

Scheduling – it ain't that easy!

No disrespect but...

Why is it that production scheduling positions are often a place to put someone until they retire?...or that they are jobs to reward a good employee from the shop floor?...or that they are entry level jobs?

Why is it that the production scheduling tools available in formal business systems don't work very well but companies still spend millions of dollars on them?...that they make sure the financials and order entry and purchasing modules work but not scheduling?...that the functionality doesn't accept how the shop floor works?...that the software companies don't do more to bring them closer to meet these needs?

Why is it that production scheduling is blamed when orders are late?...when the shop floor doesn't have enough work?...when the wrong parts are produced?...when inventory increases?...when the shop floor doesn't produce enough of the informal goal (e.g. pounds, yards, pieces)?...when a machine or people are idle?...when management isn't informed in a timely manner about production and/or scheduling related problems?

Could it be that management thinks that production scheduling is so easy that anyone can do it?...and that schedules should be perfect all the time because scheduling is so easy?...and because everyone knows that since the manufacturing process is not easy, any shop floor problems must be the fault of the schedulers because their job is easy?

The truth of the matter is production ***scheduling ain't that easy!***

First, there are several fundamental scheduling issues that must be recognized and then understood as real demands on the production scheduling department.

Secondly, there are those “every day” execution issues that really make the job difficult.

The collective demand of all of these issues is the cause and effect of why production ***scheduling ain't that easy.***

These fundamental scheduling issues and why management needs to re-evaluate how they look at them, include the following:

Expectations – because of what management expects from a manufacturing operation, ***scheduling ain't that easy!*** The Key Operating Indicators (KOI's) that companies use to measure how well a manufacturing plant is operating and to point to when the main measurement – profit – does not meet plan, are directly related to production schedules.

So if more profit is the objective, better production schedules is often the means to achieve:

- High productivity – usually the measurement is “*are we producing enough to absorb overhead?*” stated in total pounds/yards/pieces produced. Rather than when it should be “*are we producing enough of the right stuff to absorb overhead and be on-time, to maximize throughput on the bottleneck, and...?*”

- Lower inventory – often an arbitrary measurement and a macro view of “*inventory is too high and we need to reduce it*” instead of a micro view with an Inventory Plan that makes sure the right inventory is on-hand to support the short term demand and the long term Sales Plan.
- High customer service – usually expressed in a macro view of on-time shipping percentage and/or total past due orders. Should we not also consider margin/cost, number of days late, utilization of resources, and look forward to see what our customer service will be rather than looking backward to see what it has been?

In order to achieve these KOI’s, doable schedules are required. And, if the schedules are doable, then we can measure the scheduled overhead absorption, the scheduled on-time performance, the scheduled utilization of the bottleneck, the scheduled inventory build/reduction, and the scheduled past due orders – before production happens rather than after.

Uses – since production schedules have an impact on every department in a plant, the amount of detail, completeness and timeliness of a schedule that is required, insures that production *scheduling ain’t that easy!*

- Customer ordering promises/commitments –Available-To-Promise vs. Capable-To-Build. ATP is based on a Master Schedule and RCCP. Capable-To-Build is based on an accurate detailed resource schedule that is doable.
- Material ordering – schedules generate MRP messages that Purchasing responds to. What comes first? An unrealistic schedule brings material in before it can be used and inflates inventory. A doable schedule says when material is really needed.
- Capacity planning – short term for current demand, mid-term for customer inquiries, and long term for capacity additions or retirement. With a doable schedule, it is possible to evaluate the entire demand to the end of the planning horizon and get an accurate resource schedule not a rough-cut analysis.
- Financial planning – with a doable schedule, purchase commitments, overtime requirements, overhead absorption, indirect labor requirements, shipments, projected cash receipts are a few of the financial KOI’s that can be identified ahead of time.
- Authorization to produce – unless it is scheduled, don’t produce it. But, unless it is doable, it can’t be produced.

Requirements – production *scheduling ain’t that easy* because of the following requirements and the difficulty in meeting them to always be:

- Accurate & complete – including all demand, all work centers, all resources, and all products
- Doable – verifying that all resources are available – materials, manning and machines
- Manageable – so people in all management functions have access and input
- Timely – to include information about what has just happened
- Up-to-date – to include changes to any of the variables that impact a schedule

Production scheduling is a plant management function that ends up not being easy because of the following “every day” execution issues and these are the root causes why production *scheduling ain't that easy*.

Changes – Who makes these changes happen? What keeps changing that makes it difficult to prepare a schedule? When do we find out about the changes? Where do the changes come from? Why do they have to be scheduled? How do we make sure they are?

- Demand – are orders entered every day all day long?...are orders changed or cancelled every day all day long?...or do our customers wait until it is convenient for us and we are ready to prepare the weekly schedule?
- Priorities – are priorities established yearly, quarterly, monthly, weekly, daily, or hourly?...and how often do they change?...and is it final or will they change again?
- Work center capacity – do machines go down planned or unplanned or both?...are new machines added to and old machines removed from active duty?...are additional shifts added when demand is high and shifts removed when demand is low?...how long does it take to install new equipment?
- Manning – are people flexible in when they work?...is overtime an option?...how often?...are technical skills required?...how fast can they be trained?...are they cross-trained?...is there an available labor pool?
- Material availability – is it available now?...when?...is the vendor on shutdown?...until when?...was the last receipt rejected?...inventory records say it's there but can we find the parts we need?...have they been inspected and released?
- Shop floor performance – what has been completed? ...when? ...where?...what condition?...how much?...what has been rejected?...why?...when can it be re-scheduled?
- Rework – how do we account for the lost time?...the added usage of resources?...the usage of resources that were planned for other production?...the impact on future schedules?

Preparation – How and when are schedules prepared or how should they be prepared? What factors influence the preparation? Where do these factors come from? Who prepares and approves them?

- Timing – do we look at all changes at a single point in time and prepare the schedule before any additional changes occur?...and again when they change?...and when they change again?
- Frequency – do we prepare the schedule every hour, shift, day or week?
- Priorities – are there conflicting priorities based on customer, margin, order size, or the boss?
- Sequencing rules – are there products that have specific characteristics that require a specific sequence (e.g. light to dark paint, rising annealing temperatures) to minimize set-up or changeover times?
- Grouping rules – are there products that have specific characteristics that require them to be produced together before a change over (e.g. same size fittings black and galvanized then change over to the next size) or by a work cell manned by a single operator?

- Operation overlap – is it possible to shorten the manufacturing cycle by starting a routing operation before the entire batch is completed on a prior routing operation and ship earlier?
- Alternate work centers – is there more than one way to produce the part?...even if it costs more?
- Outsourcing – should we or do we have to utilize an outsource resource this one time, or every time?

Communication – **When** is it appropriate to share **What** information to **Who** needs it and by **What** method? Some of the information that has to be communicated include:

- Schedules – preparation, problems, status, performance
- Operation reporting – on time, early, late, partial, complete, excess
- Things that are different – alternate routing operations, substitute materials, rework
- Things that go wrong – scrap, machine down, rejects, absenteeism, accidents
- Impact on the Expectations – productivity, inventory, due date performance
- Scheduled overhead absorption, labor requirements, machine utilization, inventory reductions/increases, due dates
- Impact of schedules on – vendors – customers – shippers

How do we make sure that as production schedulers, we can address the following issues that others take for granted?

Expectations
Uses
Requirements

How do we make sure that as production schedulers, we can include and manage the following issues as we do our job?

Change
Preparation
Communication

I believe that there are always two basic steps to success in any business function – knowledge and the proper tools.

Education & Training – without it, *scheduling ain't that easy!* Although the availability of scheduling education and training programs is increasing, companies are not taking advantage of them:

- Production scheduling is now taught in our Colleges and Universities
- APICS certification requires knowledge of today's scheduling technology
- Seminars and educational training programs are widely available

Production scheduling is a skill function and production schedulers need to be trained and educated just like accountants and engineers.

Tools – without them, *scheduling ain't that easy!* The scheduling functionality that comes with today's ERP systems falls short of providing the power to prepare and manage production schedules in today's manufacturing environment. They provide a place for schedules to reside but they do not schedule – that is a manual thing.

The scheduling design assumptions inherent in an ERP system are based on:

- Infinite capacity – like assuming that you have unlimited dollars in your checking account.
- Backward pass loading – when does a production process start with the last operation? Subsequent operations are dependent upon when a prior operation is completed. Shouldn't the scheduling system follow this same process?
- Fixed lead times – what is the impact on lead times of what happens every day on the shop floor? They change when any activity is either early or late or unexpected – operation completions, material receipts, rejects, rework, manning, machine down.

ERP is not a scheduling system, it is a material planning system that was designed 40 years ago. The scheduling functionality in an ERP system has changed very little during that time.

Since the ERP software companies have not responded to the real needs of production schedulers, add-on systems are available:

- FCS – Finite Capacity Scheduling
 - Capacity management
- MES – Manufacturing Execution Systems
 - Tracking, monitoring, reporting

A scheduling subject that should be of particular interest to everyone in a manufacturing facility is Finite Capacity Scheduling.

- FCS will provide an accurate detailed resource schedule that is doable
- FCS will consider priorities, sequencing rules, grouping rules, operation overlap and alternate work centers
- FCS is a best approach to production scheduling and all schedulers should understand it

If FCS is a subject that you are interested in, consider joining the International Production Planning and Scheduling Association (IPPSA), www.ippsa.org – an excellent place to learn more about FCS.

IPPSA is offering a seminar on FCS in the New Haven area on February 5th. The presenter will be Bill Kirchmier, President of IPPSA. With over 40 years of scheduling experience, Bill wrote the book on FCS that is in the APICS library and part of the Ollie Wight library, implemented over 200 FCS systems, and developed an FCS software product. Additional FCS seminars will be offered in New York, Connecticut and Massachusetts in 2004.

Companies that do not have an FCS system should take the necessary steps to define their scheduling requirements and evaluate FCS software systems that are available today.

The Ashford Group, www.ashfordgrp.com, is a co-sponsor of the FCS Seminars presented by IPPSA and provides companies with assistance in defining scheduling system requirements and the implementation of scheduling solutions.

Our job is to convince management that production scheduling ain't that easy and in order to make MORE MONEY we need:

- *Education and training*
- *State-of-the-art scheduling tools*

There is also a requirement that management must support the scheduling process to:

- *Keep the database accurate*
- *Make sure everyone follows the rules*
- *Maintain the discipline*

*The schedule must be considered the “**Law of the Plant**”.*