Labor & Resource Management

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Problem:

- Unpredictable
  - High associate turnover
  - 20-30% daily call out/no show rate in some warehouse operations
- Competitive
  - Low unemployment in ideal regions
  - DC/FCs are commonly clustered

Customer expects orders faster and more accurate than ever before
LMS | Resource Management Explanation

Potential Solutions:

• Automation: Barrier to entry

• Location: Not an option for everyone

• Labor Management System (LMS):
  • Short lead time: A few months to get running
  • ROI: Common to see return within 6 months
  • Effective: Not uncommon to find 20%+ productivity increase
When to Implement a LMS?

- **Existing building**
  - Well defined processes and stability in WMS
  - Accurate and detailed operational data exists

- **New building**
  - Avoid planning to bring LMS live at the same time as the site
  - Workflow is subject to change
LMS Divided into three parts

Data based on anecdotal experience with customers who have implemented LMS
Performance Measurement
What is performance measurement?

Utilization Score

- Managers target a utilization % to make sure that paid hours to their employees are being used productively.

- Direct vs. Indirect Time

- Calculation of time spent on task over total time spent.
What is performance measurement?

Performance Score

• Used by managers to assess worker productivity - should be shared with the workers through reports and live scores

• Calculation of time it took to do actual work vs. the goal time set to do that work
Setting Realistic Goals

• **Utilization**
  • 100% not possible
  • Improvement lies on operations managers

• **User Performance**
  • Flexible
  • Clear to associate

**UTILIZATION 85%+**

**PERFORMANCE ≥100%**
Static Standards vs. Engineered Standards
Static Standards

• Completion of 1 process cycle to measure performance

• Simple to implement

• Does not account for exceptions

• Does not account for task variability
Engineered Standards

• Designed for fairness and accountability
• All Systemic interaction tracked as “Events” or “Triggers”
  - WMS/WCS System
  - Time Tracking Software
• Account for multiple factors:
  - Product Category
  - Volume and Weight
  - Experience of associate
  - Distance Traveled
Engineered Standards Process

- Identify Events
- Specify Adders
- Time Study Process
- Continuous Improvement
STORAGE

Total expected time of 1st DEPOSIT = PICKUP 1 from IG area + T1 + T2 + DEPOSIT 1
Total expected time of 2nd DEPOSIT = T3 + T4 + T5 + PICKUP 2 + T6 + T7 + T8 + DEPOSIT 2

T1 = \frac{S1}{\text{Driving Speed Load}}

T2 = \frac{S2}{\text{Lifting Speed Load}}

T3 = \frac{S3}{\text{Lowering Speed Unloaded}}

T4 = \frac{S4}{\text{Driving Speed Unloaded}}

T5 = \frac{S5}{\text{Lifting Speed Unloaded}}

T6 = \frac{S6}{\text{Lowering Speed Loaded}}

T7 = \frac{S7}{\text{Driving Speed Loaded}}

T8 = \frac{S8}{\text{Lifting Speed Loaded}}
Standards Comparison

<table>
<thead>
<tr>
<th>Static</th>
<th>Engineered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to implement</td>
<td>Requires WMS/WCS with tracked systemic</td>
</tr>
<tr>
<td>Simple</td>
<td>interaction</td>
</tr>
<tr>
<td>Lacks Reliability</td>
<td>Clear &amp; Thorough</td>
</tr>
<tr>
<td>Ineffective</td>
<td>Fair</td>
</tr>
<tr>
<td></td>
<td>Detailed</td>
</tr>
</tbody>
</table>
Standards Comparison

Example

Static Standard = 1 pick/min

Time Spent = 7 minutes total

Static Performance = \( \frac{\text{Goal} \,(t)}{\text{Actual} \,(t)} \times 100 \)

\[ = \frac{5}{7} \times 100 = 71\% \]

Eng. Performance = \( \frac{\text{Goal} \,(t)}{\text{Actual} \,(t)} \times 100 \)

\[ = \frac{X}{7} \times 100 = ??? \]
### Standards Comparison

**Engr. Performance = 92%**

**Static Performance = 71%**

<table>
<thead>
<tr>
<th>Event</th>
<th>Goal (s)</th>
<th>Weight</th>
<th>Volume</th>
<th>Shelf Location</th>
<th>Distance</th>
<th>Total Goal (s)</th>
<th>Actual (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Login</td>
<td>10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Pick 1</td>
<td>15</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>25</td>
<td>48</td>
<td>46</td>
</tr>
<tr>
<td>Exception</td>
<td>30</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Pick 2</td>
<td>15</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>80</td>
<td>105</td>
<td>120</td>
</tr>
<tr>
<td>Pick 3</td>
<td>15</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>15</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>Pick 4</td>
<td>15</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>75</td>
<td>108</td>
<td>128</td>
</tr>
<tr>
<td>Pick 5</td>
<td>15</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>15</td>
<td>40</td>
<td>41</td>
</tr>
<tr>
<td>Logout</td>
<td>10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**Performance**

- **Pick 4**: 88%
- **Pick 3**: 93%
- **Pick 2**: 84%
- **Pick 1**: 98%
- **Logout**: 100%

**Engineered**

- Shelf Location
  - Volume
  - Weight
  - Pick Event

**Modex 2000**

POWERED BY POSSIBILITIES.
Resource Management and Planning
Goals

• Right People, Right Place, Right Time

• Leverage available data to make the correct decisions

• Automate the planning process
Forecast

Workload Calculation

Planning + Optimization

Shift Scheduling

Day Scheduling

Detailed Day Scheduling

Input

Output

Allocation of employees to shifts
Allocation of employees to processes
Allocation of employees to time slots and processes

Monitoring + Rescheduling

Deviation Check

What-if Analysis

Rescheduling Processes

in advance

real time

POWERED BY POSSIBILITIES.
Forecast

• How much throughput do we need to plan for?

• Does the system account for promotions or atypical order profiles?

• Which areas of the warehouse do we expect to be impacted?
Planning and Optimization

Resource Pool

Shift Scheduling
- M-F Day
- M-F Night
- Weekend

Day Scheduling
- Receiving
- Picking
- Packing
- Consolidation
- Shipping
- Put Away
- Reserve

Detailed Day Scheduling
- Receiving
- Picking
- Packing
- Consolidation
- Shipping
- Put Away
- Reserve

Start | Midshift | End

POWERED BY POSSIBILITIES.
Monitoring and Rescheduling

- Maintain system balance
- SLA prioritized
- Prescriptive resource changes
- Based on historical performance
# People and Machines

<table>
<thead>
<tr>
<th>DATE</th>
<th>NEW ORDER</th>
<th>SKU</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/09/20</td>
<td>SSI001</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI002</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI003</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI004</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI005</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI006</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI007</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI008</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI009</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>03/09/20</td>
<td>SSI010</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>
INBOUND: 100,000
OUTBOUND: 300,000

TIME: 6:00 AM

PACKING
CONSOLIDATION
PICKING
RESERVE
PUT AWAY
SHIPPING RECEIVING
INBOUND OUTBOUND
100,000 300,000
35 5
5 3
50 20
215 30

POWERED BY POSSIBILITIES.
Incentive Payments
Benefits

• Money Motivation

• Win-Win

• Employee Retention
Considerations

• Requires quality labor standards in place

• Awards can be managed from LMS with basic interface to ERP and time tracking systems

• Incentives don’t always need to be financial
Challenges

**Challenge:** Paid work gets attention, indirect work does not

**Solution:** System should track all actions. Mandatory indirect tasks must be fulfilled to trigger incentives

**Challenge:** Encourages rushing, which improves speed but reduces accuracy

**Solution:** Tight coupling with WMS/WCS allows for auditing of work, with credit only given to successful actions
Future of LMS
Future of LMS

Machine Learning and AI

Gamification

Employee Engagement
Conclusion
Conclusion

• Unpredictable workforce requires new solutions

• LMS provides quick ROI, and immediate results when done correctly

• Managers have more time on the floor, less time spent on excel/researching
Questions?

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