Simulation Projects Overview

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Outline

• Overview
  – About CAVS Extension
  – Simulation Timeline

• Simulation Models
  – Nissan Production Model
  – Navistar Defense
  – Navsea Seabasing

• Decision Support Systems
  – VT Halter Marine DSS
About CAVS Extension

• Overall Economic Impact
  – $3,079,062,131 saved
  – 50+ companies helped

• Simulation Modeling
  – 25+ applied projects
  – ~ $100 million saved

• Training
  – Six Sigma, Minitab, Simulation Modeling and Analysis, 3D Modeling, Quality Tools, Lean Manufacturing, Logistics, Ergonomics
Nissan Production Model
Project Overview

Model the operations of the plant from the body shop through pre-delivery. The plant produces four vehicle platforms – Titan, Quest, Armada and Altima.

Questions:

- Analyze any constraints that prevent the achievement of key performance measure.
- Provide recommendations for improvements to the facility.
- Analyze scenarios raised by Nissan engineers with layout and resource alternatives.
Nissan Production System Model

### Integrated Model Scoreboard

<table>
<thead>
<tr>
<th></th>
<th>Total JPH</th>
<th>UL JPH</th>
<th>2W JPH</th>
<th>WOW JPH</th>
<th>First Rate</th>
<th>UL Time in System</th>
<th>2W Time in System</th>
<th>WOW Time in System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>45.15</td>
<td>35.25</td>
<td>17.90</td>
<td>38.05</td>
<td>8.75</td>
<td>1.45</td>
<td>2.65</td>
<td>4.46</td>
</tr>
<tr>
<td>Body Shop</td>
<td>45.15</td>
<td>35.25</td>
<td>17.90</td>
<td>38.05</td>
<td>8.75</td>
<td>1.45</td>
<td>2.65</td>
<td>4.46</td>
</tr>
<tr>
<td>Paint Shop</td>
<td>45.15</td>
<td>35.25</td>
<td>17.90</td>
<td>38.05</td>
<td>8.75</td>
<td>1.45</td>
<td>2.65</td>
<td>4.46</td>
</tr>
<tr>
<td>FBS</td>
<td>45.15</td>
<td>35.25</td>
<td>17.90</td>
<td>38.05</td>
<td>8.75</td>
<td>1.45</td>
<td>2.65</td>
<td>4.46</td>
</tr>
<tr>
<td>Trim &amp; Chassis</td>
<td>45.15</td>
<td>35.25</td>
<td>17.90</td>
<td>38.05</td>
<td>8.75</td>
<td>1.45</td>
<td>2.65</td>
<td>4.46</td>
</tr>
<tr>
<td>Pre-Delivery</td>
<td>45.15</td>
<td>35.25</td>
<td>17.90</td>
<td>38.05</td>
<td>8.75</td>
<td>1.45</td>
<td>2.65</td>
<td>4.46</td>
</tr>
</tbody>
</table>

### Additional Information

- **UL STAR:** 0.45
- **2W STAR:** 0.45
- **WOW STAR:** 0.45
- **UL:** 0.45
- **2W:** 0.45
- **WOW:** 0.45

- **Total STAR:** 0.45
- **Total WOW STAR:** 0.45
- **Total UL STAR:** 0.45
- **Total 2W STAR:** 0.45
- **Total WOW STAR:** 0.45

**Legend:**
- Blue indicates positive performance.
- Red indicates negative performance.

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**Notes:**
- The model includes detailed performance metrics for various stages of production.
- Key areas for improvement are highlighted in red.
Springfield Assembly Plant Simulation for FMTV
Project Overview

Model the operations of the plant including production vehicle movement through the facility, vehicle road tests, test and tune operations, government sign-off, finished goods storage, and shipping.

Questions:

• How many bays are needed in the DCMA building to perform repair and government sign-off operations?
• How many bays are needed for test and tune operations?
• How much parking area is required to stage finished goods?
• How many vehicle shipping ramps are required to be able to ship vehicles on time?
Layout
Simulation Model
Simulation Modeling and Analysis Support for Seabasing Capability Studies
Conceptual model & key objects
General modeling approach
Production Systems Modeling & Decision Support for VT Halter Marine
Project Overview

- **Yard Operations**: simulation model focuses on the “Shop” which includes material prep, panel line, and unit assembly.
- **Ship Structure**: Sections-Modules-Blocks-Units.
- **Requirements Development**: estimating requirements given the level of knowledge known at the time of analysis.
Simulation Model
Model Based Decision Support Systems
System Architecture

Ship Data

User Interface

Simulation Model

Process Data

Planner

Reports
Estimating Ship Requirements

Given total weight and “like” ship …

1. Distribute & scale weight across the ship structure (sections, modules, blocks, units) using ship templates

2. Based on weight distribution … Estimate ship structure parameters (e.g., # of stiffeners, # of plates, …) using ship templates.

3. Roll-up parameter data across all units to the ship level (e.g., total # of stiffeners, total # of seams).
Example Outputs
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