HIGH PRODUCTION CELL

Lean, High Velocity Manufacturing
• Lean, High Velocity

• We have created a manufacturing system to produce commercial case goods by creating a flow and eliminating waste
High Production Cell

• Lean, High Velocity

• What do we mean?

• U-Shaped Flow
• Eliminate touches
• Quick Change over
• Work Balance
• Routine Preventative Maintenance
• Consistent improvement
High Production Cell

Our Goal is to produce cabinets here
The People

• Tim Wing- Schmalz Jumbo Ergo and hardware door and drawers
• Derek Hart -Assembly Homag Automation MDE 110
• Ryan Randell Hardware – Pre Assembly
• David McMahon – Sorting and kitting
• Scott Thomas - Weeke BHX 500
• Scott Thomas - Weeke ABD 060
• Carl Patton- Homag Ambition 2480
• Shawn Smith - Holzma HPL-400 US Edition
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• We need to start

• In the office
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- Jobs drawn and detailed in woodCAD/CAM
- Information is then generated for all the process
- Part list is sent to
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- Tells us what to build
- How do we build it?
  - Dowell construction
  - ¾ or 19 mm component parts. Backs are 6 mm
  - .5m edging on boxes
  - 1mm edging on door and drawer
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- We are using full overlay slab doors
- Drawer boxes are melamine dowel construction
- Drawer fronts use dowel for positioning
- We are using solid tops to the cabinets to make it simpler to move them
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- Schmalz Jumbo Ergo crane
- Solid tops to make them easier to move
- Safe
  - Cabinets
  - Operator
- Damage free
- Gentle on joints
• How do we build it?
  – Open Frame
  – Self adjusting
  – Single or multiple boxes
  – Programmable to different settings
  – Hot Melt Technologies
High Production Cell

- How do we build it?
  - Pre Glued dowels but we still glue
  - Assembly table adjustable working height
  - Slide and place assembled cabinets
How does Derek know what to build?

- He builds whatever is in front of him.
- Goal is to build cabinets.
- If it is in the shop it needs to be assembled.
• How Does Tim know what to build?

• Ryan prepping parts keeps Derek at the build table

• Hardware applied before assembly

• Hardware table close to rack
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- How Does Tim know what to build?
- Cabinet parts are consolidated in a rack
- Parts are identified by type
- Easy to pull
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• How do parts get into the rack?
• Labels identify the path the parts take
• Color code makes understanding the path simple
• When complete the person with the part puts it in the rack
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- What needs to be done to the parts?
  - Cut
  - Band
  - Bore
  - Insert
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- ABD 060
- Horizontal and vertical drill and dowel
- Closed loop glue system
- Glue/Water
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- ABD 060
- 4 zone processing center
- SorbTech base
- CNC control of X,Y,Z axis
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- BHX 500
- Vertical part machining
- Each part unique even if the same cabinet is repeated
- Single or two similar parts
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- BHX 500
- Levels of automation
- Manual
- Pre stack table
- Pre alignment table
- Porcupine feeding with alignment full automatic
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- BHX 500
- Flexible infeed/outfeed direction available
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• How do we get machining information to the right machine
• Same program each machine knows what to do
• Bar code set up
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- Multiple bar codes for BHX 500 - one part or two
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- It is all about the edge
- Consistent edge quality
- Minimize touches
- Productivity/Flexibility
• Consistent edge quality
  – Heavy build for unit mount
  – Top pressure belt
  – HSK tool interface
  – I system tooling
High Production Cell

- Minimize touches
  - Servo change over
  - Separating agent spraying unit
  - Glue roller clamping
  - Auto Adjusting Multi Scraper
High Production Cell

- Productivity/Flexibility
  - High Speed
  - Return conveyor
  - 6 Coil magazine
  - Touch Screen
High Production Cell

- Productivity/Flexibility
  - High Speed
  - Return conveyor
  - 6 Coil magazine
  - Touch Screen
- Bar code scan or not
High Production Cell

- Productivity/Flexibility
- Minimal batching of parts
- Not worried about sorting before banding
- Minimal steps
High Production Cell

- It starts with Cutting
  - Accuracy
  - Clean cuts
  - Productivity
• **Accuracy**
  - Equal distant shafts to each pinion from the motor
  - Magnetic touch free measuring
  - Strong clamps ensure board control
  - Clamps control the board throughout the process
High Production Cell

• Clean cuts
  – Mono rail guide system
  – Narrow gap at the pressure beam
  – Blade deflection sensor
  – Parameter controlled speeds
High Production Cell

- Productivity
  - Rear feed
  - 30% more production compared to front loading
  - Cut one sheet or 5 at a time – same operator effort
  - Fast
High Production Cell

- Productivity
  - Program Sequence
  - dustEX
  - Slide and place
  - Weima Grinder for waste
High Production Cell

- After you cut it, what do you do with the trash?
- Weima WL grinder
  - No need to empty waste can
  - Goal is to keep operator at machine
  - Long tool life
  - Low maintenance
• Labeling at the saw
  – Jobs to floor with less work
  – Label when you need it
  – Part orientation for subsequent processing (grain)
  – Label orientation
High Production Cell

- How do you control quality?
- Camera controlled scoring saw adjustment on Holzma
- Servo set up on Homag
- Weeke BHX 500 can check part size and compensate
- MDE 110 case clamp auto sets and clamps
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- Routine Preventative Maintenance
- It is not just individual machines anymore
- Homag MMR
- Vibration sensors, accurate temperature measurement, tool setting gauge
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- **Expected capacity**

- **Case production**
  - 10 parts per cab
  - Cutting on the average 2 sheets per book
  - 150 books
  - 300 sheets
  - Increase stack cutting
  - 500 sheets
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- Continuous improvement

- Additional assembly
- Move the ABD closer to the kitting rack
- Machine paced gluing
- Parts buffers
- Automatic delivery
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- Continuous improvement

- We used U shaped flow
- Open to change
- We were using 3200 sf
- We were down to 2465 sf
- 2923 square feet of space
- Added through feed clamp
High Production Cell

- Finance

- Production equipment investment $1,072,071
- Estimated support equipment and software brings total to $1,300,000
High Production Cell

- Finance

- Case production
  - 10 parts per cab
  - 300 to 500 cabinets
- 300 cabinets /shift
  - Invoice @ 200 each
  - Revenue: $15,000,000/year
- 500 cabinet /shift
  - Invoice @ 200 each
  - Revenue: $25,000,000/year
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- Finance

- $1,300,000 to produce between $15,000,000 to $25,000,000 per year

- Equals less than a 1 year payback on production alone

- Plus other cost savings
High Production Cell

- Lean, High Velocity
- U-Shaped Flow
- Eliminate touches
- Quick Change over
- Work Balance
- Routine Preventative Maintenance
- Consistent improvement
High Production Cell

To Get a Cabinet here
• There really isn’t one Work Cell that is better than the other. Each of the Work Cells presented have unique features. The Work Cells presented here are a possible solution to your manufacturing needs. The right system is the one that works best for your company today and in the future.
High Production Cell

Question and answer time