

Lean Manufacturing

A Solutions Unleashed Whitepaper

Every company has a plan, to make products, to achieve profit, to buy components and raw materials, to maximise upon assets. The plan has to be scheduled to allow work to be done. Advanced Planning and Scheduling enables companies to create achievable plans and schedules based on a combination of demand, manufacturing and

inventory constraints and business rules, whether this is applied to a single machine or to a complete supply chain. Lean Manufacturing is pivotal upon scheduling.

But...

How does a schedule become a useful schedule, an optimised schedule or a responsive schedule? Without proper consideration then even the best made plan will fail, it will fail because there was insufficient and effective execution. A scheduler is between a rock and a hard place, the plan being the rock and the day-to-day events in production being the hard place. Experience will help, but even the most experienced juggler finds a limit to the number of things that can be handled at the same time. The juggler (or the scheduler) needs an extra hand... a scheduling tool.

The extra hand...

Scheduling is often seen as a mix of planning and scheduling and can be used as a stand alone system or it can be integrated with ERP, MRP and Execution Systems. Exact definition of this is unnecessary as the task has to be undertaken in all manufacturing processes of whatever nature. Whether standalone or integrated will depend upon the nature of a company's processes and established systems. Wherever it resides, or whether or not it is integrated, it is an essential part of any manufacturing solution since it provides a baseline against which a plant should be measured. This is expressed as schedule adherence, usually a KPI (Key Performance Indicator).

Objections dealt with...

Every plant is different, even plants that make the same product are different. Each has their own characteristics and all require specialist knowledge if an effective schedule is to be produced. But, a capable standard scheduling software package can be applied and adapted to all variations; thereby reducing business risk, project costs and timescales.

Education...

When scheduling product procurement is considered, and the question is by whom; the scheduler, the IT department the Operations department... there is a whole raft of considerations and terminology that immediately becomes relevant to the task. Specialist help may be sought from consultants that live and breath the subject, to get the right consultant is to get a fast track to the benefits.

For example; "What is finite capacity scheduling?"

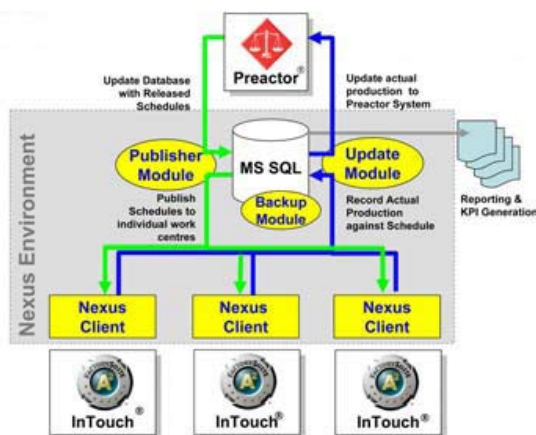
Finite capacity scheduling is a process whereby a production plan consisting of a sequence of operations to fulfil orders is generated based on the real capacity. These include machines, material, operators, tooling or anything that is a constraint on the production processes. Using finite capacity scheduling, operations are planned only when resources are available and materials are ordered only when needed. Thus inventory levels fall and bottleneck resources are not overloaded. Work remains at a relatively constant level, lead times are more predictable and delivery dates more reliable. In this way production managers spend less time progress chasing and can concentrate on the every day job of balancing, often variable demand, with the capacity available.

Advanced Education...

Users have found that a wide range of tangible benefits have been obtained by using an Advanced Planning and Scheduling system; benefits that have a real impact on the company's financial performance. By correctly scheduling in a dynamic fashion companies have experienced dramatic improvements in productivity and delivery performance, along with reductions in Inventory and Operating Costs. There are many methods of approach to achieving this, from "walking the job" through to real-time automated integration with the manufacturing process.

What do we do now?

A leading example of an Advanced Planning and Scheduling system is Preactor®, and to undertake effective dynamic scheduling then Preactor® is used in combination with Nexus. EmsPT has engineered this extension from its experience in manufacturing information systems, by using standard proven technologies from that area. This combines the power of finite capacity scheduling with the monitoring capabilities of a Manufacturing Management System. This enables companies to compare schedules against actual events in real-time, giving the scheduling department the ability to assess progress and reschedule as required, there and then.



Designed to meet YOUR Requirements

From the simplest of plants to complex supply chain solutions, from stand alone to total integration with existing systems, from single constraint to multiple constraint (materials, operators, tooling etc), the Preactor® range of scheduling options are designed to meet your specific requirements. Using the complete manufacturing solution obtained by integrating Preactor® with a manufacturing execution system using Nexus, companies can create a dynamic planning environment that gives planners the ability to publish schedules directly to the shop floor whilst maintaining complete visibility of current performance against the schedule.

...Complete Manufacturing Solution?

Nexus Publisher is a real time interface that connects Wonderware's InTouch™ shop floor visualisation and control system to the Preactor® Advanced Planning and Scheduling system. Nexus supports the ANSI/ISA S95 industry standards, which describe functional elements, information flows and decision points between the different elements of a manufacturing execution system. Nexus focuses on providing the necessary links that enable effective communication between production scheduling and manufacturing, and enabling the generation of real-time key performance indicators, in a standardised manner. Nexus was specifically developed to overcome the problems that many manufacturing companies experience when attempting to establish timely and accurate data flows between their Planning Departments and the shop floor.

Benefits...

By streamlining data flows and collecting real-time information regarding planned vs. actual performance, companies can address a number of issues which manifest themselves as:-

- The inability to establish a clear cut off point that will provide a starting point for the next schedule generation
- A delay in acquiring information that results in late schedule creation e.g. scheduling is carried out at 10:00am with a cut off time of 6:00am
- Difficulties in data gathering permits schedule generation at fixed times, typically, at best, only once a day
- Once schedules are issued Planning loses visibility of the schedule execution. This can result in lost control of the production sequence: information regarding manufacturing delays is reliant on word of mouth: customer impact cannot be assessed; and the need to reschedule is difficult to identify
- Planned versus Actual Performance Indicators can be difficult to generate and too late

Real-Time Scheduling Monitoring System How does it work?

Nexus is a control mechanism that supervises the movement of data between Preactor® and InTouch using Microsoft SQL as its data storage media.

The Publisher Module mechanism ensures that schedule integrity is upheld and that the released schedule is maintained accurately. Routines check that newly released schedules do not contradict current manufacturing activity, by ensuring that the jobs that are in progress appear at the front end of the schedule.

The Publisher Module makes the data available, via Nexus clients,

to the InTouch nodes on the shop floor. These are configured using ActiveX controls (if required these can also be presented within Preactor®), and display the schedule information pertinent to the work centre. Normal InTouch functionality can now be used to manipulate the data and control machine and operator actions.

The Updater Module records real-time production information against the relevant job on the Microsoft SQL database, before passing it back to Preactor. Within Preactor comparisons can be generated that compare production performance against the schedule, and the detailed information contained on the MS SQL database enables the generation of customer specific real - time and historical reports such as Schedule Adherence reporting.

Furthermore the information that is held can be analysed to ensure that the parameters being used within the scheduling system accurately reflect the capabilities of the production facility.



The Backup Module provides a configurable interface that enables users to specify the backup strategy they wish to adopt.

The overall impact of these difficulties is that companies can create a schedule that predicts reductions in Inventory and Operating Expense along with increased throughput potential, but are unable to monitor and react during execution. Nexus brings the power of Preactor® and InTouch™ together, each enhancing the other and resolving these issues by:

- Continually updating the schedule with real time data. Providing instant information on individual order delivery: impact on the rest of the schedule; and its viability
- Providing Preactor® with real-time manufacturing data that establishes a continuous rescheduling cut off point. Rescheduling can occur when the business demands it rather than being restricted by data availability
- Issuing schedules electronically, not only very efficient, but ensuring that all work areas are immediately operating from the same schedule generation Incorporating rules into the InTouch™ system that ensure schedule execution is controlled e.g. If the first job cannot be produced a message is sent to the Planning Department and the Operator can only select from the next three jobs
- Logging Planned versus Actual information as it happens; providing the capability to generate real-time key performance indicators and comparisons

About Us

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Industrial Automation Solutions

About SolutionsPT@SolutionsPT specialises in the field of successful solutions for real-time manufacturing replacing the business risk of introducing new technology with results. Customer experience is paramount to our core principles and is provided by three divisions concentrating on Industrial Software, Industrial Hardware and the delivery of Real-Time Enterprise Manufacturing Solutions.

emspt

Enterprise Manufacturing Systems

About EmsPT@An MES solution provider to the UK and Ireland manufacturing sector with over 20 years of experience delivering enterprise manufacturing system solutions. With globally recognised experts in the field of Business Intelligence and MES solutions EmsPT stand at the forefront of helping customers make the correct commercial and industrial decisions. EmsPT unique 'Thin Slice' model enables customers to achieve rapid deployment, change and return on their investments by utilising the scalability of proven technology to support business initiatives including Lean Manufacturing, Collaborative Production Management and Continuous Improvement. From vision to definition to selection to implementation to adoption, EmsPT delivers services to ensure sustainable business benefit.

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Industrial Automation Hardware

About HardwarePT@HardwarePT offers a comprehensive range of world-class industrial hardware and connectivity tools suitable for all industrial environments. We supply branded products and integrated solutions built with leading edge technology to support key industrial requirements such as Industrial Ethernet, Embedded Computing, Wireless Technology, Data Acquisition, Industrial Connectivity and High Availability Servers.

We present a complete range of services and support packages for longevity of supply including design work, custom builds and legacy equipment.



About Wonderware®

'Wonderware United Kingdom'® and 'Wonderware Ireland'®, (operating under SolutionsPT Ltd) are the sole independent and authorised support, training and distribution partners for Wonderware® products in the UK and Ireland geographical regions. Wonderware is the leading supplier of industrial automation and information software solutions. Wonderware is legendary for providing software that's easy to use and for providing exceptional integration benefits. Wonderware software transforms data into vital plant information and powers intelligent plant decisions in real time. Wonderware has over 400,000 software licenses in approximately 100,000 plants worldwide, which is C30 percent of the world's 335,000 plants with 20 or more employees.

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Contact

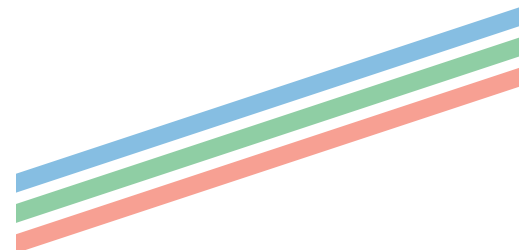
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