pilot Test evaluations indicate that there is not a clear separation of scores, though the INFOR-ERP LN solution appears the have a larger gap when compared to the others. This indicates that other factors will have to be considered in order to make a clear choice for the Manitowoc Marine Group. Those other factors will be cost, market scan results, requirement list results and a general impression of system usability. Those items will be scored and compiled into another overall scoring matrix and presented in project summary deliverable.

Task 2.5 Results from Demonstration, Analysis, and Final Selection Information

Gap Analysis

When looking at the test script scoring, there was a review of gap areas of compliance or areas that were proved difficult to execute during the presentation. The results are provided in the table below.

TEST SCRIPT EVALUATIONS SUMMARY				
	IFS	MARS	SAP	INFOR
Gap Areas (not compliant)	6	7	8	47
Difficult to Execute	41	32	88	96

Table 18-1 Gap Analysis

This really illustrated that INFOR's package really would not satisfy the requirements of our team and it was essentially eliminated from consideration. It also showed IFS has the least amount of gap areas. It also illustrates some of SAP's functionality is accompanied by an additional effort to navigate the system.

Benefits and Issues of Each Software Demonstrated

The full detailed tables are provided in deliverable Task 2.5 and are too large to insert in this document. They will serve as a future guide when implementing the selected system.

Description of System or Process changes that will occur to take advantage of Software Features	
Item#	Description
6	Must integrate engineering deliverables into system (mfg. or other customer deliverables) (ie; dwgs, specs etc.)
10	Will need to be more desciplined to handling/recording how certain mat'ls are consumed (ie: nest/fab/sub/install)
14	Will need to identify links to item where-used in multiple locations to get pedigree/history information.
15	Will need to identify sorts and product structure to a lower level to allow for better reporting/analysis.
17	Won't be able to close workpacks w/o material being issued.
18	May be able to revert back to "smart" charge #s v.s. "dumb" ones for time card.(aid to reduce errors)
19	Will have to change bid/estimating process to take full advantage of system capability
21	May need to change handling of steel/shape to fully utilize capabilities within MARS
22	May need to change handling of pipe to fully utilize capabilities within MARS
23	Will need to change Harware Problem Report (HPR) process to take advantage of functionality
24	Will have to map all major processes to create Dynamic Enterprise Models (DEM)s
25	Will need to standardize terms for tasks/operations throughout
26	Need discipline to take advantage of engineering BOM which will auto-update in ERP system
27	Appears that there is a way to link ECP notes & identifier tag onto material
28	Will have to configure "projects" to work for ship repair
33	Will Change non-conforming/rejected material process
34	Material ordering process will change
38	Will be no need to create an excel Special/Material Ordering Schedule (SMOS) because system will have data
40	Scheduling tasks will require determination of task loading: level, s-curve, front or rear load
41	Progressing and EAC determination will change our procedure
42	Time keeping entry will change (new interface and increase automation)
43	Repair material and labor rpcess in system will need to have some changes
47	Will have to change how jobs are created in this system
48	Will have to chagne how requisitions are generated (and create an approval workflow process)

Table 18-2 Process Change Table

Final scorecard

The Scorecard as presented below indicates that the Software systems were evaluated in several different areas. The scores were all based on a relative 1 (best) to 4 (worst) rating approaches. The first is the Test Script/Demonstrations and was weighted the highest at 50%. The second area was a market scan evaluation performed by the consultant Deloitte and was weighted at 10%. This market scan evaluated each package against capabilities in the market as well as some other factors such as financial viability etc. The third factor is a subjective value by the selection committee on the impression of the software, its presenters and overall opinion of the software package weighted at 10%. The fourth factor is based on the software supplier response to our requirement document and how well they could meet our needs. The requirements document rated the lowest at 5% because it's the software supplier's opinion of the how well they can meet a particular requirement. The fifth and sixth factors deal with short and long term costs for each of the packages. Combined they constitute 25% of the evaluation.

GROUP Numbers	IFS	MARS	SAP	Infor BAAN		Weightings
Function						
Functionality/Demo (score cards)	1.42	1.45	1.52	1.84		50%
Market Scan-(Deloitte Report)	3.99	1.24	1.05	3.90		10%
Impression of Presentation	2.4	2.5	2.4	4		10%
Requirement Criteria Evaluation	1.10	1.20	1.14	1.24		5%
Acquisition/Implementation Costs	1.2	4.5	3.3	0.8		12%
Life Cycle Costs (Year 2-7)	1.3	3.3	3.8	1.7		13%
Average Score	1.90	2.36	2.20	2.25		100%
Average Weighted Score	1.72	2.13	2.05	2.09		
Ranking	1	4	2	3		

Table 19-1 Final Score Card Evaluation

As can be seen above, the total score would indicate that IFS is the leader, followed by SAP when looking at the group scorecards. There is an interesting correlation to costs and the market scan results (cost correlates to market based performance/capability.) The functionality demonstration, the most important factor as weighted by the group, resulted in a fairly close result within the top three. Further analysis was conducted to determine what specific areas were the strongest and weakest and how that could effect the organization. An emphasis is placed on manufacturing and repair work, as those are the drivers for our business.

Table of the Final Selection Team Scoring/Votes:
Each selection team member (10 in all) was asked to select a ranking for each software package in the final selection group. Below is a summary of that outcome.

FINAL SCORES by Selection Committee Members Only (1/24/08)

IFS		SAP		MARS		INFOR	
Vote-Score	Qty	Vote-Score	Qty	Vote-Score	Qty	Vote-Score	Qty
1	6	1	4	1	0	1	0
2	3	2	3	2	4	2	0
3	1	3	3	3	6	3	0
4	0	4	0	4	0	4	10
Total Score	15	Total Score	19	Total Score	26	Total Score	40

The Selection Committee Recommends IFS as Vendor of Choice with SAP at the First Runner-Up

Table 20-1 MMG Selection Team Voting Results

Task 2.6 Implementation phases and deliverables
This Chart illustrates the phases, the deliverables and what is expected during each phase of the implementation.

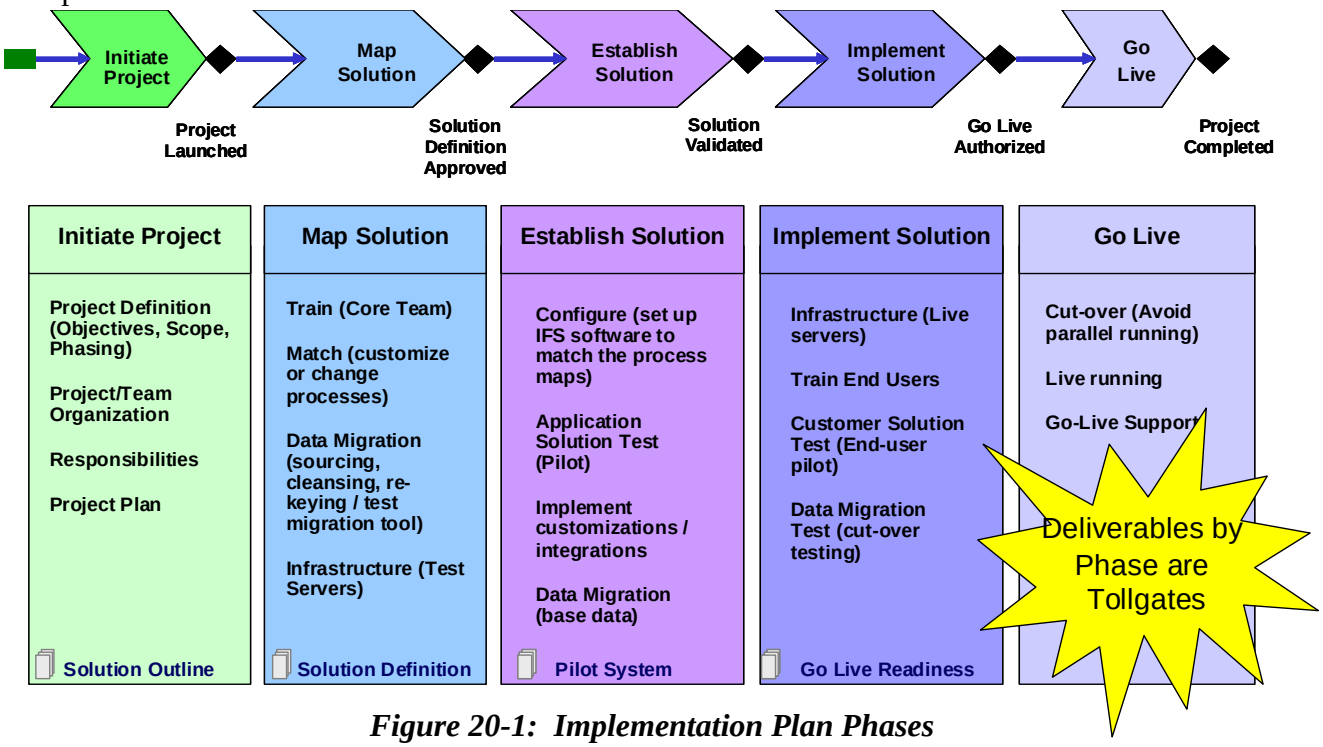

Figure 20-1: Implementation Plan Phases

RESULTS AND DISCUSSION

Phase 1:

This phase set the stage for defining the requirements of a new system which was further refined in the next stage of the process. It also identified that there are literally thousands of requirements that multiple software solutions can address and hundreds that they do not address without some customization. The final selection would likely result in a compromise of some functionality that is desired or processes will have to change or, less desirably, the software may have to be customized to some extent to satisfy a requirement of the business.

Phase 2:

The overall pilot test was a success. MMG was able to see four software providers demonstrate most of the pilot test script items that allowed us to evaluate there performance to real life situations. The pilot test was essential because a vanilla presentation that is not catered to specific requirements and demonstrations evolve into a 'slick' performance that the evaluator can't properly critique. Each of the presentations started with a general navigation and overview of the software package before we examined, in detail, the requirements. It was interesting to watch the process slow considerably once we got into the body of our requirements. There are a lot of advancements in technology in just the past ten years. It will be great to have our company take advantage of some of those features in the near future.

Lastly, the scorecard evaluation above shows some specific differences in the software suppliers. There were numerous factors and much discussion before a final vote was taken. In the end, IFS proved to be the best candidate for the group. There were no 'show stopper' issues that would preclude the group from moving forward. It turned out to be an analytical process as well as a fair and democratic process.

After much discussion and evaluation of the above information, the MMG Selection Committee made the following selection: IFS is the first choice, SAP is the second choice and MARS/Oracle is the third choice and INFOR is the fourth choice. The Steering Committee will evaluate the results and likely will officially confirm what the Selection Committee recommended.

CONCLUSIONS AND RECOMMENDATIONS

In phase I, the voice of the customer proved valueable, but we should have anticipated that creating 3000+ items would lead to some prioritization. During Phase I, MMG should have had Shipbuilders (i.e.: people who really understand the manufacturing and building processes of Shipbuilding) conduct the site visits. We had Finance and IT resources conduct the visits instead. It did provide some insight into those areas, but it could have been more rewarding with different personnel.

In phase II, we developed a business case for ERP implementation *after* the Pilot Tests. There was some value in understand what functionality was there before we could estimate the impact to the organization. However, when we developed the business case, we uncovered some significant areas that we should have had Pilot test scenarios created to evaluate directly. Another general comment was that having a software subject matter expert attend the presentation on our behalf and have the presentation video-taped mitigated the risk of a software presenter from overstating the capability of a product.

There were some more specific lessons learned resulting specifically from the Pilot demonstrations. There were a few items in the Pilot scripts that the software providers thought they understood, but really did not. MMG should have provided a contract document to each software supplier that described the product work break down structure (PWBS) as well as the accompanying ship work breakdown structure (SWBS). Each software provider required extensive explanation of this shipyard specific cost and product approach and that took away valuable presentation time. Another disappointing lesson learned was that several of the software suppliers had Shipbuilding experience yet failed to consult those industry experts to be fully prepared for the presentation. The pilot test scripts required demonstrations of uploading and downloading files into the system, yet it appeared that that was not clearly understood by some of the software suppliers. Consequently, we had to arrange for follow up presentations (via the web) to ensure compliance to our original requirements. The MMG evaluation team was prepared for the presentations, but we found that extra explanations were required and we had to often stop some of those conversations and put those items in a “parking lot” to address at a later date in the interest of time. It was difficult at times for the team to be able to objectively look at some pilot demonstration items without getting too caught up in what is currently done in the existing systems. Some other items, such as having a subject matter expert consultant, a dictation scribe record questions and responses, video taping proved to be valuable meeting tools that paid dividends for later review. Given that we had four full presentations of two days each over a 3 week period of time, it was good to have each evaluation team member write benefits and issues of each software as they witnessed them. Otherwise, it would have been very difficult to differentiate the pilot presentations at a later date. Lastly, we may have selected a poor time on the calendar for these presentations. At year end, most software providers are seeking to close potential deals by year end. As a result, we may not have gotten the best effort from each software company as there were potentially competing customers that may have been perceived to have greater potential for closing a deal before year end.

The final selection and voting from the MMG selection team was really a straight forward exercise. Once all of the information was presented to the group and the various aspects of the

results, the gaps, and the scores and stratification were discussed in a MMG selection team forum, the votes were cast and the results were clear. There was no debate or argument over what was the official ranking of the final vendors.

The Internal Supply Chain project was a success. We believe that there were some items as described above that could have been improved, but overall it resulted in a thorough investigation into what the industry provides and how it could be utilized to improve MMG's internal supply chain. The resulting analysis of the presentations and scoring appeared to be a logical conclusion when considering all of the factors that can be a part of a business transformational process of this magnitude.

MMG is currently scheduling a trip to shipyards in Europe to conduct a final validation by key Shipbuilding resources within the business. MMG will then present its business case and cost estimates to the Manitowoc senior management for a capital expense approval. There is real value internally to improve the business system. However, there is likely a greater potential improvement for customers like the U.S. Navy related to the impact a new system could have for management of large scale, evolving project that requires a large amounts of documentation and traceability. The new system could provide a new level of reporting transparency that does not exist today. MMG is very appreciative in the support that was given to do a 'bottoms-up' approach and evaluation of a new business system to satisfy the internal supply chain management needs of MMG. MMG also hopes that the U.S. Navy may be receptive to some additional support in the future to aid in reducing the overall cost to the government by providing some funding to offset some of the acquisition and implementation costs for the execution phase of the project.

REFERENCES

None cited.