Increasing Crane Productivity

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Embryo to Jumbo
Productivity vs. Ship Size

With identical machinery, productivity 24 wide / 17 wide = 85%

Speeds and accelerations must increase 45% to maintain productivity.

Other methods of improving productivity will be more practical.
Tandem 40 dual hoist

Crane – Yard Interface
Tandem 40 Container Cranes

Issues

- Single Hoist
- Dual Hoist
- Spreaders
- Machinery House
- Hoist Machinery
- Trolley
- Production
- Weight and wheel loads
Tandem 40 Hoist Systems

Single hoist systems

Dual hoist systems
Tandem 40 Single Hoist Equipment

Bromma Headblock and Spreader
Source: Bromma Conquip AB

RAM Headblock and Spreader
Source: World Cargo News, October 2005

Stinis Headblock and Spreader
Source: Cargo Systems, December 2005
Tandem 40 Single Hoist Systems

Advantages
Can use with existing single hoist systems

Disadvantages
Cannot separate to fit into some ship holds
Balancing

Source: Bromma Conquip AB
Tandem 40 Single Hoist Headblock

Source: Bromma Conquip AB
Tandem 40 Dual Hoist System
Dubai Tandem 40
Two 40s, Four 20s  80 long tons
Shanghai Tandem 40s
Twin Tandem 20s
Lowering to Chassis
Lowering to Chassis
IBC Removal
Notice spacing cylinders
Tandem Head Blocks, Spreaders
Headblock Spacing Cylinders
Trolley
Trolley Arrangement

WS headblock stowed
General Arrangement

Combined Gearbox
Combined Gearbox
Combined Gearbox
Two Gearboxes
Two Gearboxes
CraneSim Tandem 40 Productivity

Computed 40s = \(2 \times 46.3 = 92.6\) moves/hour
Expected 40s = \(0.75 \times 92.6 = 69.5\) moves/hour
## A Few Statistics

<table>
<thead>
<tr>
<th>Crane</th>
<th>Single Hoist 65 lt capacity Oakland B55</th>
<th>Tandem 40 Dual Hoist 80 lt capacity Yantian, China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight metric tons</td>
<td>1300</td>
<td>1800</td>
</tr>
<tr>
<td>LS / WS Factored</td>
<td>35 / 55</td>
<td>55 / 70</td>
</tr>
<tr>
<td>Operating Rail loads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40s per hour</td>
<td>30 – 45</td>
<td>45 - 70</td>
</tr>
</tbody>
</table>
Crane – Yard Interface

Lane Arrangement
Elevated Lanes
Overhead Protection
Considerations for Tandem 40 Operations
Landside Lanes

Source: ZPMC
Lane Overhead Protection

Source: ZPMC
Tandem 40 trailer
<table>
<thead>
<tr>
<th>Landside ballast?</th>
<th>Container</th>
<th>Approximate gage required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>8</td>
<td>29.24 m</td>
</tr>
<tr>
<td>Maybe</td>
<td>10</td>
<td>35.88 m</td>
</tr>
<tr>
<td>Unlikely</td>
<td>12</td>
<td>42.52 m</td>
</tr>
</tbody>
</table>
Yard Layout - Equipment

Tandem yard cranes will be more viable
Summary
Increasing Crane Productivity

Liftech Consultants Inc.
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Thank you
Liftech Consultants Inc. Presentation Source Documentation:

Source documents will be stored in: Presentation\Waiting to Archive\AAPA 2006\Crane_Productivity

FYI - Much content originally came from the Zelus Port Congestion 2005 presentation.