NSRP National Shipbuilding Research Program

LiftShip 2

Business Technologies and Ship Design & Material Technologies 2021 Joint Panel Meeting

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The LiftShip 2 Team

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The Beginning



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The Overarching Problem

Lift Failures:

- Personnel Safety
- Rework due to structural failures
- Schedule delays due to rework
- Lost profit from added efforts to:
 - > Perform the assessment on the incident
 - Document and initiate the rework / repair effort
 - Perform the rework / repairs
 - Develop a recovery schedule
 - > Assess the impacts on the shipyard schedule

Potential Causes

The Why:

- Equipment issues
- Environmental issues
- Calculation errors
 - > Assumptions due to incomplete information
 - > Assumptions due to a complicated lifting arrangement
- Changes to the structure after the calculations were performed
 - More time on the hill time to add more outfitting
 - Using the structure as a mobile warehouse

What if....

Develop the accuracy and benefits of a Finite Element Analysis to eliminate the local yielding / buckling rework with significantly reduced labor?

The How....

Automatically derive the Finite Element mesh from the 3D design / production model

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Project History

LIFTSHIP 2

Research Announcement 218-451-003

LIFTSHIP

Research Announcement 2018-438

Improving the 3D CAD-to-FEM Interface for Shipbuilding Needs Panel Project 2017-416

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LiftShip (the original)

It automated the process of developing the Finite Element Analysis Mesh Model from the 3D design model



The Continuation....

LiftShip 2

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LiftShip 2 (the continuation)

✓ Perform analysis on Lifts with Turns / Complex Lifts

- ✓ Provide a user-friendly method to change the Level of Detail of the Finite Element Mesh to suit the intended analysis
- ✓ Develop Enhanced Visual Reporting of the analysis to support the Stakeholders





Level of Detail



Visual Results Reporting





Where we are:



PHASE I





Current Status:

- ✓ Team training continues leveraging the original LiftShip project and FEA software
- ✓ Technical Team is reviewing Use Cases for Lift Arrangements to understand the Shipyard's processes regarding Complex Lifts and Complex Lifts with Turns
- ✓ Team is fully engaged with nearly 2 dozen attendees on the biweekly Team Meetings

Additional Benefits Realized:

✓ Utilization of LiftShip to support efficient FEA for other areas / needs in addition to lifts

Technical Status: ShipConstructor

- Reviewing the Use Cases
- Enhancing the user experience from the original LiftShip project
- Working with ATA and Altair to streamline the data translation workflow to increase efficiency
 - Removing excessive data folders
 - Eliminating unused data
- Performing training on ShipConstructor



Technical Status: Altair Engineering

- Reviewing the Lift and Turn Use Cases
- Enhancing the HyperWorks LiftShip user interface and feature set
- Streamlining the workflow for ShipConstructor data exchange
- Lift and turn analysis method development

Performing HyperWorks training



Altair



Technical Status: ATA Engineering

- Discussing lift/turn with shipyards to ensure that the LiftShip tool captures each yard's best practices
- Enhancing the LiftShip data transfer from ShipConstructor to FEMAP
 - Graphical user interface for setting up data transfer
 - Additional features like rotated stiffeners, corner cutouts, level of detail, etc
- Developing tool for streamlined lift/turn simulation and visual reporting
- Provided on-demand training resources for FEMAP and LiftShip

QUESTIONS?





Thank you

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