

## MFI - Flat Packed with efficiency...

MFI Manufacturing is the production facility making flat-pack and ready assembled kitchen and bedroom furniture for MFI stores. Based in Howden, East Yorkshire, the company has a large manufacturing facility with automated facilities for board lamination, cutting to size, edging, boring, drilling, routing and packing. The company now employs over 800 people on this site, the facility has been there for 22 years, under various brand names, and other facilities (for fixings manufacture etc.) are nearby at locations in Hull. Production of the famous flat-pack furniture requires great efficiency and throughput, with over 100,000 units produced each week.

*“InTouch has provided the best platform for integration of shop floor data”, Howard Blunt, Systems Manager MFI*

The facility handles the complete process of the manufacture of flat-pack units. The chipboard arrives in large standard sheets; these are first laminated before being fed to automatic programmable sawing machines. These machines cut the laminated board into the sizes required (or multiple parts if the end unit is small), prior to edging strip being applied. The edged boards are then fed to complex drilling, boring and routing machines where the various assembly fixings will be located. Multiple part boards (such as drawer fronts) are then sawn into individual units and edged. Each board is then fed by conveyor and picker/stacker unit to a large number of parallel roller conveyors to await final picking

SCADA systems on laminating machines showed the production department the production advantages that could be obtained through process visualisation. These systems were supplied as part of the laminating process machinery.

However, MFI Manufacturing had a problem; the packing machines were proving to be a troublesome bottleneck to production. The initial response was to install a programmable logic controller to monitor the line, with a simple machine status interface. This proved to be effective, but once it was realised that the PLC data needed to be analysed and thereby generate production reports, a change of technology was needed. This was where Howard Blunt, Systems Manager, became involved. Being aware of the effectiveness of InTouch on the laminating machines, he decided that this was the better method. So SolutionsPT supplied another Wonderware InTouch system, specified for its ease of use, and its Microsoft platform, allowing ready integration to other IT systems in the company.

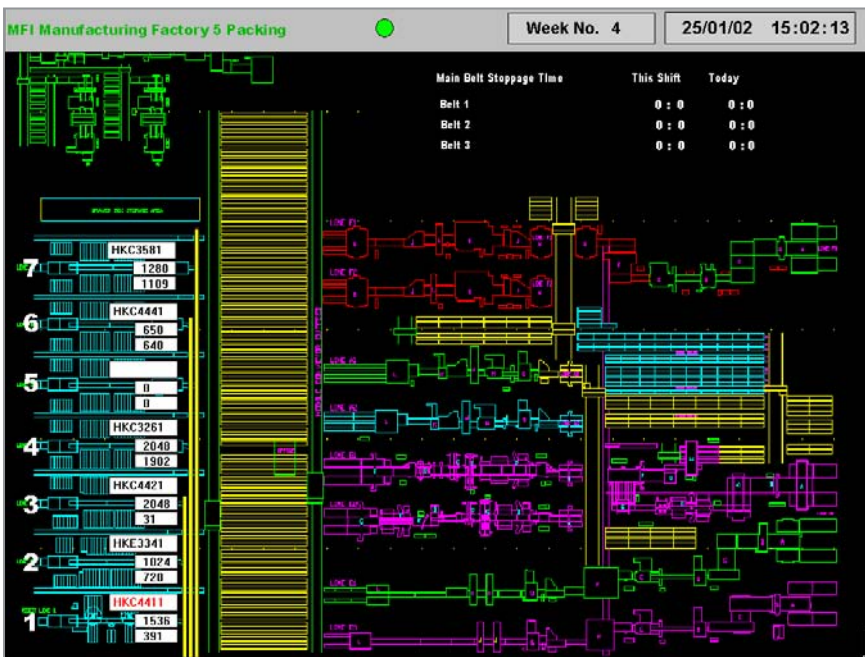
Howard maintains that this is a very simple application; one that may even be hard, in isolation, to justify the use of a PC based system. The problem that had to be solved was the many differing short stoppages on the packing machines which were difficult to isolate. The packing lines are complex and fully guarded for safety, making solutions harder to evaluate. One line was fitted with InTouch, running on a laptop computer, any stoppage was categorised by selecting a reason from a menu, this data being extracted daily to a spreadsheet and reports generated. It was soon evident that the problems could be identified and solutions evaluated for their effectiveness. From this single machine “experience footprint”



**Robot loading aligned packaging to machine**

according to the schedule for the packing lines. A picking unit travels up and down the conveyors selecting the parts that are required for the particular flat-packs that are being run on the packing lines.

Early adoption of Wonderware's InTouch



packaging schematic

the investment was made to apply InTouch to the complete packing facility.

The seven packing lines are fully automatic, with robot in-feed of stacked parts which are placed on the cardboard case that is “folded around” the stack to produce the flat packs that we buy in the stores. The Motorman robots firstly pick up the flat cardboard packaging, drop it on an inclined surface to set it square with the machine, then pick it up again and place it square on the in-feed conveyor. Robots further down the line add the main board components on to the packaging, fixings are added, the packaging is then folded around the stack of components, the box is glued down and the content inkjet-sprayed on to the case.

The InTouch is used to monitor critical cycle times within this process; this data is later used to produce production reports. If a cycle time is exceeded by a pre-set time, this is counted as a stoppage. The problem is that each pack has

finished flat packs leaving robot machine



differing cycle times. The InTouch therefore has to be aware of what pack is being assembled. This is where a simple application becomes integrated into a whole solution.

The main production plan for MFI is the key to the whole manufacturing facility, this plan is based on historical demand, key promotions, seasonality, new products, the stores order books and other criteria. This data is distilled into a plan for the production schedule using Microsoft Access. Production is therefore geared to this forecast. The information is fed to the packing manager’s screen, the selects the pack that is scheduled, this in turn primes the InTouch to reflect the cycle times that are required to properly monitor the seven packing lines.

The data from in InTouch is visualised on the supervisor’s workstation, with indication of stoppages, cycle times, throughput and the pack that each line is handling. This data is later used to generate production Costings. Howard has taken care to visualise the complete production process on the overview screen, no doubt in readiness for other production monitoring developments. In addition to visualising the production facility and displaying detailed packing line information, the data is extracted through an in-house development in Visual Basic to write the data into Microsoft Access. This program is then used to produce management reports to show production efficiencies, and to compare actual production with that planned. The resulting data is distributed over the company’s Intranet. MFI have therefore achieved what can be described as a closed-loop information system, from the main production schedule, to the supervisor, to the machine, from the machine, to the manager and finally as a performance comparison to that planned in the planning system.

The detailed packing line data is examined for the causes of mini- and micro- stoppages. The resulting reasons are then prioritised for attention, and per-pack-type cycle times and efficiencies are verified and recalculated. The placement of the basic packing cardboard on an inclined plane (it slides to an end-stop, therefore ending up square to the line) was designed as a result of such a process improvement. Another process improvement was to deal with the bottom “baseboard” that the component parts are stacked upon on the conveyor. Forty-five seconds were being lost on each “end of stack” by the removal of the baseboard by the robot, this has now been re-engineered so that it slides out of the way, allowing the next stack to be fed into the process. Remembering that 300 packs are processed per hour per line! Other incremental improvements have resulted in significant

improvements in throughput.

The benefit of the investment to MFI Manufacturing? To Howard it is clear that “InTouch has provided the best platform for integration of shop floor data”. Further utilisation of Wonderware’s Products and ongoing use SolutionsPT’s S-Plan support is planned.

*Wonderware UK wishes to thank the following company for its valued contribution to this success story...*

**MFI**

**[www.mfi.co.uk](http://www.mfi.co.uk)**

*Note: The Howden plant is now closed owing to the severe credit problems in 2009. There is some hope that the manufacturing facility will be continued as a separate entity. However, the testimonial to Wonderware products (in particular InTouch) remains valid as an example of how to integrate shop floor automation with ERP systems and thus close the information loop.*



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