How IT solution can help ship’s energy saving measures and introduction of iSEMS

STX Marine Service/LG CNS
1. Introduction of STX Marine Service
2. Background
3. Issues
4. Introduction of iSEMS
1. Introduction of STX Marine Service

History

1966 “Establishment”
- Incorporated Pan Ocean Bulk Carriers Ltd

1982 “Growing-up”
- Began break bulk liner service to USA and Canada.

1990 ~ 2004 “Development”
- Absorbed the Maritime Division of Pan Ocean Shipping in 2003.

2005 “2nd Start-up”
- Joined as SMC Business Division to STX Corporation in 2005.

2011 ~ Now “STX Marine Service”
- Reborn as “STX Marine Service”.

Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales (USD Mil.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09’</td>
<td>270</td>
</tr>
<tr>
<td>10’</td>
<td>300</td>
</tr>
<tr>
<td>11’</td>
<td>400</td>
</tr>
<tr>
<td>12’</td>
<td>450</td>
</tr>
<tr>
<td>13’</td>
<td>340</td>
</tr>
</tbody>
</table>

Business Areas

- Marine Engineering
- Plant Service
- Ship Management (124 Ships)
- Trading
2. Background

- The time of paradigm shift
- Optimized consumption

- Eco Ship
- BDI
- Bunker Price
- Regulation

VS

- $700
- $689

iSEMS
3. Issues

Technical issues

- Optimization
- Routing
- Hull Condition
- Engine Performance
- Speed/RPM
- Trim
- Marine Engineering
3. Issues

Technical issues

▷ Routing

- Distance
- Ship Performance
- Weather
- Time Expense

Algorithms for optimal route

- Route
- Speed
- RPM

▷ Hull Condition

- Fouling hull
  - Hull cleaning
  - Total Resistance
    - Still Water
    - Weather
    - Fouling

- FOC
- SPD

• Predicted energy loss due to fouling
3. Issues

Technical issues

➤ Engine Performance

Diagnosis

Analysis

Plan

Repair

➤ Trim

Dynamic Trim

Static Trim

Trend Data
3. Issues

Voyage Planning

Chartering & Contract
Charter profit estimation

Estimated Cost
Actual Cost

Measured data

Management
Communication

Measured Data
3. Issues

Management issues

- Continuous improvement

Regulation

- GCF (Green Climate Fund)
- ECA Zone
- EU-MRV
- MBM (Market Base Measure)
  - GHG Fund
  - ETS
  - EIS
  - SECT

BP (Best Practices)
4. Introduction of iSEMS

**Eco operation**
- Voyage Planning
- Opti. Routing
- Hull Performance
- Opti. Trim
- M/E Performance

**Solution Concept**
- iSEMS for Ship
  - Officer
  - Monitoring/Execution
  - Goal Setting
  - Planning
  - Evaluation
- iSEMS for Shore
  - Operator
  - Director
  - Sales
- Analysis service

- Integrated Monitoring
- Continuous Improvement
- Regulation
- Measured Data
- Data-based Comm.
4. Introduction of iSEMS
4. Introduction of iSEMS

iSEMS for Shore

**Main Functions**

**Prediction**
- Select appropriate ship
- Cost estimation

**Monitoring**
- Status monitoring
- Performance diagnosis
- Factor analysis

**Analysis**
- Final C/P
- Speed/FOC
- Energy KPI
- GHG

**Report/e-Record**
- Data Log from devices
- Position Report
- Service Report

**Prediction**
- Charted Vessel
- Vessel Name: departure port, arrival port, sailing days,
  total distance, fuel consumption, speed, FOC
- Data from devices

**Monitoring**
- Charted Vessel
- Vessel Name: departure port, arrival port, sailing days,
  total distance, fuel consumption, speed, FOC
- Data from devices

**Communication**
- Charted Vessel
- Vessel Name: departure port, arrival port, sailing days,
  total distance, fuel consumption, speed, FOC
- Data from devices

**Monitoring**
- Charted Vessel
- Vessel Name: departure port, arrival port, sailing days,
  total distance, fuel consumption, speed, FOC
- Data from devices
4. Introduction of iSEMS

**iSEMS for Ship**

<table>
<thead>
<tr>
<th>Data Collection</th>
<th>ECDIS</th>
<th>AMS</th>
<th>Weather System</th>
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</thead>
<tbody>
<tr>
<td>Shaft Torque Meter</td>
<td></td>
<td>Flow Meter</td>
<td>VDR</td>
</tr>
<tr>
<td>Loading Computer</td>
<td>MIP</td>
<td>Manual Input</td>
<td></td>
</tr>
</tbody>
</table>

**e-Record**
- Collect ship's internal and external data from sensors and/or system
- Integrated management
- Transmission of ship's eco operation data to shore

**iSEMS Appliance**
- Display
- UPS
- iSEMS Application
- Data collection
- Physical Redundancy (Optional)

**Eco Operation Application**
- Voyage Planning, Position Report, etc.
- Support decision making based on collected data and best practice guide PDCA cycle
4. Introduction of iSEMS

**iSEMS for Ship**

**Plan**

- Suggest calculated total cost considering optimum route, past achievement, best practice, shortest distance, etc.
- Goal setting for evaluation of eco operation (Ballast, EEDI, SFOC/SLOC)
4. Introduction of iSEMS

iSEMS for Ship

Monitoring

- Provides weather&sailing information and display deviations between the initial goal figure and current performance
- Provides engine&sailing information and display deviation between shop&sea trial test data and current performance data
4. Introduction of iSEMS

iSEMS for Ship

Self Evaluation

- Self evaluation regarding eco operation of voyage & engine part
- Display actual performance data comparing with initial goal figure and crew opinion
- Support preparing of next voyage plan and maintenance plan, economically
**4. Introduction of iSEMS**

- **iSEMS Supporting Center**
  - **Expert service**
    - Eco operating Briefing
    - Data analysis to support C/P contracts
    - Effect analysis of energy saving device/technology
    - Support to chartered in/out
    - Support to environmental regulations (CO2, Inventory, MRV, MBM, etc.)
  - **Data Cloud Service**
    - Enhanced data security management
    - Efficient IT system management
    - Ship’s data management
  - **Install & Maintenance**
    - Error handling
    - Manage to version
    - Install the appliance
    - Update to information
  - **User training & customer service**
    - Support to iSEMS contract
    - User training (On/Offline)
    - 24hr call center service
  - **Fault management**
    - Fault monitoring (app., server, N/W)
    - Fault reception
    - Remote processing

**Ship owner/manager**

Eco Operating analysis by the expert
Unitary customer service
Secure data management
Thank you