The Next Generation of High Speed Folding Technologies

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Agenda

- The Impact of Next Generation of High-Speed Folding Technologies
  - Current feeding challenges
  - Typical Solutions
  - PFX Feeder
  - Additional Components
  - Economic Evaluation
Current Feeding Challenges

- Reliable feeding and folding typical up to 210 m/min;
- Net output can’t be increased beyond that at the same rate as gross output
- Speed Restrictions due to
  - Paper curl
  - Paper waviness
  - Paper weight
  - …
Current Feeding Challenges

Optimization potential:
50 - 65% of the error messages at folders are double sheets and pick-up problems at the feeder (even more with competitor machines)
Conventional Feeder
Conventional Feeder
The PFX Feeder

- PFX = Pallet Feeder eXtended
- Feed from the Press Pallet
- Change feeding concept: Single sheet vs Shingled sheets
- Optimize the width
- Automate the set-up
The PFX Feeder
The PFX Feeder
The PFX Feeder

- Idea: use offset press concepts
The PFX Feeder
The PFX Feeder

- Sheet Separation via pulsed air and lifting suckers
- 1st acceleration via suction head with asymmetrical suction roller – 65 m/min

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The PFX Feeder

- Sheet Separation via pulsed air and lifting suckers
- 1st acceleration via suction head with asymmetrical suction roller
- 2nd acceleration via suction roller from bottom
Processing of oblong formats

Feed sheets like on a press – portrait vs. landscape

30-40% more sheets/min can be conveyed
The PFX Feeder

- Implications Down-Stream

Under-shingled
The PFX Feeder

- 2nd station with „frog“ system
- Spreading of single sheet stream into two parallel sheet streams in the second station
- Reduced speed of units after the first folding unit
The PFX Feeder – Economic Impact

- Gain 30% by going to landscape feeding
- Gain additional 25% to 33% by shingling

Feeder work mode: negative sheet gap onto the transfer table
The PFX Feeder – Economic Impact

- **Additional Benefits:**
  - Minimize WIP by balancing the press output with the folder productivity -> impact on working capital
  - Optimize floor space:
    - Less space for WIP
    - Less space because less equipment
  - Palletized Feeder
    - Better ergonomics for operator
    - Less work to prepare piles / signatures
  - Folding with two units, automated set-up;
    - no conversion of folder necessary
The PFX Feeder – Economic Impact

- Gain additional 11% by optimized lay-outs
- 144 pages, circulation of 48,000 copies

\[ 9 \times 16\text{p.}/\text{printed sheets} = 432,000 \text{ printed sheets} \]

16 page example – brochure format 8.5 x 11” (A4), 144 pages volume, circulation 48,000 cp.

<table>
<thead>
<tr>
<th>Printing Press</th>
<th>( \varnothing ) 12,000 sheets/h</th>
<th>36 hours production time</th>
</tr>
</thead>
<tbody>
<tr>
<td>432,000 printed sheets - 16 pages</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ 8 \times 18\text{p.}/\text{printed sheets} = 384,000 \text{ printed sheets} \]

18 page example – brochure format 8.5 x 11” (A4), , 144 pages volume, circulation 48,000 cp.

<table>
<thead>
<tr>
<th>Printing Press</th>
<th>( \varnothing ) 12,000 sheets/h</th>
<th>32 Std. Production Time</th>
</tr>
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<tbody>
<tr>
<td>384,000 Printed sheets - 18 pages</td>
<td></td>
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The PFX Feeder – Economic Impact

9 x 16p./printed sheets = 432,000 printed sheets
In example product – brochure format A4, 144 pages volume, circulation 48,000 cp.

Folding machine
KH82 or TH82
\[ \varnothing 8,000 \text{ sheets/h.} \]
54 hours production time
8 x 18p./printed sheets = 384,000 printed sheets
With example product – brochure format A4, 144 pages volume, circulation 48,000 cp.

Folding Machines
TH82 with PFX feeder and twin lay system
\[ \varnothing 12,000 \text{ sheets/h} \]
(overlapping sheet stream)
32 hours production time

432,000 folded sheets
(16p. cross-fold)

384,000 folded sheets
à 18 pages

- 41% production time

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The PFX Feeder – Economic Impact

In example product – brochure format A4 (8 1/4 x 11 3/4"), 144 pages volume, circulation 48,000 cp.

<table>
<thead>
<tr>
<th>Press</th>
<th>Signatures</th>
<th>Pages per signature</th>
<th>Number of Brochures</th>
<th>Sheets</th>
<th>Run Speed</th>
<th>Hours</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Fold</td>
<td>9</td>
<td>16</td>
<td>48,000</td>
<td>432,000</td>
<td>12,000</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>PFX Frog Fold</td>
<td>8</td>
<td>18</td>
<td>48,000</td>
<td>384,000</td>
<td>12,000</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td><strong>Savings</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>4</strong></td>
<td><strong>32</strong></td>
<td></td>
<td><strong>11%</strong></td>
</tr>
</tbody>
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<td></td>
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<tr>
<td><strong>Savings</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>41%</strong></td>
</tr>
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- Total Time conventional: 90 hours
- Total Time with Frog and PFX: 64 hours
- One less signature to run on a perfect binder.
- Additional press time & folder time to run additional jobs.
The PFX Feeder – Economic Impact

- TH 96:
  - 300 days/year
  - * 16 hour/day
  - * 8,000 sheets/hour
  - \( \rightarrow 38.4 \text{ million sheets/year} \)

- TX 96:
  - 300 days/year
  - * 16 hour/day
  - * 12,000 sheets/hour
  - \( \rightarrow 57.6 \text{ million sheets/year} \)

\[ + 19 \text{ million sheets/year} \]

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The PFX Feeder – Economic Impact

- Automated Make-Ready: Less time, less waste
- Feeding consistency significantly improved
- Output +50% Compared to High-end folder without PFX Feeding technology
- Output +>100% Compared to 3-5 year old folder
- Reduced WIP
- Reduced Floor Space

- Consider a replacement scenario:
  One TX folder vs. three older folders:
60 million signatures per year

**OLD**

- 3 Shifts
- KD 78
- MBO K760
- MBO K760

**NEW**

- 3 Shifts
- TX 96

**Savings per year:**

- 6 at $40,000 → $240,000
- 1076 ft² at $ 4 sft/year → $4,304
- ⅔ Less Makeready Cost → $35,000

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**Efficiency**
The Next Generation of High Speed Folding Technologies

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