

# Customization of Web-Based Planning and Production Engineering Technologies to Support Integrated Shipyard Work Flow

**All Panel Meeting, Philadelphia, PA**  
**Project Results**  
**September 15, 2009**

**Presented by**  
**Dennis Fanguy, Bollinger Shipyards**



Technology Investment Agreement (TIA) 2008-391:

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Web-Based  
Planning Project

# Project Overview

- **Prime: Bollinger Shipyards – Lockport**
- **Duration: April 2008 to September 2009**
- **Industry Investment: \$530k**
- **NSRP ASE Investment: \$542k**
- **Participating Shipyards: Bollinger, Atlantic Marine Mobile**
- **Technology Partners: Strategic Project Solutions, Inc.**
- **Implementation Support Team: Hepinstall Consulting Group, CBS Consulting**

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# Web-based Planning Project

## Desired Outcome

- To develop and validate a *project management approach to shipbuilding and ship maintenance* through the *delivery of a web-based production engineering tool* tailored to the needs of this industry along with a reliable, exportable implementation process using planning and production engineering methodologies.
- The tool will enable shipyards to *reduce project costs and cycle time* through project standardization as well as provide the *ability to perform rapid re-planning while maintaining alignment of all project stakeholders in real time*.

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# Based on Construction Industry EPC Best Practices (Civil Refineries, etc)

ExxonMobil

**BOLDT**



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# Participating Shipyards & Benefits They Were Seeking

	<b>Bollinger – Lockport</b>	<b>Atlantic Marine - Alabama</b>
Projects	Offshore Supply Vessel – Project 210	LPD 11 Modules
Duration	August 2008 – March 2009	August 2008-June 2009
Scope	Engineering, Production, Vendors	Production, Project Management, Quality Control, Engineering
Benefits the Shipyards were seeking through this project:	<p>To drive cost and cycle time out of ship building and ship conversion to meet the challenges of a declining government market</p> <p>To relieve the competitive pressures of their commercial market.</p> <p>To enhance capability to integrate all ship construction work, including external project stakeholders</p> <p>To develop capability of consistently performing ship construction work following standard processes.</p>	



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# Summary of Shipyard Vision

- ***Deckplate Coordination Vision Elements (15-20 Minute Daily Meetings)***
  - To have an integrated daily plan of all production activities and production support (engineering, project management, material, etc) planned for the next day.
  - To be able to create a task for a constraining activity so that it appears on individual's work list for commitment decision. (It becomes a controlled, visible request instead of an email that might fall through the cracks.)
  - To collaboratively discuss priorities for next day's work, and commit work activities that will optimize project performance instead of individual performance..with extended team
  - *Seamless* physical progressing of work on a daily basis

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# Summary of Shipyard Vision

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- ***Deckplate Coordination Vision Elements (15-20 Minute Daily Meetings) - continued***
  - To update the forecast automatically (without manipulation) based on the work commitments made at the daily meeting
  - To involve major subcontractors, design agents, major vendors from time to time – as part of the project team – to integrate their work into the daily plans and have visibility into their work progressing
  - To be able to upload information/deliverables associated with tasks so that all the information is at point-of-use, and all can access the information
  - To ensure solution is UNCOMPLICATED...easy to implement!

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# Summary of Shipyard Vision

## *Information Visibility Elements*

- To have visibility of:
  - All remaining work to complete a key event or major milestone
  - All remaining work associated with a zone, module, deck, or area of ship (ie, pilot house, engine room, etc).
  - All remaining work associated with a system.
  - All remaining work by discipline (for example) on project
  - All remaining work by discipline across all projects so that priorities can be established for shared resources.
  - All remaining engineering activities associated with specific module; Pre-launch activities; Regulatory activities; etc

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# Summary of Shipyard Vision

- ***Information Visibility Elements***

- To have a comprehensive listing of all tasks associated with a customer change order to reflect actual impact
- To have visibility “at-a-glance” of overall project schedule variance
- To have visibility into the team’s commitment reliability rate to understand project team performance to understand level of variability in project.
- To better understand your team’s reliability to accomplish tasks that were committed to the day before
- To better understand the things that are preventing your project team from completing tasks as planned
- To see the level of uncertainty decrease from your production system

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# Example of Shipyard Variation “Gustav & Ike”



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# Summary of Shipyard Vision

- ***Linking to Other Shipyard Systems Vision Elements***

- To have the physical progressing of each task be linked to higher level schedules/EVMS data, to provide automatic updates



- ***Customer Integration Vision Elements***

- To have visibility into progress of customer's tasks that impact the shipyard



- ***Optimize Shipyard Work - Vision Elements***

- To utilize standard work elements to automatically plan and execute repetitive work
- To be able to review history of all tasks on Boat 1 to analyze and improve follow-on boats. To target initiatives that will ensure learning curve objectives. To test impact of proposed build strategy changes.



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# Project Work Scope

## Bollinger OSV 210

- **Construction of 210' Offshore Supply Vessel, 1<sup>st</sup> of Class**
- **Construction Period Aug 2008 to April 2009.**
- **Involved all Major Shipbuilding Trades,**



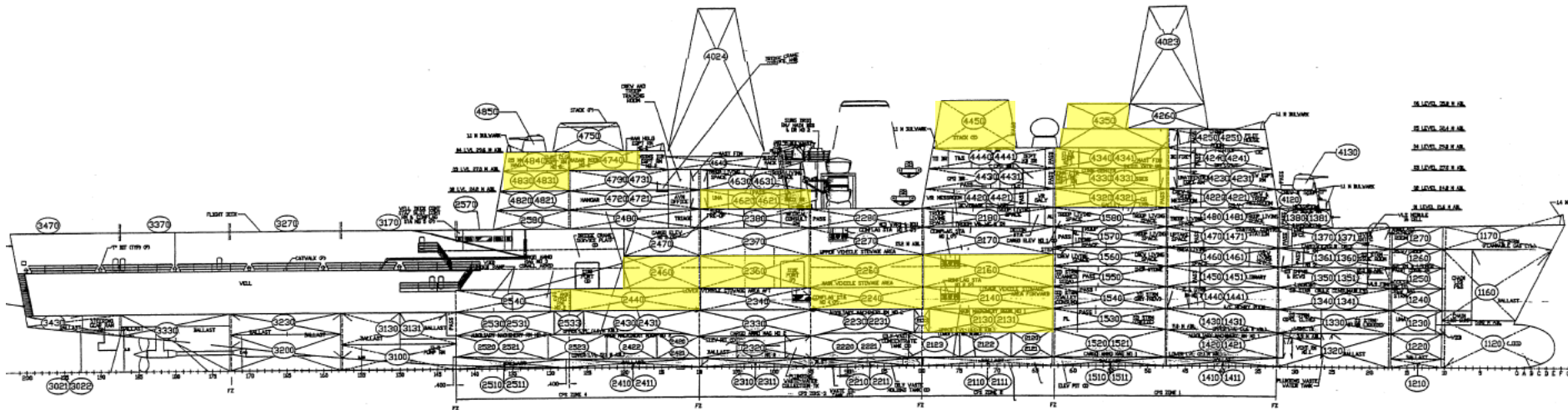
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# Project Work Scope LPD Unit Fabrication

- 23 Units Total – Vehicle Stowage Area, Hanger, Stacks, Living Spaces, Mission Spaces
- Original Schedule – August 2008 thru June 2009
- Steel, Piping, Electrical, HVAC, Metal Outfitting



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# Project Results

- **The vessel, a first-of-class OSV, delivered on schedule and exhibited a 10+% overall cost savings. The project also had a significantly reduced overtime burden and a extremely low re-work rate for a first of class design.**
- **Commitment Reliability has significantly improved productivity, increasing to over 70% from 50%.**
- **Both comprehensive shipbuilding projects exceeded cost and schedule goals.**
- **Delivered a robust planning and production engineering tool to the U.S. Shipbuilding industry, with associated processes that are tailored to the dynamic environment of shipbuilding and ship repair.**

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# Bollinger Accomplishments – Project 210

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- Daily Project Meetings Consistently Held Two Times Per Week

August 2008

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September 2008

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October 2008

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November 2008

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December 2008

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

January 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April 2009

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May 2009

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June 2009

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

July 2009

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

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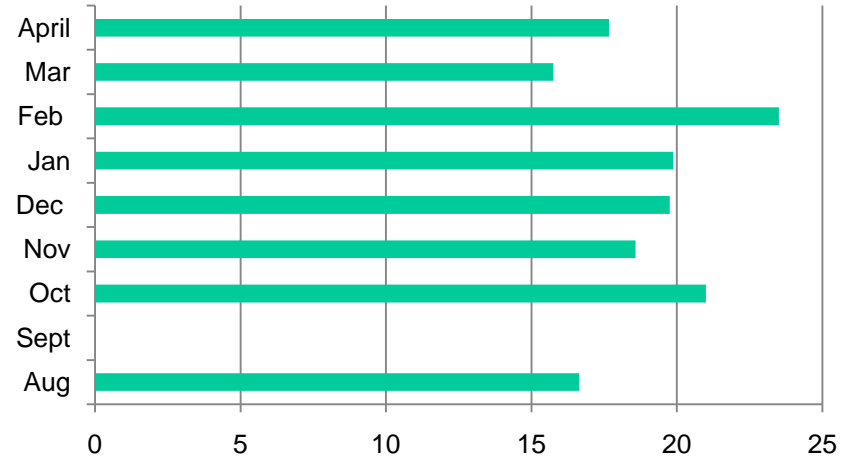
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# Bollinger Accomplishments

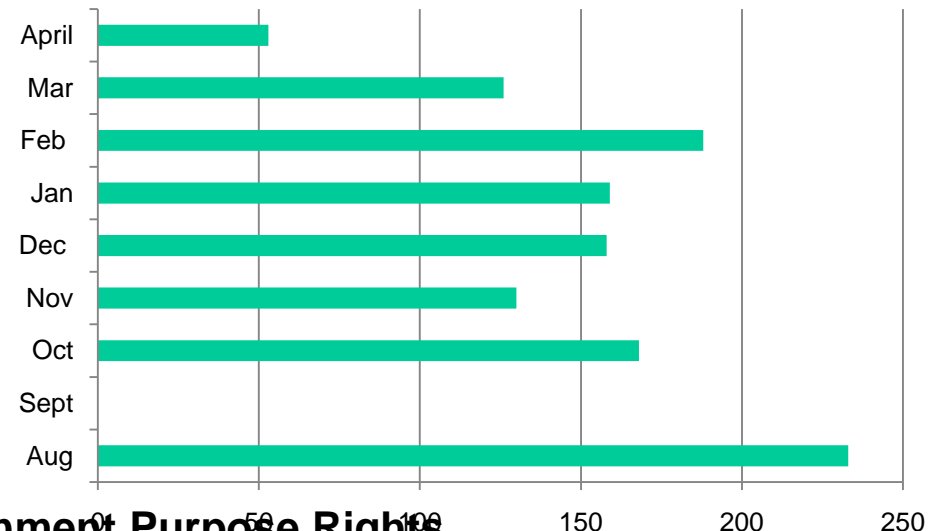
## Project 210

- Increase in Number of Tasks per Plan from Start-up**
  - Most Production Groups providing input to planning daily activities
- Substantial Number of Planned Tasks per Month**

Monthly Avg # Tasks Per Plan



Total # Planned Tasks Per Month



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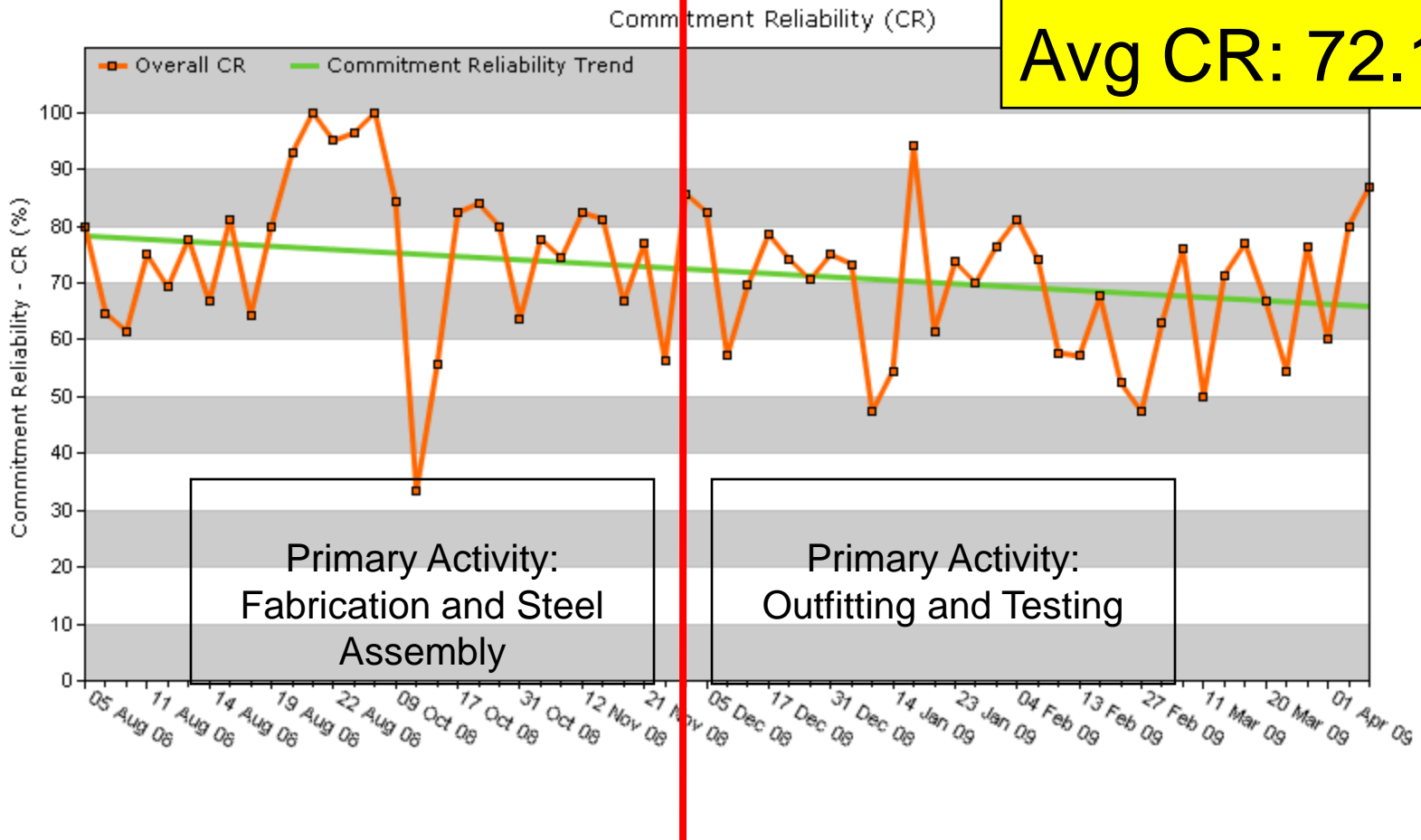


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# Bollinger Accomplishments Project 210

- Commitment Reliability

**Avg CR: 72.18%**



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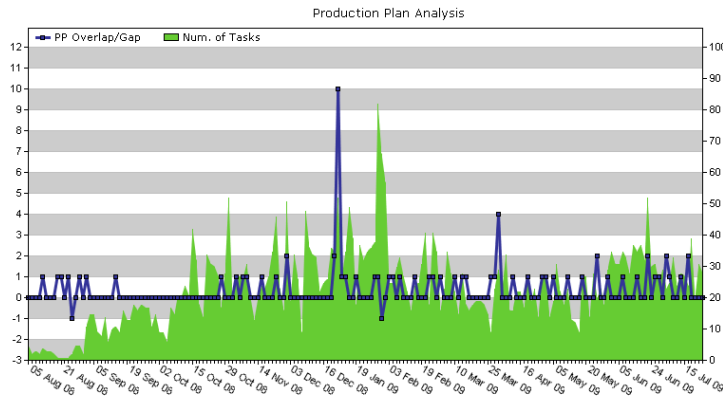
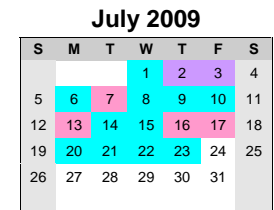
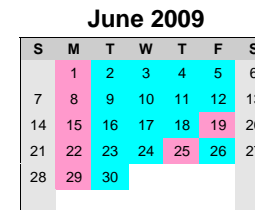
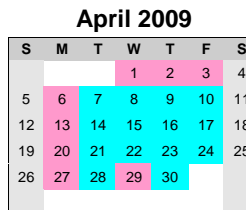
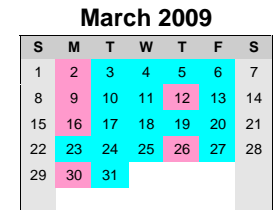
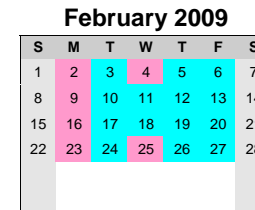
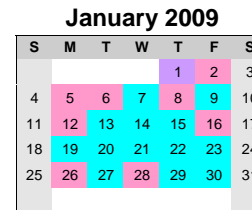
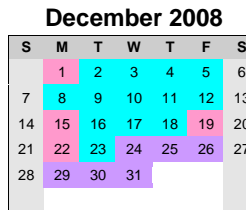
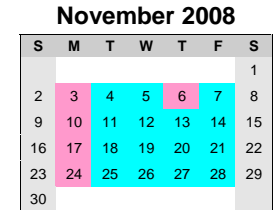
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# Atlantic Accomplishments

- Daily Project Meetings Consistently Held from Project Start**

- Committed Work on a daily basis - Production Plans created for each date shown in blue

**185 Daily Plans Created**  
**Averaged 4 Daily Plans per Week**



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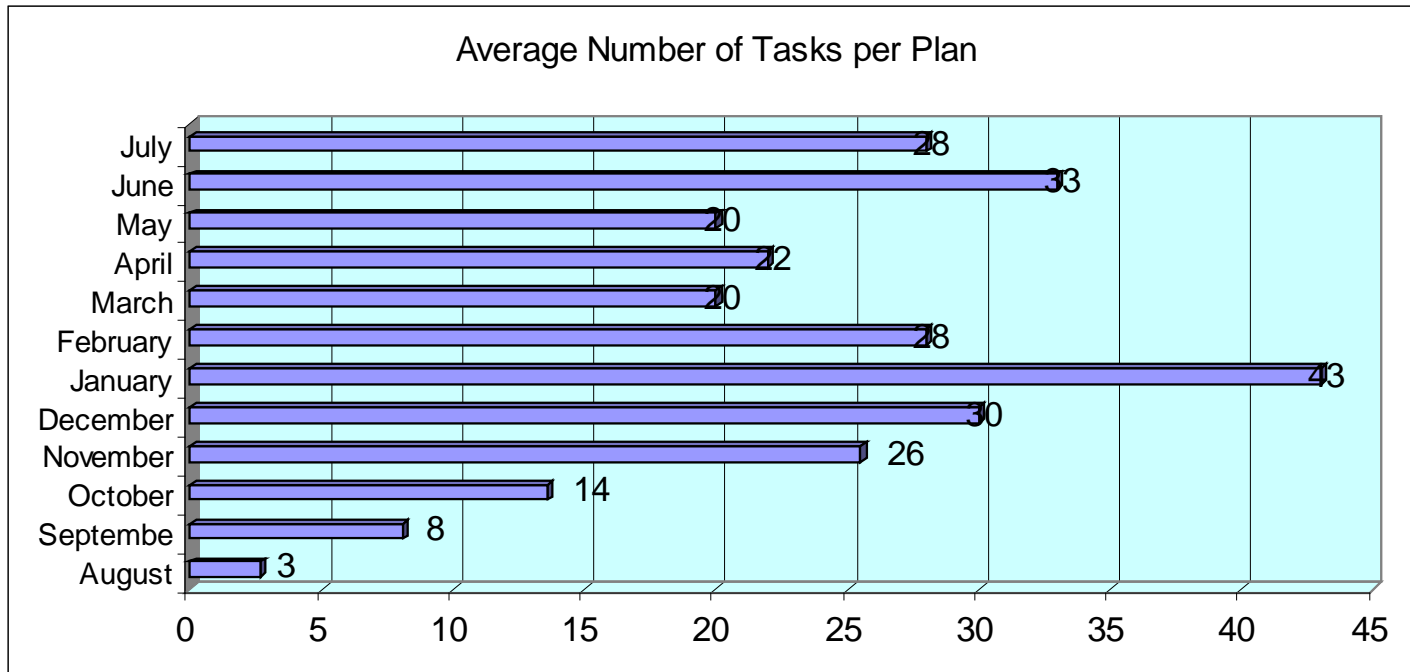


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# Atlantic Accomplishments

- **Substantial Number of Tasks per Plan**

- Averaged 23 tasks per plan for the project
- Most Production Groups provided input to planning daily activities



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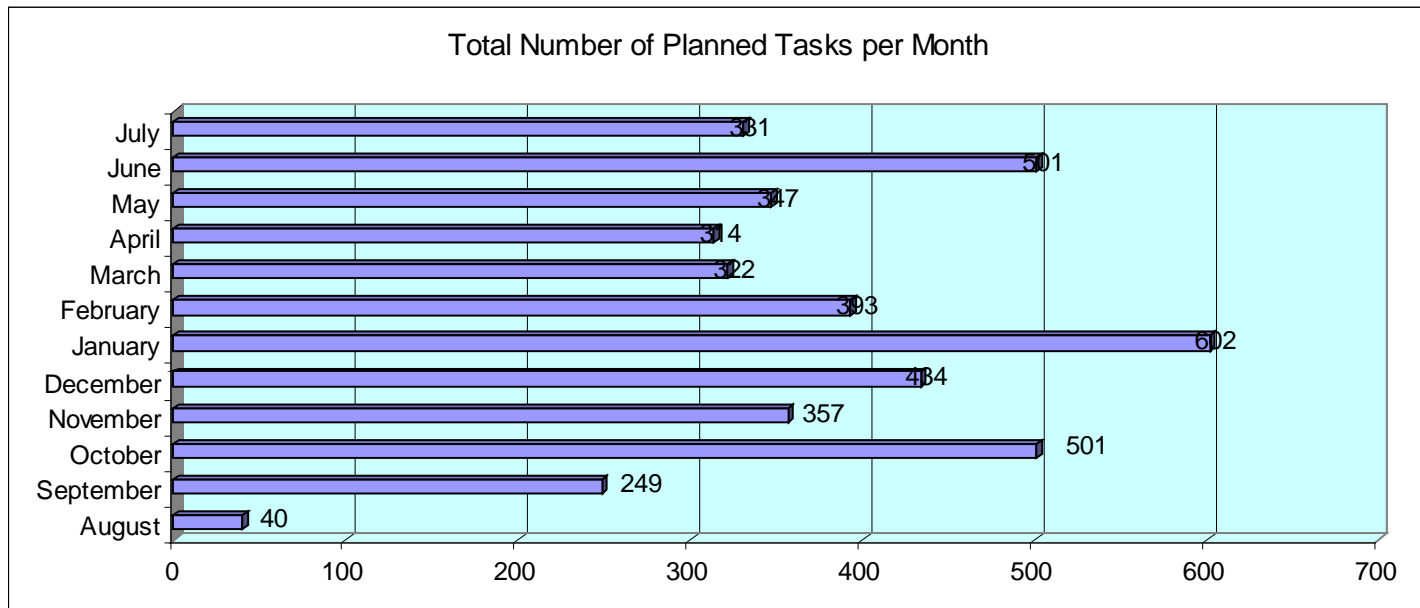


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# Atlantic Accomplishments

- **Substantial Number of Planned Tasks per Month**

- Averaged 366 planned tasks per month
- All months after the first two start-up months had more than 300 tasks per month



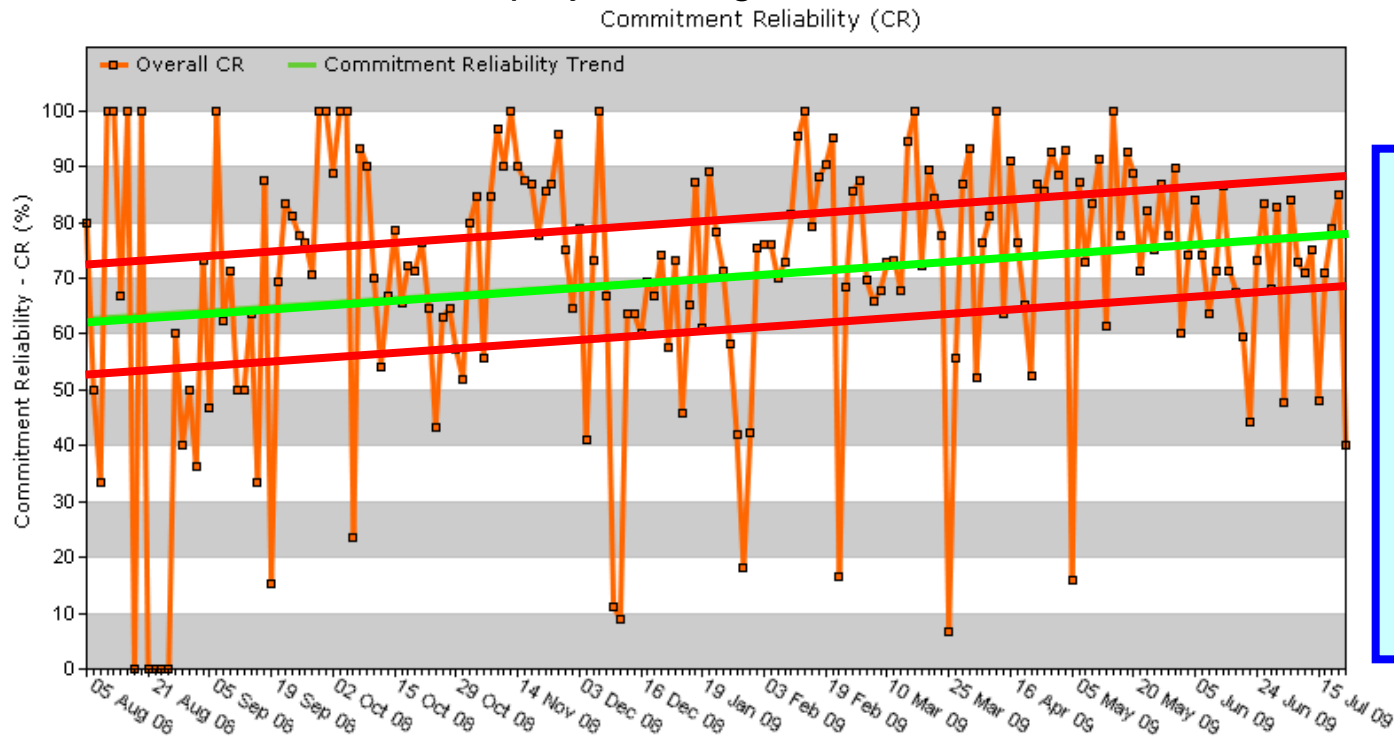
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# Atlantic Accomplishments Steadily Improving Commitment Reliability

- **General trend for commitment reliability steadily improved through the project cycle – Project Overall Average CR = 70%**
  - First two months of project – avg CR = 61%
  - First five months of project – avg CR = 66%



**Start CR =  
61%**

**End CR =  
78%**

**Improvement  
of more than  
20%.**

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# Atlantic Accomplishments Commitment Reliability Details

- **Commitment Reliability generally increased until it dropped off slightly at the end of the project.**

August	49%
September	65%
October	72%
November	85%
December	60%
January	62%
February	78%
March	73%
April	80%
May	79%
June	71%
July	69%

- **Units with the highest Commitment Reliability and highest number of activities planned per day, yielded the highest cost and schedule performance.**

2440	72%
2360	78%
2260	66%
2160	70%
2460	91%
4330	71%
4831	75%
4830	73%
4621	82%
4320	80%
4321	84%
4331	85%
4341	100%
4620	72%
4740	75%
4450	86%
4840	88%
4340	97%

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# Implementation of SmartBoard

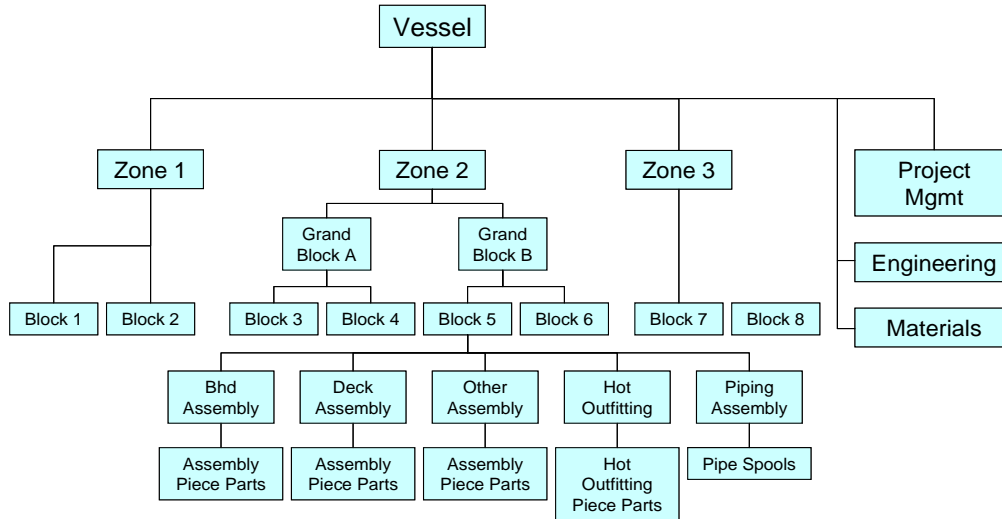
- **SmartBoard purchased and installed in team room.**
- **Team used it during daily meetings and look-ahead meetings.**
- **Created a “stand-up, around the chalkboard” 5-minute meeting environment**



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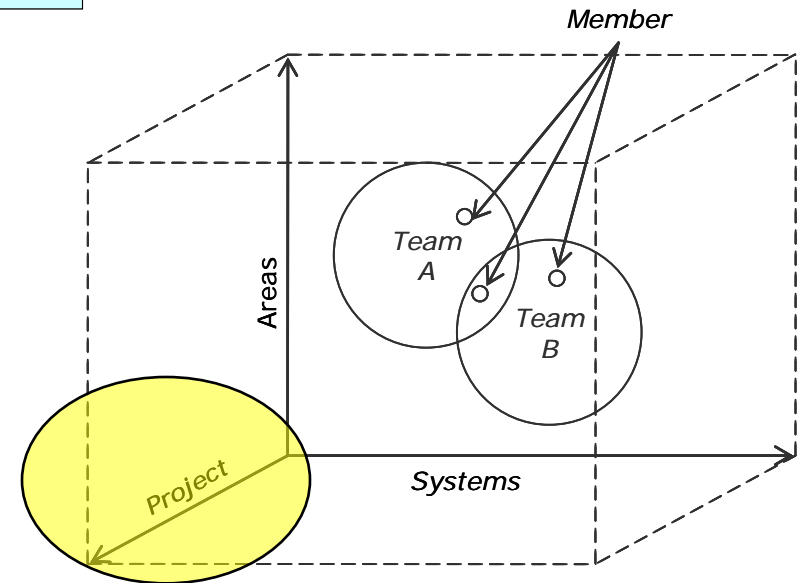
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# Advanced “4 D” Work Breakdown Structure



- Ship WBS
- Area WBS
- System WBS
- Organization WBS

- Allows the user to the same information according to their specific needs.



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# Standard Processes Developed (both shipyards)

- **Team has created standard processes for the following:**
  - Steel (includes most all standard steel fabrication and assembly work):
    - Fabrication Deck Profiles
    - Deck Assembly
    - Bulkhead Assembly
    - Final Unit Structural Assembly
    - Steel Outfitting – before flipping unit and after flipping unit (ship shape)
    - Prepare Unit to Move to Outfitting
    - Loadout
  - Electrical (includes most all standard electrical outfitting work):
    - Electrical Hotwork -prior to flipping unit and after flipping unit
  - Engineering
    - VFI Delivery Process

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## Web-Based Planning Project

# Key Project Findings

- High degree of variation occurs in shipbuilding and ship repair projects
- Much of the variation can be controlled, and even prevented over time.
- Sources of variation can be captured, quantified, and identified as improvement targets.
- Variation drivers (largest source of variation) change over the life-cycle of the project.
- Traditional Project Management Methodologies *do not address* the variation.
- Execution data (“what will be done”) needs to be generated by the “front line” supervisor.
- Planners provide forecast data (“what should be done”).
- The level of planning detail that is needed for one stakeholder (i.e., program manager) is not the level of detail that is needed by another stakeholder (i.e., electrical supervisor on Zone 1).
- Collaborative planning sessions and daily production commitment meetings drive significant improvement and are well received by production.
- Weak production and engineering management processes require exceptionally talented leaders to compensate.

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# Project Deliverables

- **Available to US Shipyards, Design Agents, and Government Representatives through [nsrp.org](http://nsrp.org)**
  - Education Awareness Presentation
  - Shipyard Baseline Assessment Template
  - Project Definition Report
  - Shipbuilding and Ship Repair Work Breakdown Structure Reports
  - Knowledge Manager and Material Manager Reports
  - SPS|ShipFlow Web-based Shipyard Management User Guide
  - SPS|ShipFlow – Commercially available product and methodologies customized for the US Shipbuilding and Ship Repair Industry
- **NSRP Web-based Planning Project Final Workshop will be held Thursday, Sept 17 (1:00pm-5:00pm)**

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# Questions?

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