

Genoa Design Industry Perspective.

NSRP Business Technologies and Ship Design
& Materials Technologies Joint Panel

August 21, 2024



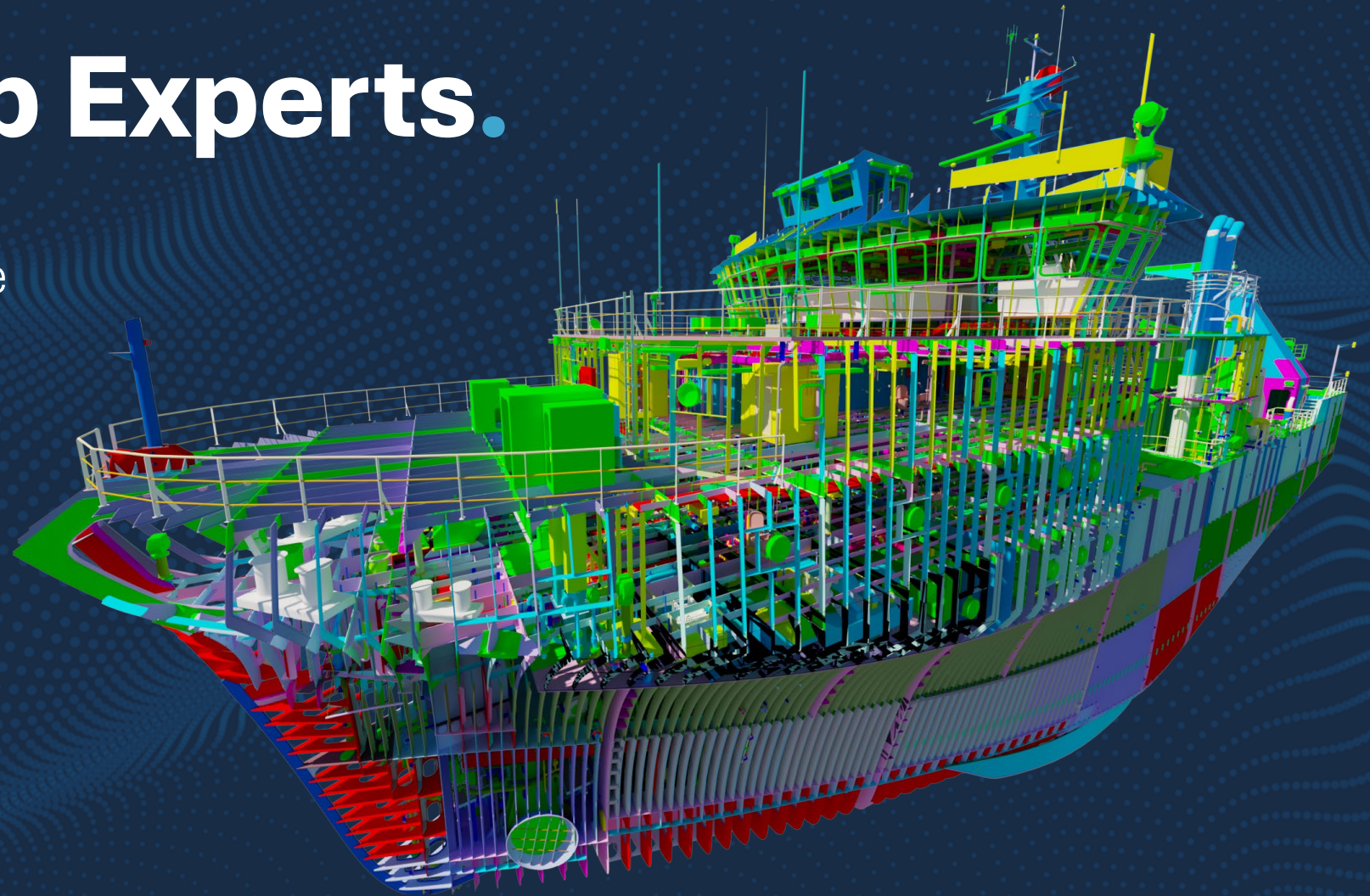
CHRIS LAUGHLIN

Director of Business Development & U.S. Operations

GENOA DESIGN INTERNATIONAL

Digital Ship Experts.

- **29** Years of Experience
- **130** Projects to Date
- **239** Team Members
- **4** Locations Across North America



Why is the Demand for Ships Outpacing Industry Supply?



SKILLED LABOR SHORTAGE

Many shipyards are experiencing a significant workforce gap due to retiring personnel and insufficient numbers of young workers entering the industry. Shipyards are also in need of engineers, designers, Subject Matter Experts, etc., to mature functional and detailed engineering.



INCREASING OUTPUT QUICKLY AND EFFICIENTLY IS THE GREATEST CHALLENGE FACING SHIPBUILDING

- The US Navy, increased its shipbuilding budget by **12.5% per year** from 2020-2024.
- US shipbuilding output has decreased by **more than 85%** since the 1950s.
- American shipyards capable of building large vessels has fallen by **more than 80%**.



SUPPLY CHAIN VULNERABILITIES

- Shipbuilders often face disruptions in critical supply chains, exacerbated by global events and geopolitical factors.
- Limited access to essential materials and components can cause delays in production and project timelines, affecting overall competitiveness and profitability.

Solving the Problem, HOW?



GENOA'S TALENT SOLUTIONS

- Sourcing and/or developing talent with the right skills to meet industry demands.
- Focuses on addressing skill shortages by developing and sourcing highly skilled professionals



GENOA'S CORE SERVICES

To meet ever-tightening constraints, we believe that fostering intelligent management, cultivating high caliber design talent and evolving innovative approaches are the keys to offering premium quality products and services with cost and schedule certainty.



GENOA'S FUTURE PRODUCT OFFERINGS

Identifying new risks and gaps early and developing new products and services to mitigate.

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SOLVING THE PROBLEM

Genoa's Talent Solutions



Problem Statement

The supply of talent has not kept up with demand.

The shipbuilding industry is experiencing a growth cycle in the USA and Canada. That growth is resulting in major challenges with delivering large complex assets on time, including finding the right mix of talented resources to execute projects.



The Talent Gap

WORKBOAT

WORKER SHORTAGES CAUSE COAST GUARD TO ADJUST CONTRACT DELIVERY DATES

By Guest Author: Stephen Blakely — May 20, 2024

After years of working to successfully obtain congressional funding to rebuild several of its aging fleets, the Coast Guard is now facing additional delays because of a lack of shipyard workers.

Coast Guard officials have said that the worker shortage at shipyards along the Gulf Coast is delaying three of its programs already funded by Congress to modernize its fleets:

Bloomberg

WORKER SHORTAGES CAUSE COAST GUARD TO ADJUST CONTRACT DELIVERY DATES

By Guest Author: Tony Capaccio — April 12, 2024

The shipyard producing the US Navy's new frigate has been hobbled by a failure to "achieve engineering and skilled workforce levels" for the medium-sized vessel, according to a service document on the project that's now forecast to run as much as three years late.

Mitigating The Risk

01

Develop New Talent

02

Look outside traditional sources

03

Diversify Talent

04

Develop Strategic Partnerships

05

Determine the real demand

06

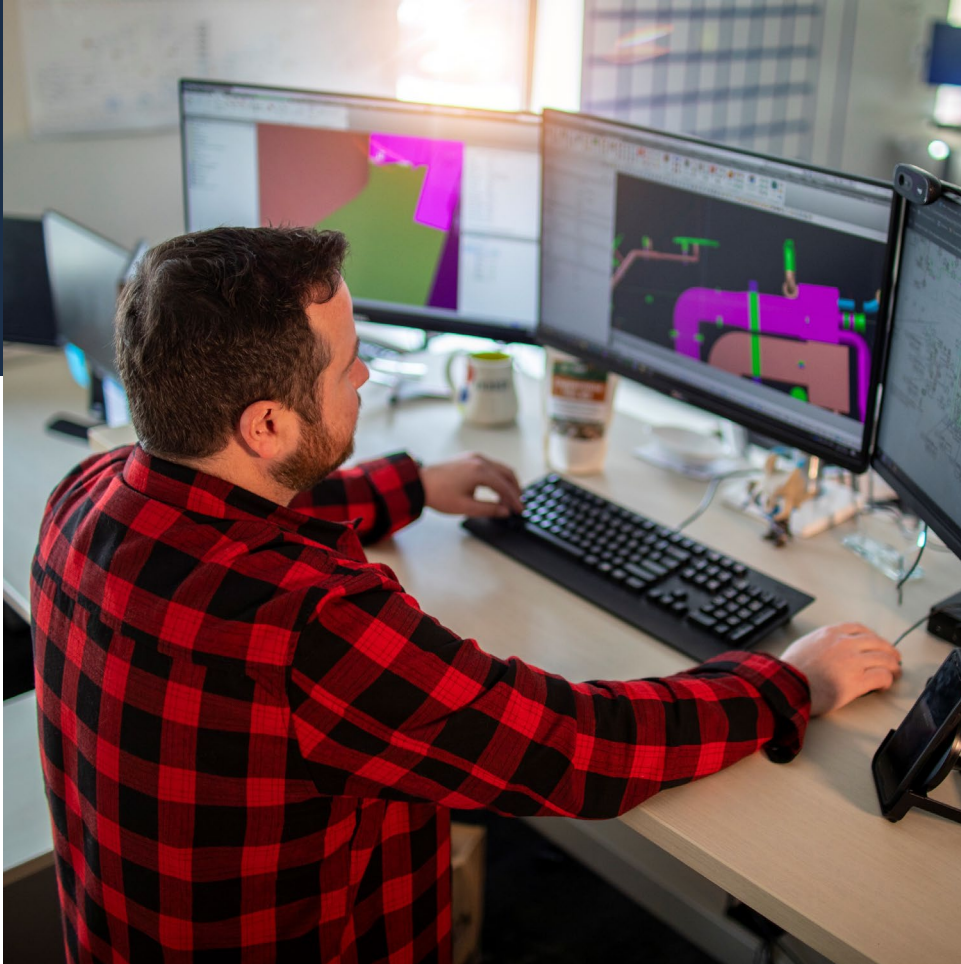
Genoa's Academy

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SOLVING THE PROBLEM

Genoa's Core Service





SOLVING THE PROBLEM

It All Starts With Design & Consulting

WE OFFER A FULL SET OF DESIGN SERVICES, CUSTOMIZED TO SUIT YOUR NEEDS:

- Transitional Design
- Detailed Design
- Production Packages

WE ACHIEVE EXCEPTIONAL RESULTS WITH A FOCUS ON:

- Planning
- Configuration & Information Supply Chain Management
- Quality Services

Transitional Design

“Bringing Functional Design to life”

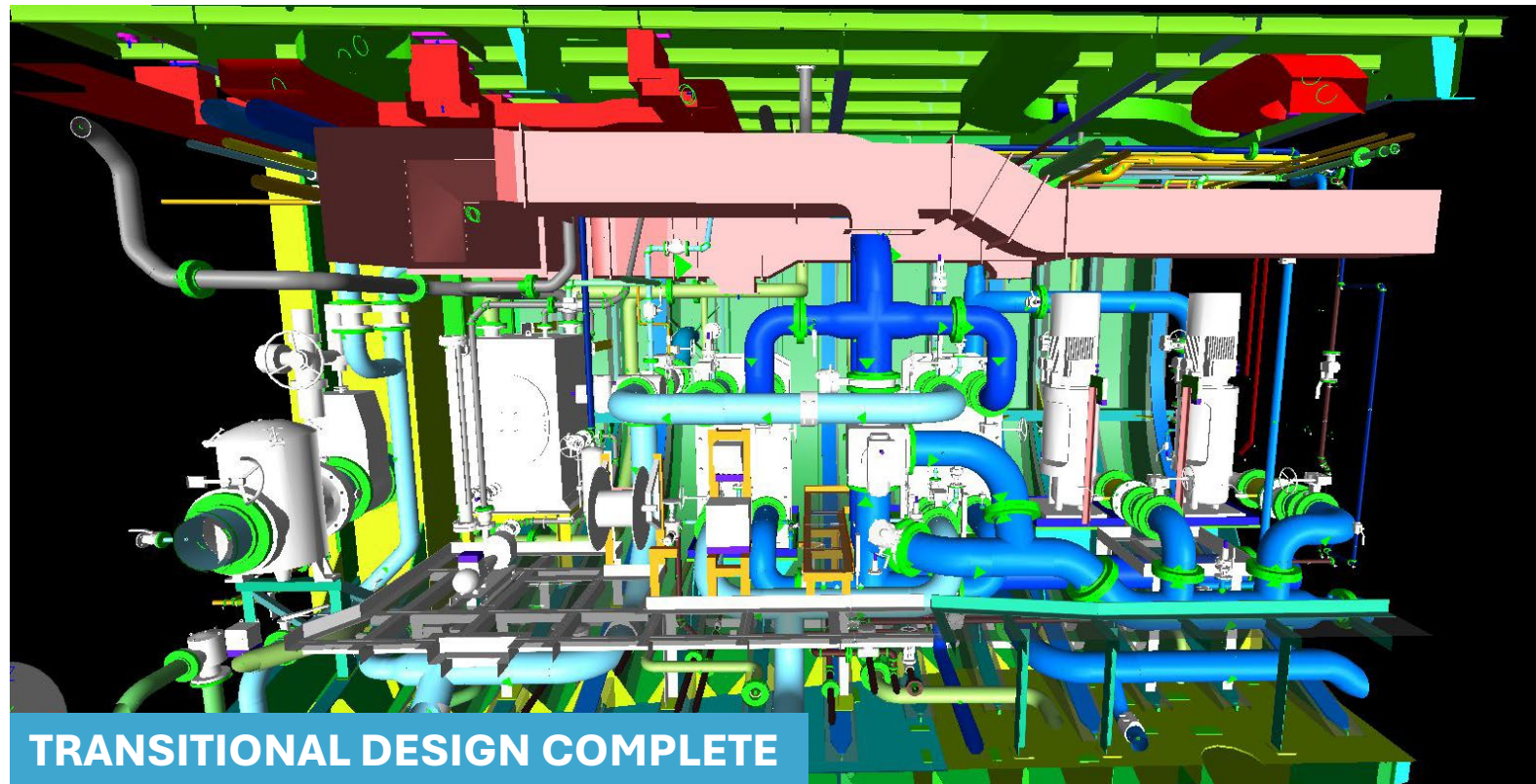
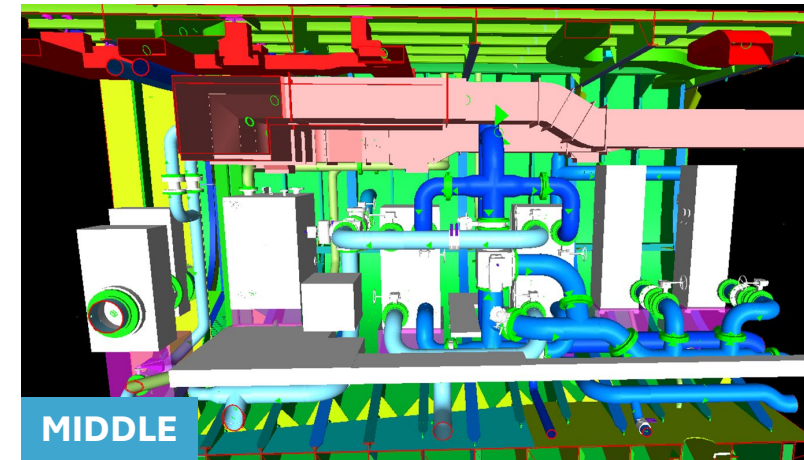
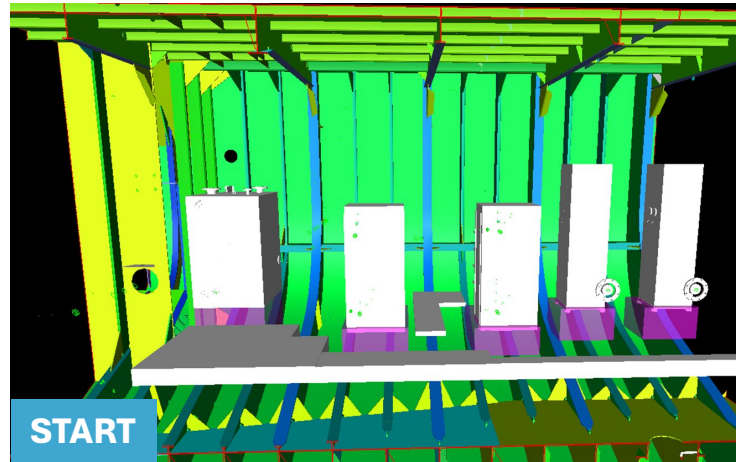
PURPOSE: De-risk the Functional Design without undue detail

MODEL DEVELOPMENT

Task sequencing chosen to limit Value at Risk

1st resolves broad & interdependent problems

2nd Moves on to items that are increasingly localized and independent



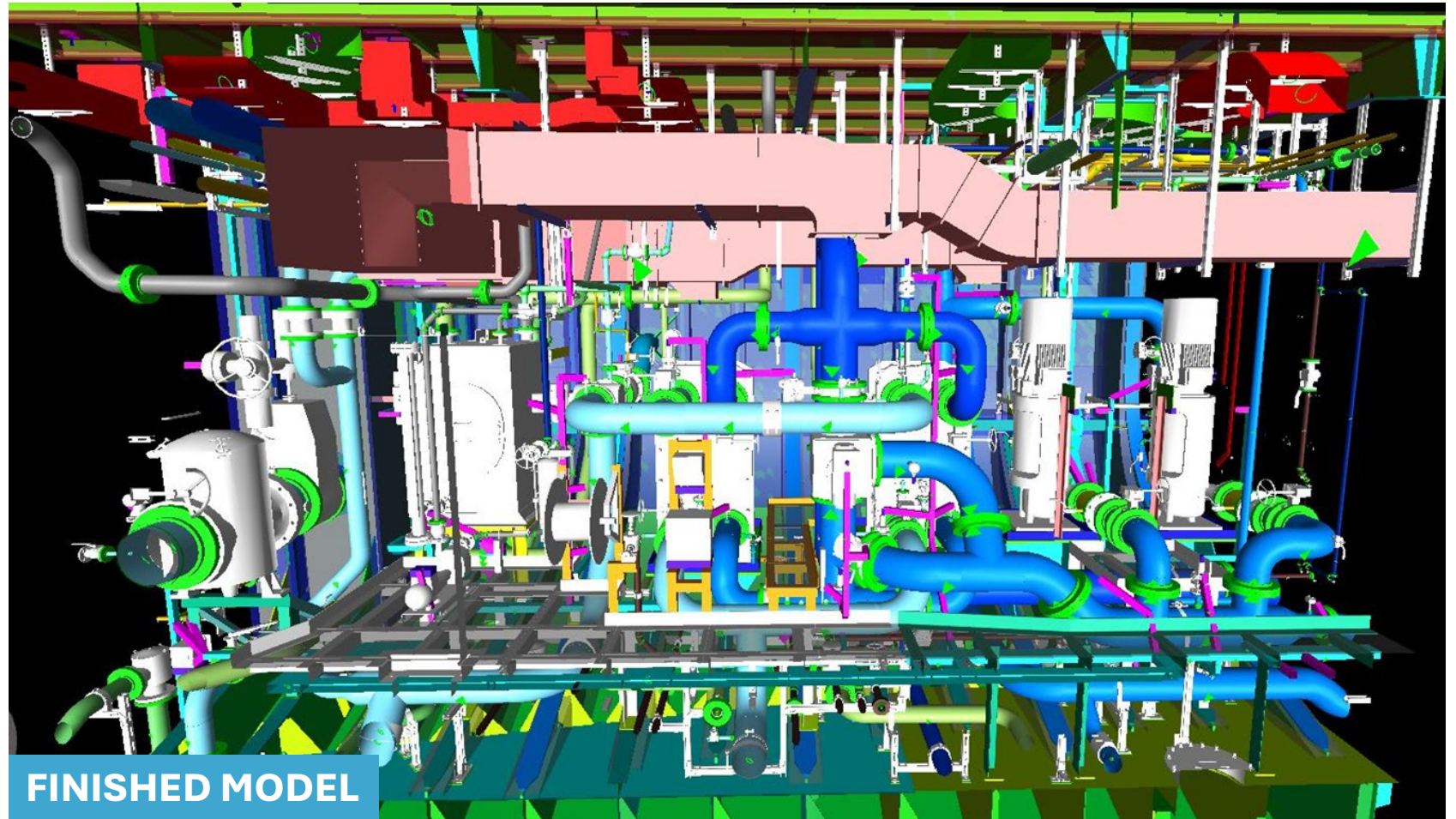
Detail Design

“Completing the picture”

PURPOSE: Add the myriad of final details to complete the model

MODEL COMPLETED BY INCLUDING:

- Piping instruments and minor components
- Remaining minor equipment
- Supports
- Outfit detailing
- Local cable runs
- Yard specific standards



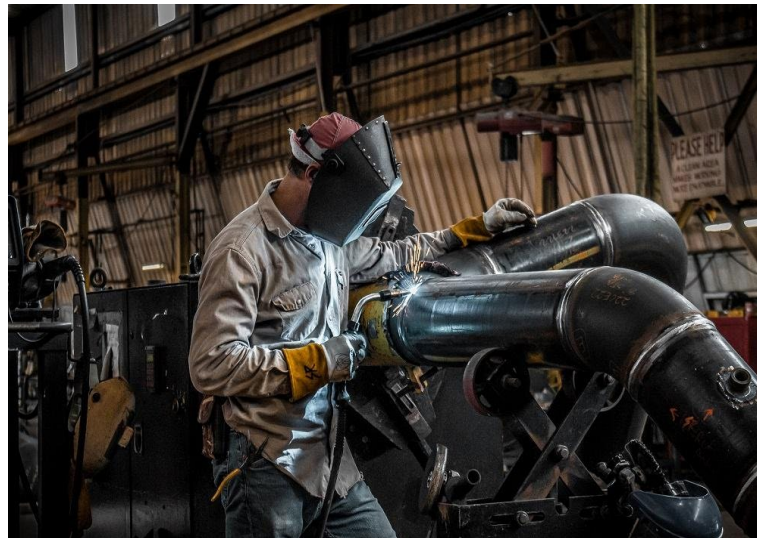
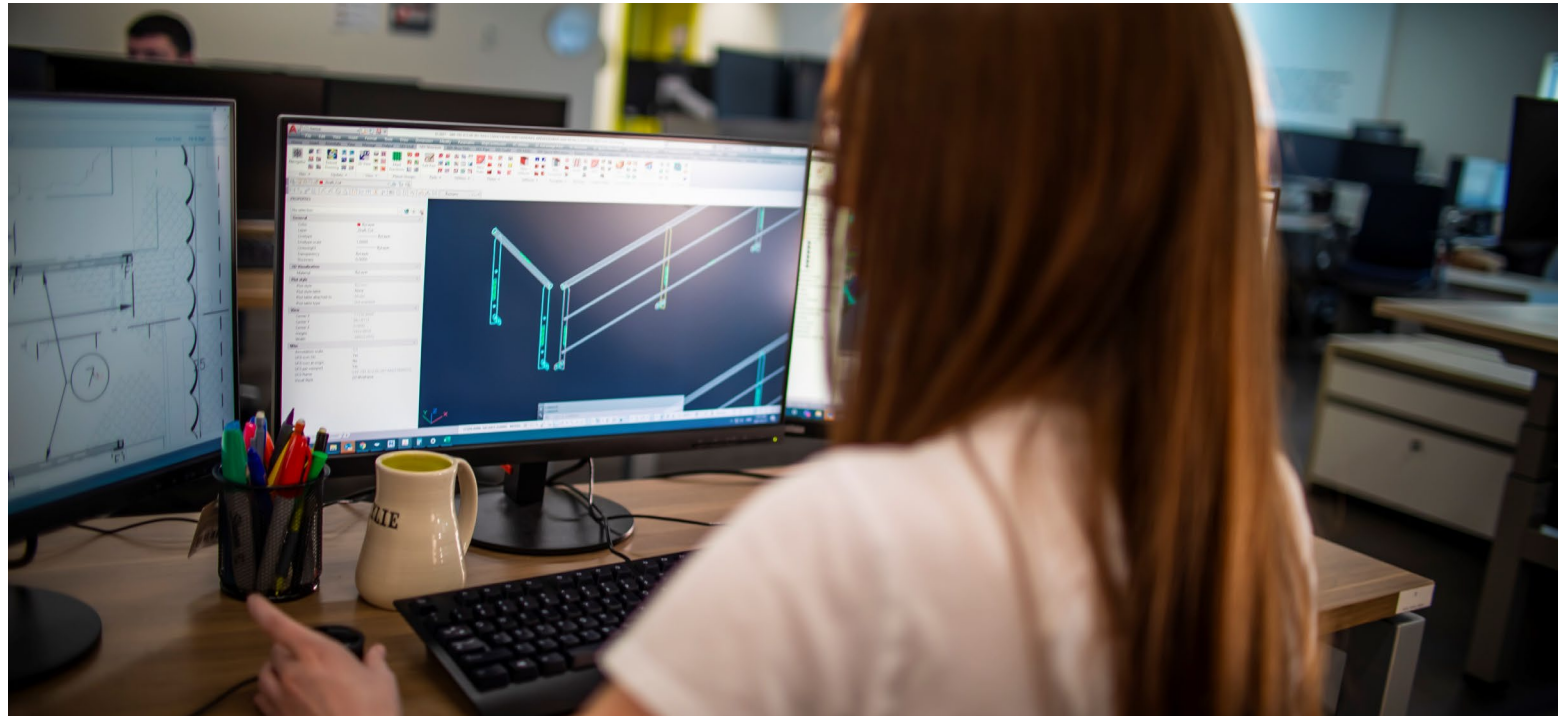
Production Packages

“Where the rubber meets the road”

PURPOSE: Translate the model into a constructable form

TAILORED DRAWINGS TO MEET:

- Build Strategy
- Construction Planning
- Module Breakdowns
- Bending, cutting and forming equipment
- Yards Standards and practices
- Stock management system



AACE International Recommended Practice No. 18R-97

COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN
ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR
THE PROCESS INDUSTRIES
TCM Framework: 7.3 – Cost Estimating and Budgeting

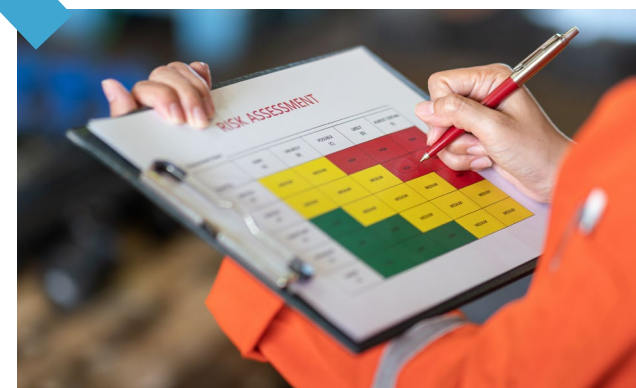
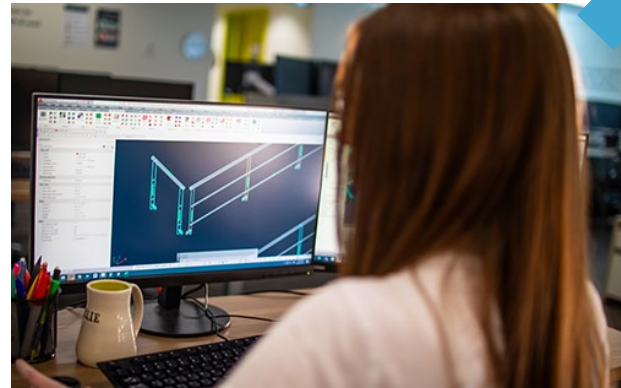
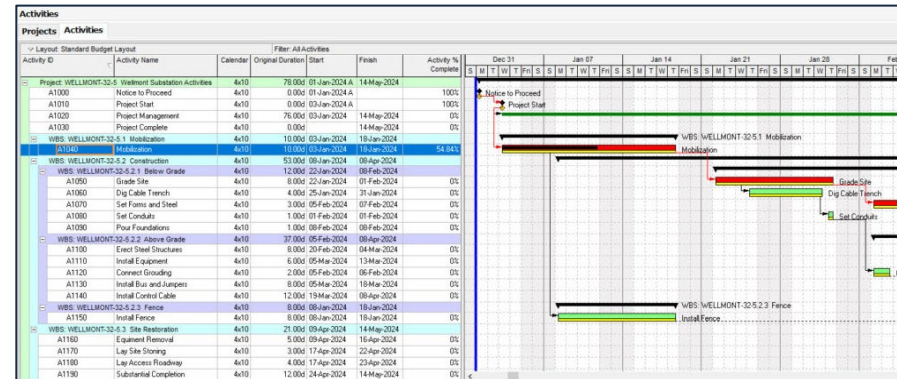
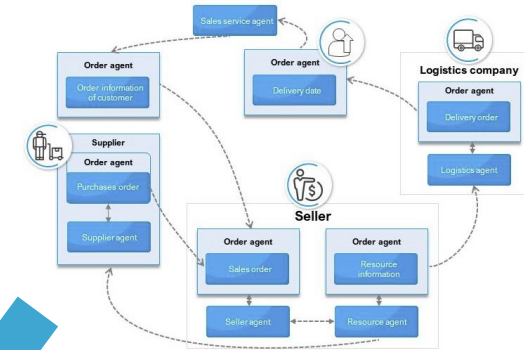
Planning

“Prepare and Follow Through”

CRITICAL COMPONENTS:

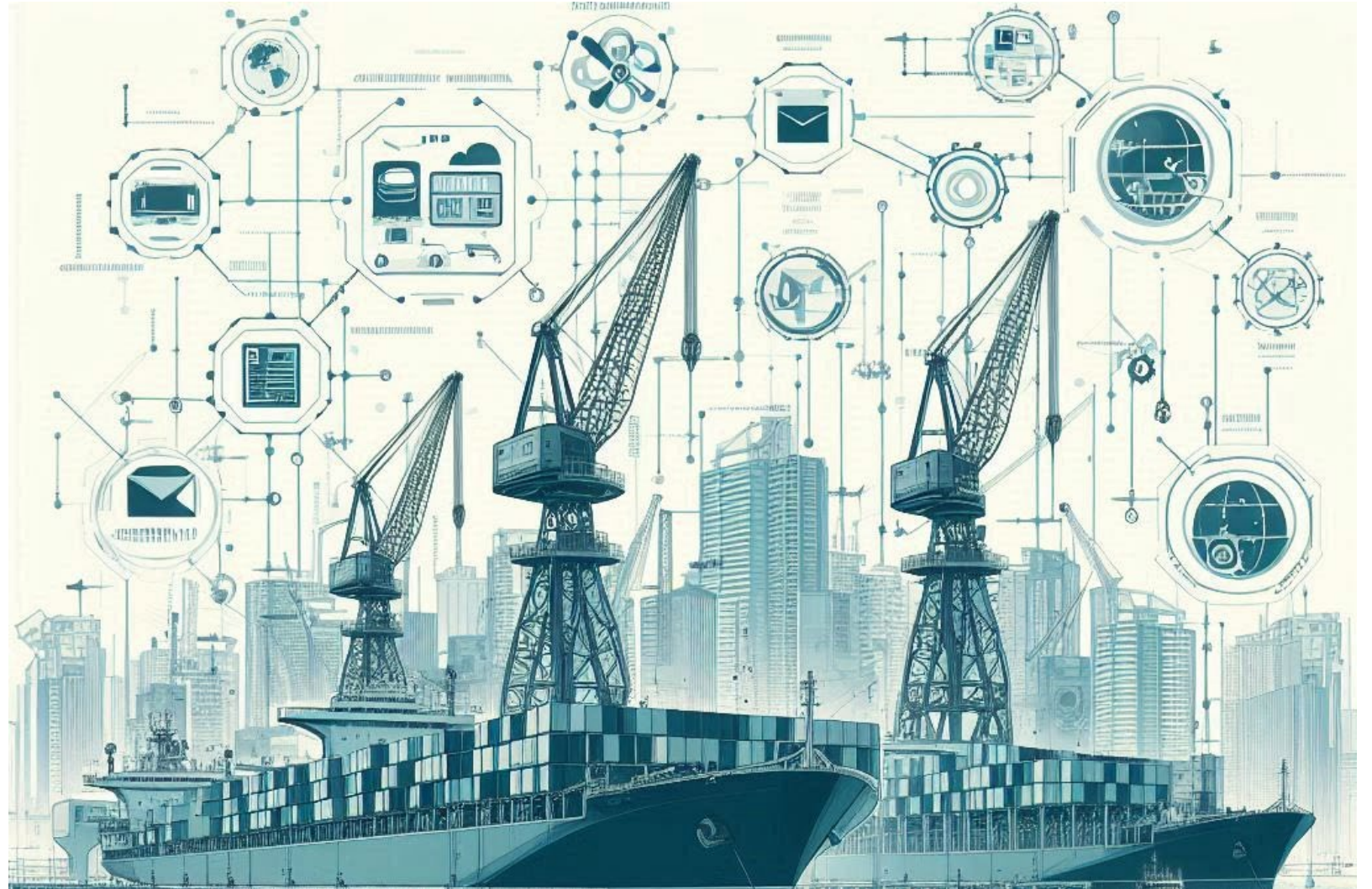
- High quality estimates
- Information supply chain management
- Resource management
- Risk Management

Information Flow in Supply Chain Management



Configuration & Information Supply Chain Management

*“Effective Systems
Drive Sound Decisions”*

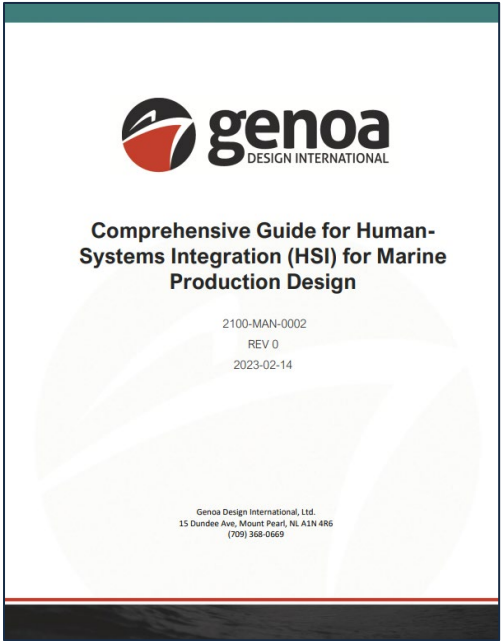


Quality Services

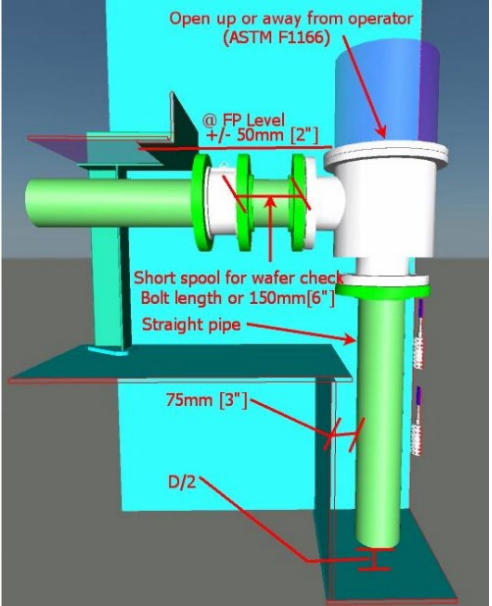
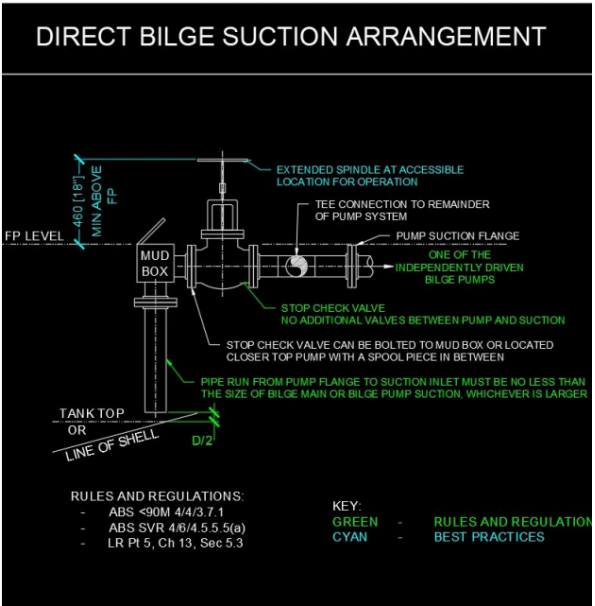
“Leaving nothing to chance”

COMPLIANCE WITH:

- Specification, Class, National and International regulations
- Human Systems interface based on ASTM F1166
- Model Based Work Instructions & Yard standards



Source	System	COMPLIANCE STATEMENT
OO Spec Sect. 505.1	Ballast	Confirm suction bellmouths inside ballast tanks are flanged for removal.
OO Spec Sect. 529.2	Ballast	Confirm remotely operated ballast valves have an accessible means of manual operation (and remotely operated Ballast valves are not fitted inside tanks).
SOLAS Ch II-1/35-1 3.10 (per SPS-Code Ch 2), LR-P5.C13.8.1.3/4 & 8.2.1	Bilge	The bilge main (and any bilge pump or its pipe connection to the bilge main) is to be so arranged that no part is situated nearer the side of the ship than b/5. Where any bilge pump or its pipe connection to the bilge main is situated outboard of the B/5 line, then a non-return valve is to be provided in the pipe connection at the junction with the bilge main. The emergency bilge pump and its connections to the bilge main are to be so arranged that they are situated inboard of the B5 line. If any part of a bilge suction pipe is located outboard of B/5 (or in a duct keel), a non-return valve is installed on the pipe inside the compartment containing the suction open end. Note: B/5 is measured at right angles to the centreline at the level of the deepest sub-division load line, where B is the breadth of the ship
LR-P5.C13.7.6.1 & OO Spec Sect. 529.1	Bilge	Confirm: 150 liter (0.15 m³) min capacity for machinery space (double bottom) bilge wells. (Note: Minimum sized well could be built from 12" sch X5 pipe with a depth of 500mm); Bilge wells in other spaces are at least 0.03 m³ capacity.
LR-P5.C13.7.4.1	Bilge	Confirm machinery space (and tunnel) bilge suction (other than emergency suction) are led from easily accessible mud boxes (c/w "quick access" covers) fitted with straight tail pipes to the bilges. Confirm strum boxes are not fitted on these tail pipes or to the emergency bilge suction.
LR-P5.C13.7.7.1	Bilge	Confirm space exist between bilge tail pipe open end and the bilge well bottom (or shell plate, as applicable) to allow a full flow of water (min = pipe D/4) and to facilitate cleaning (may require extra space).
LR-P5.C13.4.2.1	Bilge	Confirm one bilge branch and one direct bilge suction at each side, where the double bottom extends the full length of the machinery space and forms bilges at the wings. (normally only applicable if bilges are formed by margin plates at the outboard edge of the tank-top)
LR-P5.C12.2.9.2	Bilge	Confirm no welded sleeve joints are used in bilge pipes inside deep tanks
OO Spec Sect. 529.1	Bilge	Confirm the bilge eductor is installed such that it is easily accessible and can be removed for cleaning.
LR-P5.C13.4.4.1 & OO Spec Sect. 529.1	Bilge	Confirm if additional bilge suction are required for the drainage of depressions in the tank top formed by crank pits, or other recesses, by tank tops having inverse camber or by discontinuity of the double bottom.



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SOLVING THE PROBLEM

Genoa's Future Product Offerings





SOLVING THE PROBLEM

Future Products

ESTIMATING SERVICES

- AACE Classification System adapted for shipbuilding

CRITICAL DESIGN REVIEW ADAPTATION:

- Increased granularity for large programs

VALUE AT RISK

- Measuring and reducing risk exposure



SOLVING THE PROBLEM

Estimating

CLASSIFICATION SYSTEM

- **Class 5** – Market Analytics
- **Class 4** – Feasibility Studies
- **Class 3** – Proposals
- **Class 2** – Project Planning
- **Class 1** – Pre-Execution

Critical Design Review

ADAPTATION

- CDR process intent
 - Event driven activities
- Increase granularity of events
 - Integration readiness levels

*"Conducting design reviews when programs are not ready increases the risk that major design deficiencies go undetected until later"– **Office of the Inspector General, Audit Report, 1992, The Critical Design Review Process for Major Defense Acquisition Programs***



Value at Risk

PRINCIPLES OF VaR

- Identification of key risks
- Earned value deficiency
- Measuring risk exposure
- Schedule vs risk exposure

“The longer it takes to discover any problems, the more the flawed results will have undermined downstream activities, thereby amplifying the cascade of rework and its cost and schedule impacts”

– **Browning & Eppinger, 2002**



“*A picture is worth a thousand words.
A model is worth a million!*”

Kyran Pennell, Genoa Senior Technical Consultant & SSI Client Champion

Thank You.

