

NSRP Project: Design for Producibility for Mid-Tiered Shipyards

**PDMT Panel Meeting Brief
September 28, 2007**



Technology Investment Agreement (TIA) 2007-380:

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DFP Team Members

- **Shipyard Participants**

- Bollinger Shipyards - Lockport, LLC (Prime)
 - POC: Dennis Fanguy (Project Manager)
- Todd Pacific Shipyards
 - POC: Bob Gilbert
- Atlantic Marine – Jacksonville, LLC
 - POC: Chuck Nugent

- **Technical Council**

- Victoria Dlugokecki, P.E.
- Hepinstall Consulting Group, Inc.
 - Lisa Hepinstall

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Why this project? ...from FMI Benchmark on DFP

- “...there is a low appreciation of the importance of *capturing production knowledge* and *defining facility constraints and attributes* in order to *define design parameters* that result in optimum production performance...”
- “...high turnover of staff in many of U.S. yards means there is often a *loss of DFP knowledge* during gaps in design activity...”

(NSRP, “A National Consensus Investment Strategy to Address the findings of the 2004 Global Shipbuilding Industry Base Benchmarking Study”, 2005)

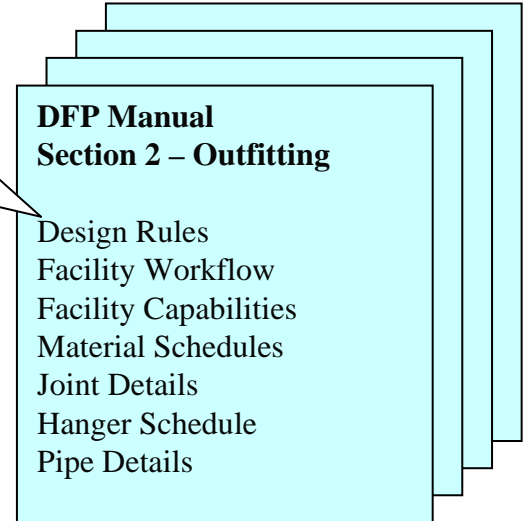
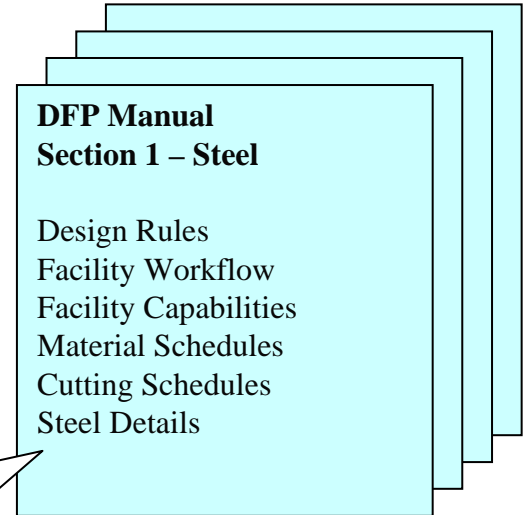
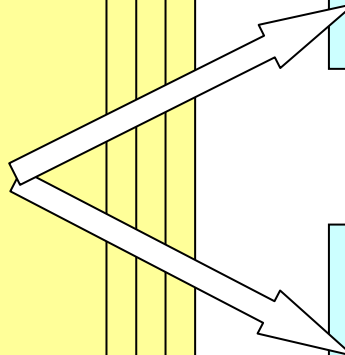
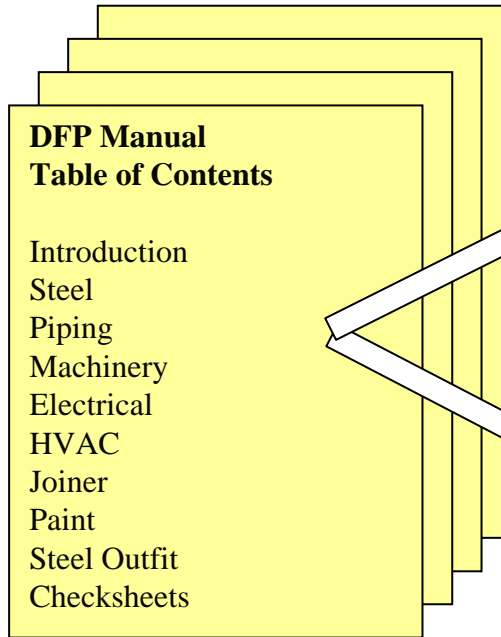
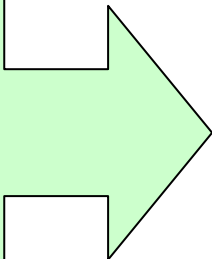
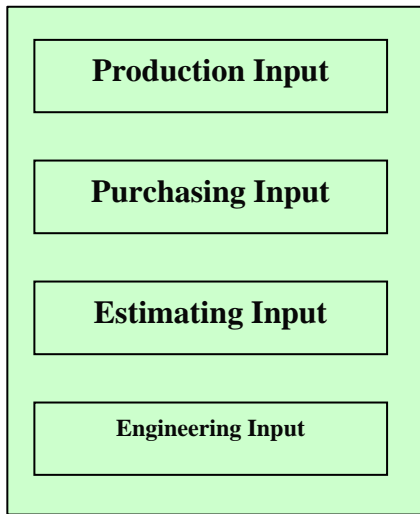
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Key Deliverable – DFP Manual

DFP Manual – each participating shipyard
DFP Manual – template (blank)
DFP Manual – template (sample information)



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DFP for Mid-Tiered Shipyards Project Status

Task	Description	Time Frame
1	Hold Kick-off Meeting	Completed
2	Assess shipyard potential application of DFP and provide awareness training to stakeholders	Completed
3	Document ship construction constraints	Completed
4 5	Formalize structural steel preferences and associated design rules	Sept – Nov 07 Working
6 7	Formalize outfit preferences and associated design rules	Dec 07 – June 08
8	Create DFP manuals	July 08
9	Evaluate impact of DFP application in shipyard environment	Mar – July 08
10	Finalize DFP manuals	Aug – Sept 08
11	Hold final workshop to disseminate project accomplishments to the industry	Sept 2008

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Task 2 – Shipyard Application and DFP Awareness Training

- **General information for each individual participating shipyard**
 - Principal Product Lines
 - Engineering Strategy and Capabilities
 - Production Processes and Capabilities
 - Facility Layout and Capabilities
- **Expectations of DFP Implementation**
- **DFP Awareness Training provided to shipyard personnel**

DFP Awareness Training Presentation – Available to Industry

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Task 3 – Shipyard Capabilities and Constraints

- Facility Information – Shops/Workstations
- Facility Information – Equipment Specifics
- Processes Outsourced

**Capabilities and Constraints
Information Captured for Each
Participating Shipyard**

**Formalizing the Shipyard Capabilities
and Constraints Report – Available to Industry**

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Shipyard Capabilities and Constraints

- **Data Gathered for Each Shop/Area**

- Primary Function of Shop
- Workstation Identification
- Material Flow
- Length/Width of Bldg
- Clear Height
- Clear Width
- Square Footage
- Height under hook
- Door Opening
- Crane Support
- Method of Transportation
- Major Equipment
- Important Notes

**Data documented on 11x17
“easy reference” tables**

(1) Fabrication & Assy Areas

(2) Paint/Outside Covered Areas

(3) Specialty Shops

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Shipyard Capabilities and Constraints

- **Data Gathered for Equipment**

- Equipment Name and Description
- Footprint
- Max / Min Size Part / Plate that can be processed
- Important Notes
- Part Type (Plate, Flat Bar, Angles, etc)
- Process (Manual, CNC, etc.)

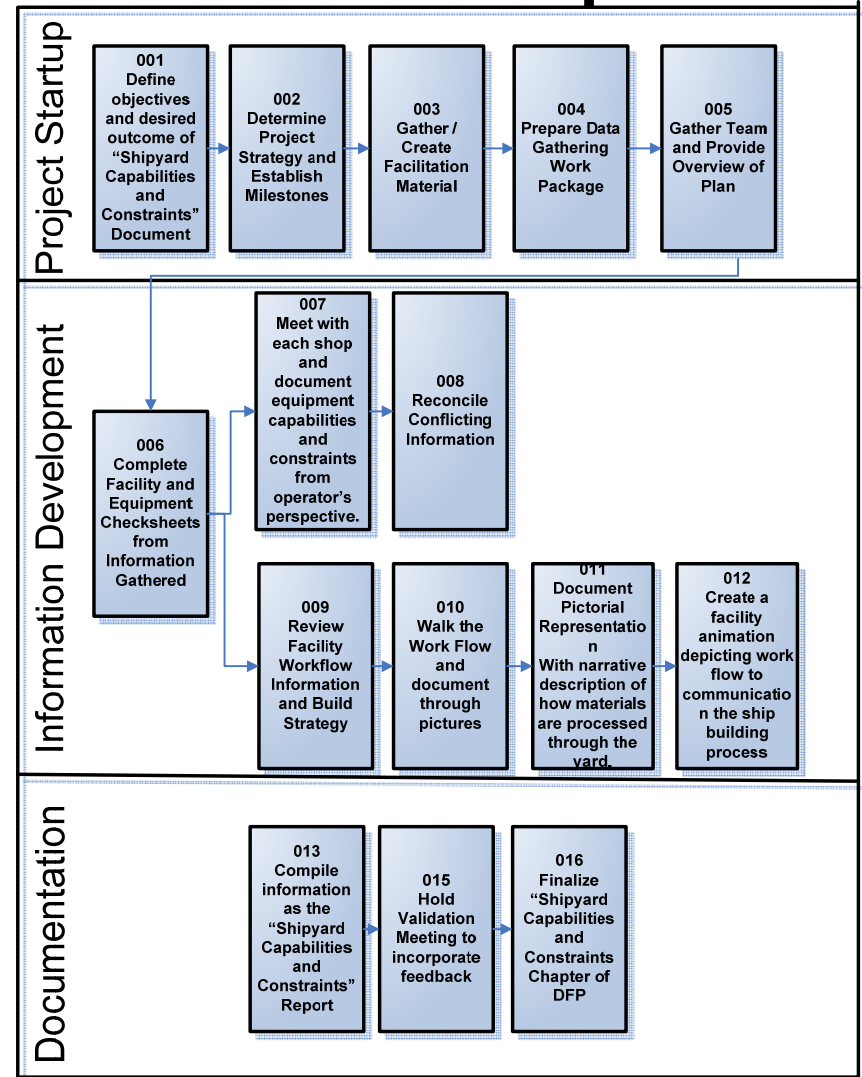
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Formalizing the Shipyard Capabilities and Constraints Report

- Step-by-step process instructions, including process step guidelines and supporting documentation templates
- Enables process sustainability, repeatability and exportability
- Available to Industry



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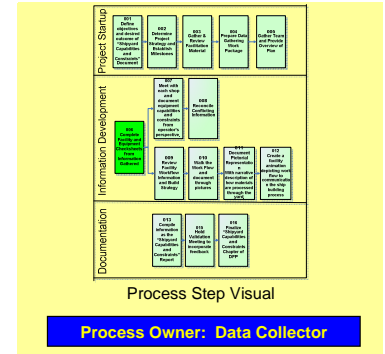
Example of Process Step Work Instruction

- Purpose and Desired Outcome
- Process Step Visual with Process Owner
- Step-by-step instructions and general guidelines
- Inputs – including templates
- Deliverables – including templates

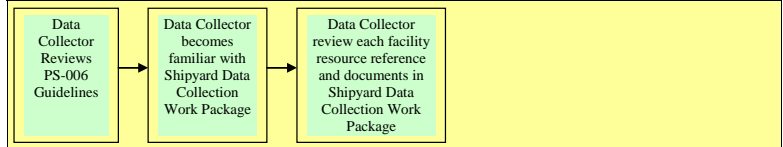
PROCESS STEP 006 Document Capabilities and Constraints Information from Data Gathered

Purpose:
To compile data from gathered references and incorporate the information into the Shipyard Data Collection Work Package. This activity is also used to identify areas to focus the interviews and shop visits.

Desired Outcome:
The data collector understands what data to look for and what data to validate during the shop visits.



Process Steps:



Inputs: Deliverables:

- Process Step 006 Guidelines (A6)
Shipyard Data Collection Work Package
Shop Template (1)
Cutting Template (1)
Cutting Template (2)
Panel Line Template
Pipe Cutting Template
Shop & Area Template (2)
Paint Template
Crane Template
Waterfront Capabilities Template 1 & 2
Shop Template (3)
Cutting Template (3)
Color Coded Facility Map
Facility Yard Lay-out
Shop Lay-outs
Bid Proposal Information
Engineering Notes

Partially completed Shipyard Data Collection Work Package.

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Example of Workstation Templates

Plate and Profile Cutting

WKST – ____: _____ Capabilities Information			
Workstation			
Workstation Gen Desc.			
Workstation Flow: Input Output			
Workstation Environment			
Length (ft)			
Width / Clear Width (ft)			
Total Square Footage (ft ²)			
Overall Height (ft)			
Height under Hook (ft)			
Door / Opening Information			
Door / Opening Information			
Crane Support	Crane Desc.	Qty	Capacity
Method of Transportation			
Major Equipment:			
Important Notes:			

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Example of Workstation Templates

Automated Plate Cutting Equipment Information

WKST – _____ Automated Plate Cutting Equipment Information							
Equipment	Table / Cut	Footprint		Max Size			Control System
		W	L	W	L	H	
		(dim. in feet)		(dim. in feet)		(in.)	

NOTES:

Panel Line Equipment Information

Panel Line Equipment Information							
Equipment	Equipment Description	Max Size			Wt	Max Plate Offset	Chamfer Min
		W	L	H			
		(dimensions in feet)		in			
Plate Seam Welder							

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Task 4 and 5 – Structural Steel Preferences and Design Rules

- List of potential preferences for each structural steel process characteristic
- Evaluate alternatives and select preferred alternatives based on a total cost perspective
- Document the structural steel preferences of the shipyard in an easy-to-use ship production tables
- Document structural steel design rules for various phases of design – functional design, product modeling, production information development

Formalizing Structural Steel Preferences and Design Rules Reports – Available to Industry

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Preferences and Design Rules Sample Information

- **Steel plate size preferences (lengths, widths, thicknesses, grades); required excess; associated material identifiers.**
- **Steel profile size preferences (types, scantlings, lengths); associated material identifiers**
- **Steel plate cutting facility preferences (plate burning, cutting shears, etc)**
- **Steel profile cutting facility preferences**
- **Collation of preferred structural details, including cut-out details, bracket and chock details, end connection details, etc.**

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Example of Steel Production Table

Steel Profile Size and Cutting Preferences								
Profile size	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
3" x 2"	P	P	P	P	X	X	X	X
4" x 3"	X	P	P	P	A	X	X	X
5" x 3"	X	P	P	A	A	X	X	X
5" x 3-1/2"	X	X	P	P	A	X	A	X
6" x 4"	X	X	X	P	P	A	A	X
7" x 4"	X	X	X	A	A	X	A	X
8" x 4"	X	X	X	X	P	X	A	A

Notes:

- P** indicates BSI preferred profile sizes
- A** indicates available profile sizes – non-preferred
- X** indicates not readily available profiles

Preferred: Everything above the demarcation line can be cut with the iron worker.

Not Preferred: Everything below the demarcation line needs to be hand-cut.

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