The Future of Simulation
Introduction to BCMEA

BCMEA is an employers association consisting of 67 member companies

The BCMEA deploys 28 different training programs to a workforce of more than 3500 longshoremen.

BCMEA has the role of:
1. Providing labour relations assistance to the waterfront employers
2. Establishing and maintaining various industry benefits programs
3. Promoting accident prevention, administering safety education and managing Workers’ Compensation Board claims
4. Supplying a skilled workforce through training and upgrading programs developed in collaboration with stakeholders.

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Vancouver Port

The Most Diversified Port in the Northwest
Vancouver Port

The Inner Harbor
Vancouver Port

New Westminster & Delta
Vancouver Port

Prince Rupert
## Vancouver Port

### Expansion Plans

Many sites are currently expanding or have plans for expansion in the next few years.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cranes</td>
<td>TEU</td>
<td>Capacity</td>
<td>Cranes</td>
</tr>
<tr>
<td>New West</td>
<td>59</td>
<td>366,000</td>
<td>4</td>
<td>560,000</td>
</tr>
<tr>
<td>Fraser Surrey</td>
<td>3</td>
<td>272,000</td>
<td>366,000</td>
<td>4</td>
</tr>
<tr>
<td>Delta Port</td>
<td>6</td>
<td>896,992</td>
<td>850,000</td>
<td>6</td>
</tr>
<tr>
<td>Terminal 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total New West</td>
<td>9</td>
<td>1,168,992</td>
<td>1,218,000</td>
<td>15</td>
</tr>
</tbody>
</table>

| Vancouver         | 54        | 435,000   | 5         | 535,000   | 6         | 535,000   | 6         | 535,000   |
| Vanterm           | 5         | 374,000   | 4         | 360,000   | 5         | 720,000   | 5         | 720,000   |
| Centerm           | 4         | 288,000   | 5         | 720,000   | 5         | 720,000   | 5         | 720,000   |
| Total Vancouver   | 9         | 662,000   | 795,000   | 11        | 1,255,000 | 11        | 1,255,000 | 11        | 1,255,000 |

| Total             | 18        | 1,830,068 | 2,013,000 | 21        | 2,505,000 | 26        | 2,915,000 | 34        | 4,015,000 |
Port Diversification

Vancouver Port handles the most diverse range of commodities in the Northwest

Bulk
- Agri Products
- Coal
- Sulphur
- Wood Chips
- Potash
- Concentrates

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Vancouver Port handles the most diverse range of commodities in the Northwest

**Break Bulk**

- Lumber
- Logs
- Steel
- Pulp

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Port Diversification

Vancouver Port handles the most diverse range of commodities in the Northwest

Containers
Current Interactive Simulation Training

BCMEA uses an interactive simulator for the initial training of operators

Simulates operating scenarios for different types of equipment.

- Pedestal Cranes
- Ship Gantry
- Dock Gantry
- Rubber Tire Gantry

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Current Interactive Simulation Training

Current Simulator Issues

The simulator currently utilized by BCMEA has its limitations

- Proprietary software/hardware is cost prohibitive
- Unable to handle customized scenarios
- Slower processing time
- Has met its threshold for expandibility
- Inferior graphics and interactivity

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Employer Expectations

Employers expect training programs to deliver a “complete” operator.

- Up to speed immediately
- Produce at or better than the benchmark
- Experienced operators average 25 moves per hour.

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Employer Expectations

Without a simulator: Dock Gantry Training = 30 days

30 days on the job training.

- 1st day on the job, trainees average 15 moves per hour.
- They require an average of 30 days to reach 25 moves per hour.
## Employer Expectations

### Without a simulator: Dock Gantry Training = 30 days

<table>
<thead>
<tr>
<th>30 Days on the Job Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Operator avg 25 Moves per Hour</td>
</tr>
<tr>
<td><strong>Shifts on the Job</strong></td>
</tr>
<tr>
<td>Trainee Progress (Moves Per Hour)</td>
</tr>
<tr>
<td>% Reduction in Productivity</td>
</tr>
<tr>
<td>Added Hours/Shift compared to Reg Op</td>
</tr>
<tr>
<td>Hourly Cost/ Gang</td>
</tr>
<tr>
<td>Cost per 5 shifts</td>
</tr>
<tr>
<td>Cost/Set of Trainees</td>
</tr>
<tr>
<td>Sets of Trainees / Year</td>
</tr>
<tr>
<td>Total Cost per year</td>
</tr>
</tbody>
</table>
Employer Expectations

With a simulator: Dock Gantry Training = 15 days

5 days on the simulator and 10 days on the job training.

- Trainees develop essential skills on the simulator prior to working in production.
- 1st day on the job, trainees average 23 moves per hour.
- They require an average of 10 days on the job to reach the benchmark of 25 moves per hour.
- Length of program is reduced to from 30 to 15 days.
# Employer Expectations

## With a simulator: Dock Gantry Training = 15 days

<table>
<thead>
<tr>
<th>Days on the new Simulators</th>
<th>Days on the Job Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Regular Operator</th>
<th>Trainees first day on site</th>
<th>Improvement/ 5 shifts</th>
</tr>
</thead>
<tbody>
<tr>
<td>avg 25 Moves per Hour</td>
<td></td>
<td>avg 23 Moves per Hour</td>
<td>avg 1 Move per Hour</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Shifts on the Job</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 - 5</td>
</tr>
<tr>
<td>Trainee Progress (Moves Per Hour)</td>
<td>23 - 24</td>
</tr>
<tr>
<td>% Reduction in Productivity</td>
<td>-8%</td>
</tr>
<tr>
<td>Added Hours/Shift compared to Reg Op</td>
<td>0.5</td>
</tr>
<tr>
<td>Hourly Cost/ Gang</td>
<td>-$1,000.00</td>
</tr>
<tr>
<td>Cost per 5 shifts</td>
<td>-$2,500.00</td>
</tr>
<tr>
<td>Cost/Set of Trainees</td>
<td>-$3,750.00</td>
</tr>
<tr>
<td>Sets of Trainees / Year</td>
<td>20</td>
</tr>
<tr>
<td>Total Cost per year</td>
<td>-$75,000.00</td>
</tr>
</tbody>
</table>

Note: The cost per 5 shifts is calculated as follows:

- Hourly Cost/ Gang: $1,000.00
- Cost per 5 shifts: -$2,500.00
- Cost per year: -$75,000.00

Improvement/ 5 shifts:

- Trainee Progress (Moves Per Hour): Avg 1 Move per Hour
- % Reduction in Productivity: 8% to 4%
- Added Hours/Shift compared to Reg Op: 0.5 to 0.25
Impedements to Training

Factors that impact the scheduling and effectiveness of training include...

- Access to equipment
- Duration of the training program
- Training in production
- Lack of opportunity for specialized maneuvers
- Cost
  
  ***
New Generation of Simulators

Advances in technology and design have taken simulation to the next level.

- Off-the shelf hardware
- Employ real dynamics
- Assessment features
- Customizable features
- Instructor driven variables
- True to life trainee experience

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New Generation of Simulators

Advances in technology and design have taken simulation to the next level.

Employ real-time dynamics

- Training in tandem
- Operator actions influence the site scenario
- Operator able to feel impacts of operation through cab motion (wind, container impact, cargo tilt)

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New Generation of Simulators

Advances in technology and design have taken simulation to the next level.

Assessment features

- Tracks container path
- Tracks trainee reactions in fault and emergency situations
- Records collisions and major/minor mistakes
- Productivity evaluation:
  - Number of moves
  - Average moves per hour
  - Containers handled
  - Trainee progress reporting (historical data retention)

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New Generation of Simulators

Advances in technology and design have taken simulation to the next level.

Array of customizable features

- Terminal/environment
- Replicate crane specific controls, thresholds & safety features
- Accommodate different types of cargo & stowage
- Deploy environmental conditions on the fly
- Implement ground crew interaction
- Specialized situations requiring unique maneuvers.
New Generation of Simulators

Advances in technology and design have taken simulation to the next level.

Capable of staging uncommon scenarios
New Generation of Simulators

Advances in technology and design have taken simulation to the next level.

Instructor driven variables

- Deploy environmental conditions on the fly
- Implement ground crew interaction
- Stage time of day.

***
Advantages of interactive simulation training include…

- On-the-job training time significantly reduced minimizing impact on productivity
- Reach production targets more quickly
- Practice difficult maneuvers with no risk to cargo or equipment
- Wide variety of operating conditions
- Realistic scenarios help to develop specific skills
- Progressively more complex scenarios as skills improve
- Safe, controlled environment
- Output a greater number of qualified operators in a smaller amount of time

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Advantages

The Future of Simulation
Presented by:

BCMEA