DDMRP/TOC at Lgi
Lane Kagey - COO
What will we talk about today?

- Lgi’s Business
- Our adoption of DDMRP/TOC
- Our latest improvements
- So what? What are the benefits?
**LGI’s Business**

- Lgi starts in 1978 and is quickly drawn into the technology community in the Portland area.
- Our technology customers moved to Asia, we followed.

![Portugal, Malaysia](Penang, Malaysia)

![Wuxi, China](Wuxi, China)

![Portland, USA](Portland, USA)
Lgi’s Business

- Lgi is a product engineering company that creates custom solutions for engineers.
- We are passionate about innovation that brings highly specialized manufacturing solutions to the products you engineer.
LGI’s Business

- We are engineers pushing the boundaries in print technology and materials science.
- We are relentless about solving customer problems.
- We develop highly responsible and reliable relationships with engineers and engineering-focused companies.
LGI’s Business

Our Results

- Specialized labels, Film Insert Molding, Clean Room, Printable Electronics, Extreme Components, Flexible Electronics, and any new problem we can solve.
**PROCESS LABELS**

- Used or consumed in support of or during the production process (or other internal processes, such as laboratory/research environments)
- Does not include labels that become part of a finished product (such as packaging or product identification labels)
- Examples include:
  - Cleanroom labels
  - Sterilization process labels
  - Cryogenic and cold storage labels
  - Durable labels
**User Interface**

- Enables user to interface with features of device and control device performance.

- Examples include:
  - Overlays
  - Membrane switches
  - Keypads
  - Buttons
  - Display and touch screens
PRODUCT IDENTIFICATION AND INFORMATION

- Used to incorporate product identity and branding as well as product information such as serial and warranty information.

- Examples include:
  - Metal nameplates
  - Embossed and Dome labels
  - Holographic and graphic-rich labels
  - UL/CSA approved labels
Die Cut Components

- Used as a functional element of the device to provide features such as:
  - Adhesion
  - Thermal conductivity
  - Electrostatic dissipation
  - Vibration dampening
  - Flame resistance
  - Sealing
  - Insulation
  - Shielding
FILM INSERT MOLDED PARTS

- What is FIM?
  - Film is printed second surface, formed and trimmed to match geometry of molding tool used to create plastic injected part
  - Enables text and graphics to be integrated with molded plastic parts
  - Durable and visually appealing alternative to first surface forms of decoration

- Applications include:
  - Lenses
  - Displays
  - Badges
  - Remote Controls
  - Bezels
LGI AND TOC

- In 2004 we began an aggressive series of changes to revitalize Lgi
  - We needed a more robust strategic direction
  - We needed greater global reach
  - We needed higher performance production systems
- By 2005 we began looking for ways we could dramatically improve our production performance
The solutions had to account for:

- Global facilities – extreme price pressure
- Both Low volume – High mix and High volume – Low Mix
- Bills of Material – this is not common in our industry
- Unique job shop with high product variation
- Dynamic order variation
  - “Slot-ins”, “Pull-ins” and “Push-outs”
  - High short lead time volume < 1 day order to delivery
- Very fast quotation creation < 5 minutes goal
- Easy to schedule
- Easy to re-train staff
LGI AND TOC

- We first learned about TOC at an industry association conference in 2005.
- We hired a consultancy to help us adopt TOC practices and worked with them through 2008.
- The work we completed allowed us to successfully navigate the huge downturn of 2009 in our industry while maintaining profitability.
- In 2010 as volumes rebounded we didn’t need to staff up.
LGI AND TOC

- In 2009 we launched operational management software we designed and built for our business based on our TOC implementation.
- Subsequently in 2011 we integrated our software with DBR+.
- TOC principles are utilized throughout our entire business with on-going training both U.S. and International. Training has been challenging.
OUR CADENCE SOFTWARE

- Web based operational management software including DDMRP/TOC functionality
- Work began in 2008 originally designed to help us with improving our speed to quote.
- By late 2009 we had progressed into full job planning and order taking.
- In 2010 we began adding the front and back ends such as invoicing and shipping/receiving as well as globalizing the rollout to Penang
**LGI CADENCE IMPLEMENTATION**

- **Quote**
  - RFQ
  - Estimate/Quote - 2008

- **Order**
  - Purchase Order
  - Order Entry - 2009

- **Build**
  - Job
  - DBR+ - Integration in 2011

- **Ship**
  - Inventory
  - Shipping - 2009

**Invoicing/Vouchering** – 2012
**Monitoring/Analytics** - 2013
RECENT ENHANCEMENTS

- Analytics
  - Detailed on-time performance
  - Detailed budget to actual for time and materials
  - Buffer analytics just starting

- Shop floor web based Status Monitors
  - Job priority
  - Buffer status
  - Job kit availability
  - Built using Cadence and DBR+ data
SHOP FLOOR MONITORS

- USB Android stick
  - Android version 4.2
- TV accesses our internal monitor website.
  - Current job running for the resource
  - Job sequence – latest start & planned duration
  - Job ready to start – color coded
  - Buffer status – color coded
PRODUCTION MONITORS
PRODUCTION MONITORS
PRODUCTION MONITORS
PRODUCTION MONITORS
## Production Monitors

![Production Monitor Interface](image)

### Schedule for PEN 6 Color Flexo Press - PEN 6 Color Flexo Press ...

**Resource:** PEN 6 Color Flexo Press - PEN 6 Color Flexo Press ...

**Filter:** Constraints, Non-Constraints, All

- **Show Only Ready To Start**

<table>
<thead>
<tr>
<th>Work Order</th>
<th>Sales Order</th>
<th>Work Order Qty</th>
<th>Part</th>
<th>Customer</th>
<th>Expedite</th>
<th>Status</th>
<th>Start</th>
<th>Full Duration</th>
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<tbody>
<tr>
<td>35485</td>
<td>8488658</td>
<td>4,690,000</td>
<td>35485</td>
<td>Hagomocyr (Thailand)</td>
<td>In progress at PEN 6 Color Flexo Press</td>
<td>2/28/2014 3:13 PM</td>
<td>12.92 hours</td>
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<tr>
<td>35617</td>
<td>214409</td>
<td>150,000</td>
<td>35617</td>
<td>Cardos Automation System Sdn. Bhd.</td>
<td>Completed at Inventory- Penang</td>
<td>3/10/2014 12:11 PM</td>
<td>3.77 hours</td>
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<tr>
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<td>Showa Denko HD Singapore Pte Ltd</td>
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<td>3.05 hours</td>
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</tr>
</tbody>
</table>

PRODUCTION MONITORS

Loading for PEN 6 Color Flexo Press

Available: 12.92 7.75 7.75 7.75 7.75 0.0 0.0 7.75 7.75 7.75 7.75 0.0 0.0
Load Hours: 12.92 3.72 5.52 2.35 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 3.25 0.0 0.0
Unreleased: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 3.25 0.0 0.0
Released: 12.92 3.72 5.52 2.35 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

Last refreshed 3/10/2014 8:29:30 AM

© DDT 2004-2013

LCIEXCHANGE\SQLEXPRESS\DBRPlus_PEN
PRODUCTION MONITORS

[Image of a production monitoring interface]

- **Resource:** PEN 6 Color Flexo Press - PEN 6 Color Flexo Press
- **Total Hours Today (1 machine):** 7.75 hours
- **Yet To Be Received:**
  - 35691, 3.4 hours
  - 35692, 1.3 hours
  - 35514, 1.5 hours
- **Total:** 7.9 hours
- **Received:**
  - 35617, 3.7 hours
- **Total:** 3.7 hours

Monday, March 10, 2014
8:17:02 AM

Only released work is displayed.

LGIXCHANGE:SQLExpress/DBPlus_PEN

Last refreshed 3/10/2014 8:17:02 AM
© DDT 2004-2013
LGI Cadence Benefits

- On-time performance has improved
  - 85% to ~97% - To Customer due date
- Far less chaos in shop
- Clear priorities for all employees
- Budget vs. Actual
  - Time improved from about 10% to 3% delta
  - Material improved from about 7% to -11% delta
- Less arbitrary “rescheduling” by operators
LGI CADENCE BENEFITS

- Global “anywhere/anytime” visibility
  - Key executives
  - Job status for sales/customer service
- Reduction in inventories approaching 50%
- Focus on capacity management
- Exception reports allow us visibility of issues that we can correct before it affects the client.
LGI CADENCE BENEFITS

- Profitability
  - Making money now and in the future
  - This is obviously the key criteria
  - Our profitability was maintained through 2009 and has been improving since in spite of very large price drops and volume declines in our core Asia HDD business
WHAT’S NEXT?

Currently we are in the midst of an upgrade to simplify Cadence for our Penang and Wuxi staff

- Currency exchange – USD, MYR, SGD, THB, CNY, etc.
- Dimensional analysis – Imperial vs. metric
- The interaction of these two particularly for pricing, quotation, purchasing and inventory valuation.
WHAT’S NEXT?

- Next major release will include Cadence assisted buffer management for Raw Material and Finished Goods
  - ADU calculation
  - ADU History analytics
  - Buffer dynamics analytics – spikes, murphies, EOL, BOL, etc.
  - Customer usage integration where possible
Q & A

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