Reducing Waste in a Converting Operation

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7 Potential Areas of Waste

According to the principles of Lean Manufacturing

- Transport
- Inventory
- Motion
- Waiting
- Over-processing
- Overproduction
- Defects
## Table A: Defects and Detection Methods

<table>
<thead>
<tr>
<th>Defect Type</th>
<th>Detection Method</th>
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<tbody>
<tr>
<td>All discrete defects such as holes and spots. All visible surface variations such as streaks and lumps.</td>
<td>Full Web Inspection System</td>
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<tr>
<td>Print defects and pattern defects.</td>
<td>Print Inspection System</td>
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<tr>
<td>Thickness, color and coat weight variations.</td>
<td>Beta Gauge or other quality scanner</td>
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<tr>
<td>Process upsets and changes such as make ready, grade changes and raw material run-outs.</td>
<td>Output monitoring of mill PLC or DCS</td>
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<tr>
<td>Operator induced defects such as sample taking, roll cleaning and manual machine adjustments.</td>
<td>Operator report via push button or log</td>
</tr>
</tbody>
</table>
The Ideal Defect Tracking and Removal System

Step 1: Collect ALL Defect Data

- Include in Data;
  - Defect Type
  - Location
    - Machine Direction Start/Stop points
    - Cross Machine Direction
  - Downstream Corrective Action (Default)
    - Slow
    - Stop
    - Ignore
  - Any other data such as time, temp, operator, etc.

- Store Data in SQL type database such as RYEKO’s Rollsync
The Ideal Defect Tracking and Removal System (Con't)

Step 2: Synchronize the Data.

- Place position Marks on Web during Inspection (Rollsync)
- Transfer quality data with roll to downstream operation
  - Server based with Roll ID
  - Can be another plant
- Read Position from Moving Web
- Show Current Position (even a partial roll)
- Display Next Defect requiring Action
Printing Position Codes on the Moving Web
The “Tape Measure” Illustration
The Ideal Defect Tracking and Removal System (Con't)

Step 3: Take Corrective Action

- Allow Auto-stopping of line for removing defects.
- Operator can override the default of Slow, Stop or Ignore.
- With Position Codes the system can also:
  - Track every inch of removed product
  - Be used to make Sets according to length
  - Measure any Stretch or shrinkage in roll
  - Auto Stop for End of Roll
- The data and results from all processed rolls is saved for analysis and historical reference.
Figure 2. RollsSync Block Diagram
Conclusion

The keys to reducing waste in a converting operation:

1. To collect and record all quality information
2. To synchronize that quality information to the web
3. Remove only the bad product and sell only the good product

¿Questions?