Radio Frequency Identification (RFID)
RFID Task Group

• Joe LeBlanc, Smurfit-Stone (Chairman)
• Hal Baker, Longview Fibre
• Dave Boarman, Temple-Inland
• Randy Clark, Boise
• Jerry Clark, Interstate Resources
• Richard Etra, Norampac
• Jeff Hehir, Georgia-Pacific
• Deborah Lenk, Weyerhaeuser
• Rodger Reeder, International Paper
• Dwight Schmidt, CPA
• Jim Southwell, PCA
• Janice Zielinski, Menasha Packaging
Task Group Background

• Established by FBA Board at November 2003 meeting

• Board-defined objectives:
  – Investigate RFID technology, including current status of RFID implementation
  – Recommend the role FBA can and should play for the industry regarding RFID technology
Action Plan

- Recyclability of Tags
- Box Plant Supply Chain Assessment
- EPC Global Liaison
- Competitive Assessment
- Technology Assessment
- Leverage Progress made by FEFCO / JCCA
Action Plan Excludes

- Developing a primer on RFID
- Circumventing the time / effort of other companies and / or industries by handing out an all-encompassing answer
- Doing research and development, or creating specifications
Recyclability of Tags

- NCASI performed preliminary mass-balance study examining impact of RFID tags on waste water and sludge vectors in a recycled operation, not on resulting box concentrations.

- Established working group of industry environmental professionals with both mill & box plant perspectives.

- Work group approved NCASI experimental plan design. Pilot plant work was performed at Western Michigan University the week of January 10, 2005.

- Final results will be available in May.
Recyclability of Tags

• NCASI performed pilot plant trial at Western Michigan University (gratis) to determine the fate if RFID foil antennas (commercially available) during hydropulping.

• Based on the test, NCASI determined that all of the antenna were removed from the hydropulper at the screens.
Box Plant Supply Chain Assessment
Forrester’s approach

• Base benefits and costs on a fictional, but representative, corrugated box plant

• Focus on make-to-order brown boxes

• Define requirements and costs for inline tagging on flexo-folder gluers and specialty folder gluers
Two types of assumptions in the model

• Corrugated box plant assumptions
  – Plant visits
  – Interviews with corrugated box manufacturers
  – Secondary resources (e.g. FBA & TAPPI)

• RFID assumptions
  – Forrester’s research
  – Interviews with RFID vendors
RFID's Impact On The Corrugated Box Plant

The following is a commissioned study conducted by Forrester Consulting on behalf of the AF&PA and FBA.

September 20, 2004

by Christine Spikey Overby, Sharyn Leaver, Stacey Jankins

Model: RFID Cost/Benefit For US Corrugated Box Manufacturer

### Converting machine calculator

<table>
<thead>
<tr>
<th>Machine upgrades, cost summary</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New converting machine</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Machine modification</td>
<td>$ 150,000</td>
<td>$ 300,000</td>
<td>$ 150,000</td>
<td>$ 600,000</td>
</tr>
<tr>
<td>Scheduled down-time</td>
<td>$ 56,675</td>
<td>$ 436,606</td>
<td>$ 191,015</td>
<td>$ 684,296</td>
</tr>
<tr>
<td>Machine commissioning</td>
<td>$ 3,797</td>
<td>$ 29,253</td>
<td>$ 12,798</td>
<td>$ 45,448</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$ 210,472</td>
<td>$ 765,858</td>
<td>$ 353,813</td>
<td>$ 1,330,144</td>
</tr>
</tbody>
</table>

### Input

To see the data in a row, click on the "+" sign to the left of the row.

Cells colored blue are modifiable variables.

Cells color pink are modifiable variables that bear a disproportionate impact on costs. Please pay special care when modifying these assumptions.

All default cost assumptions in this model were made using cost estimates gathered from June to August, 2004.

### Converting machine purchase

<table>
<thead>
<tr>
<th>Specialty folder-gluer</th>
<th>Cost of machine (used)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$ 400,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New machine costs</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty folder-gluer purchase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
</tbody>
</table>

Assume: Most companies will upgrade existing converting machines rather than purchasing another converting machine.

Assume: Still, the purchase of a converting machine may be the best option in special situations, like when machine upgrades are improbable (for example, space doesn’t permit a line extension).

Assume: If a company must purchase another machine, it will purchase a used machine whenever possible.
Terms of use

• FBA members allowed to use the report and model in direct conversations with individual customers.

• FBA is NOT allowed to publicly release the report and model.

• Any use of the modifiable model must not have any reference to Forrester.
Overview Of XYZ Corrugated Corp.

• Large integrated box plant
  – $40.9 million in sales
  – 676 million square feet in production
  – Allows for a more comprehensive cost model

• A variety of converting equipment
  – Three flexo-folder gluers
  – One specialty gluer
  – Demonstrates RFID’s impact on multiple types of machine

• RFID upgrades in each year
  – Specialty gluer in Year 1
  – Flexos in Year 2 and Year 3
  – Reflects a gradual ramp-up that correlates with customer demand
Industry metrics: MSF

Year 1: $0.84
Year 2: $0.43
Year 3: $0.33
Summary

- RFID customer service benefits are high
- RFID internal operational benefits are limited
- RFID costs can exceed the cost of a brown box
Visit [www.fibrebox.org](http://www.fibrebox.org) for more RFID information

- The newly redesigned Fibre Box Association website has a page specifically designated for RFID information and links.

- Go to “Other Services” section in the Member’s Area and click on RFID.