Scheduling Essentials

HOW TO ALIGN SCHEDULING AND MATERIAL PLANNING TO STREAMLINE OPERATIONS
# Table of Contents

3  Introduction

CHAPTER 1:
4  The Dangers of Poor Production Planning and Scheduling

CHAPTER 2:
6  The Challenge of Material Requirements Planning

CHAPTER 3:
8  The Role of Forecasting

CHAPTER 4:
10  Effective Production Planning

CHAPTER 5:
12  The Importance of Business Process Improvement

14  Conclusion
At the heart of any manufacturing operation are two basic functions: production scheduling and material planning. Production scheduling identifies and schedules the processes, raw materials, and resources needed to optimize production and enable successful, on-time production and delivery of completed products.

Working hand-in-hand with production scheduling is material planning, also known as material requirements planning (MRP). MRP is essentially a computer-based inventory management system that helps organize the elements needed for finished goods – things such as raw materials, components, and subassemblies.

Aligning production scheduling and material planning is crucial for streamlining manufacturing operations and optimizing production. This Executive Guide provides insights and advice for doing just that.
Central to manufacturing planning and control is the timely and appropriate acquisition and allocation of resources required to manufacture a product that satisfies customer demand within a certain time frame. In order for that to happen, a variety of materials and labor need to be seamlessly coordinated to yield optimal results. Consequently, any problem with production planning and scheduling — keys to effectively controlling manufacturing — is a process optimization problem.

While there are any number of issues that can affect production planning and scheduling, there are five common ones that are prevalent among a wide range of manufacturers. They include:

**NOT PROPERLY ESTABLISHING CAPACITY.**

Capacity is at the very heart of the manufacturing operation. As a mathematical point in ERP equations, if capacity is not accurately established at the beginning of the manufacturing process, all calculations are going to be wrong. To make it even more challenging, capacity is dynamic — machines go down, workers get sick, overtime comes into play. All these things affect capacity and need to be taken into account to accurately establish it.

**UTILIZING INCORRECT ROUTINGS.**

Routings are essentially operation times. If routings are over- or under-estimated and run times are wrong the incorrect routings will adversely affect output.
PLANNING PRODUCTION FROM A DESKTOP.

Today’s sophisticated ERP software and powerful computer systems can lull production planners into a false sense of highly-efficient production planning and scheduling security. Software flexibility and easy customization can result in an over-reliance on the computer to ensure that production scheduling will work perfectly. In reality, the results are often far less than satisfactory.

To avoid production planning mistakes that can’t be seen on a computer screen, it is important for production planners and schedulers to get out on the shop floor and interact with production personnel. An active presence on the shop floor enables planners to personally see what is happening and double-check ERP calculations against the physical reality of actual manufacturing operations.

ATTEMPTING TO DO TOMORROW’S PLANNING WITH YESTERDAY’S TOOLS.

Many manufacturers, especially small-to-medium-businesses (SMBs), attempt to do production planning and scheduling with legacy systems or data manipulation tools poorly equipped for the task. For example, Excel is good for exporting reports and providing some data analytics, but it makes a poor production planning engine.

Any modern, integrated ERP system such as VISUAL is able to process data, establish a production schedule, and then provide a set of reports that will indicate any problems that need to be addressed. Good ERP systems that are fed the proper data will do all the calculations and produce an appropriate production schedule. It is important for production planners to let the ERP system manipulate the data and provide scheduling answers so they can use their time to focus on solving problems.

IGNORING MAINTENANCE FOR PRODUCTION.

Complex discrete manufacturing has a lot of moving parts, including high-performance machines that need considerable maintenance and fine-tuning. If machines are out of calibration and not performing at full potential, production slows as workers struggle with inefficient or unreliable machinery, scrap and rework increase, and overall product quality suffers, all of which can adversely affect company growth and reputation.

In manufacturing there has always been conflict between production and maintenance and it is easy to see why. Production traditionally wants to keep machines running while maintenance wants to take machines off-line for service so they can continue to operate at capacity.

Quality and efficiency are the cornerstones of profitable manufacturing and preventive maintenance is critical for enabling machines to operate at peak efficiency. If manufacturers want to improve performance and optimize productivity, it is crucial to focus on preventive maintenance and find a balance between that and production.

However, even with best-practices in place for production planning and scheduling, it is easy for manufacturing to get derailed by inefficient material requirements planning.
SCHEDULING ESSENTIALS: How to Align Scheduling and Material Planning to Streamline Operations

Material requirements planning plays an essential role in manufacturing, enabling the production process to proceed smoothly and efficiently. As an inventory management system, MRP helps production managers plan and schedule the raw material purchases required for manufacturing. Without the proper MRP processes in place, the ability to reliably and consistently manufacture products is put in jeopardy.

To ensure that an MRP system runs smoothly, it is important to avoid five major material requirements planning pitfalls:

1. INADEQUATE BILL OF MATERIALS (BOM)

All production planning starts with a bill of materials – if that is wrong, virtually everything else affecting production will be wrong as well. The BOM drives operations, purchasing, manufacturing, and logistics – the data from a manufacturing BOM is used to inform ERP, MRP, and the manufacturing execution system (MES). Inaccuracies in a BOM such as ordering the wrong parts or the wrong quantities can result in significant problems, especially for companies operating on a lean strategy. The more complete and accurate a BOM, the better the decisions made regarding inventory levels, operational efficiency, and the most cost-effective and profitable way to get products to customers.

2. INCORRECT OR OBSOLETE MATERIAL REQUIREMENTS PLANNING POLICIES

ERP and MRP systems are essentially sophisticated calculators – they utilize mathematical inputs to determine how much stock to buy and keep in inventory, what lead times should be, and other policies affecting the manufacturing operation. Unfortunately, some planners input process data only once, with no thought...
to monitoring and analyzing output to determine if adjustments need to be made. They set up the system to manufacture a certain product, input some numbers that may or may not be based in reality, and then never revisit the numbers once they’re in place. If those inputs are wrong, all the planning will be, too.

3. **LACK OF UNDERSTANDING OF PLANNING FUNDAMENTALS**

Proper material requirements planning is a complex process that requires good analytical skills and strategic thinking. However, many companies have the wrong person in the position – often they will use buyers and simply call them planners. What is important to understand is that planning is a strategy and purchasing is a task. The individual in the planning role may not be familiar with the principles of supply and demand or know how to interpret the information coming out of the MRP system. This can be a major stumbling block for effective material requirements planning.

4. **ABSENCE OF FORECASTING**

An MRP planner must anticipate what the company will need to successfully manufacture and deliver products. The only way to do that is to have a forecasting mechanism and model. Without proper forecasting there is no planning. Material requirements planning becomes reactive instead of proactive – that’s not an MRP strategy, that’s simply purchasing.

5. **TREATING SUPPLIERS AS VENDORS, NOT PARTNERS**

Your main suppliers are the initial key to effective material requirements planning. Without their cooperation, you will have no materials to make your products. It’s critical to involve your key suppliers in your MRP beyond simply sending them purchase orders. By developing a close relationship with them, you can have a better view of the supply chain and create supplier agreements that work well for both parties to ensure a ready supply of raw materials for production.

These five major material requirements planning pitfalls all highlight the need to establish good metrics and business analytics. Metrics enable you to measure planning accuracy and facilitate the continuous improvement critical to optimizing ERP and streamlining manufacturing operations.

With production planning and MRP best-practices established, the focus should turn to forecasting. This key process is the catalyst for launching the overall manufacturing process and is crucial for maintaining a lean strategy.
Accurate forecasting is the cornerstone of efficient manufacturing. Accurate forecasting enables all the moving parts of MRP and production scheduling to integrate and function properly. Without accurate forecasting, effective scheduling is virtually impossible.

Aligning forecasting and production scheduling is part art and part science. What makes forecasting and scheduling so challenging is that needs vary widely from company to company, depending on the organization’s business model, what they’re making and how they make it. Even within a single company there can be different situations and processes that can affect forecasting and production scheduling.

There are a number of criteria that can affect your company’s ability to forecast accurately and reliably including:

- Is demand consistent?
- What factors affect the variables being forecast?
- What’s your supply chain visibility?
- How reliable is your transportation and do you have access to multiple modes?

To be able to reliably forecast production requirements and efficiently manufacture products based on forecasting information requires answers to those questions.

There are essentially four steps or keys to effective forecast management that, properly implemented using the information obtained from the questions above, can improve forecasting accuracy and reliability as well as simplify production scheduling:

**FORECAST**

Some manufacturing forecasters joke about the ease of forecasting: “it’s easy – all you have to do is predict the future.” In a way, this is certainly true. Forecasting is the process of making predictions of the future based
on past and present data and the analysis of trends.

Most companies start forecasting but often stop just as they get started because, depending on the product being manufactured, forecasting can get quite complex and require a lot of data input. As a result, some companies are tempted to "wing it" without putting hard-and-fast policies and procedures into place. The result is that production planning personnel don't know whether to execute against the forecast, negating any potential forecasting benefit right from the start.

EXECUTE AGAINST THE FORECAST

A forecast is useless unless production scheduling is executed against it. By utilizing forecasts and executing production against them, companies begin generating critical data that can be used to analyze and improve future forecasting in a cyclical process of constant improvement.

MONITOR ACCURACY AGAINST THE FORECAST

Forecast accuracy is crucial for streamlining production operations, minimizing costs, and increasing profits. Most manufacturing businesses find it valuable to monitor and evaluate the forecasting process using both individual and aggregated forecast-accuracy metrics. By tracking these metrics over time, you can improve forecasting capabilities as well as drive production process improvement (a principal factor in ERP). Forecast accuracy is so important to the manufacturing process it should be a key performance indicator.

Monitoring forecast accuracy is crucial for optimizing operations but it is surprising how many companies don't do it for a number of reasons, including data storage issues, inability to agree on metrics, and simple inertia.

ADJUST THE FORECAST

The need and desire to improve forecasting accuracy is fundamental to utilizing an ERP system. By constantly and consistently monitoring forecast accuracy, you are generating information that can help you accomplish three major objectives:

- **Determine if you’re using the right forecast models**
- **Identify the adjustments needed to improve them**
- **Project any expected deviations from the planned forecast**

With accurate, reliable forecasting implemented as a key component of manufacturing operations, organizations can approach production planning with confidence.
Production planning is at the core of any manufacturing process. The purpose of production planning, of course, is to organize material and human resources to efficiently manage production costs, time, materials, and personnel.

Efficient, effective production planning involves the intricate choreography of all these elements so that they come together in a cohesive, timely fashion to speed the production process along to a successful, profitable conclusion. For any manufacturing operation to reach its full potential, effective production planning must be at its core.

Production planning process improvement starts with three fundamental tasks:

1. PROVIDE PRODUCTION PLANNING EDUCATION

Unfortunately, many manufacturing operations, especially small-to-medium-sized businesses (SMBs), relegate production planning to machine operators or process managers who have come along with the business as it has grown. While these individuals may be outstanding machine operators, they typically don’t have a broad knowledge of planning and production principles. To equip them to become skilled, qualified schedulers and planners requires education so they can successfully use tools such as Infor’s VISUAL, which is one of the preferred ERP solutions for SMBs.

2. UTILIZE A "CLOSED LOOP" MANUFACTURING PROCESS

By this we mean a process that has a defined beginning, middle, and an end that yields measurable data and results. An open-ended process does not provide output data to support analytics, making it difficult to analyze process efficiency. Without a closed loop, manufacturers can be lulled into simply inputting ERP data to run a process with no thought to improving it. A closed loop process provides measurable results that enable
manufacturers to gain answers to a number of critical questions such as:

- Are your run times accurate?
- What is your efficiency?
- What is your accuracy of capacity?
- How much overtime is consumed?
- Did you get the result you were expecting?

Having a closed loop system and an appropriate set of metrics enables you to understand why you’re getting the results that you’re getting.

Most production planners who are having trouble with production scheduling simply know that their scheduling doesn’t work – and they have no idea why. The metrics and analytics that can be used with a closed loop system enable you to determine where critical breakdowns in the production operation occur.

3. IMPLEMENT ROOT CAUSE ANALYSIS

Root cause analysis can help you correct deficiencies throughout the production process. By discovering and addressing the root cause of production problems you can permanently fix them instead of simply treating the symptoms. For example, if production runs are typically late, instead of approving more overtime, analyze why production takes longer and fix the root problem.

All production planning improvements come down to two basic tools: metrics and analytics. Without identifying and defining what needs to be measured and gathering that data, there’s nothing to analyze for ways to improve. Well-defined, reliable metrics and analytics are the key to improving production planning, streamlining operations, and supporting continuous improvement.

All the processes discussed so far are integral to ERP. When any one of them fails to perform optimally the entire system can suffer. For some manufacturers, it is easier to simply discard an apparently-problematic system or piece of hardware than it is to overhaul or replace a fundamentally inefficient business process. Yet to streamline operations and optimize performance that is exactly what should happen.
To achieve maximum results from any BPI effort requires a long-term commitment to continuous improvement. There are a number of proven techniques for process improvement, including Lean, Total Quality Management (TQM), and Six Sigma — however, for any company to effectively and consistently drive process improvement, it must be embraced at every level within the organization.

There are several initiatives that can be undertaken to encourage employees to embrace continuous improvement and help embed BPI in your corporate culture:

**UTILIZE TOP-DOWN COMMUNICATIONS.**

Business process improvement cannot be dictated from the C-suite. For effective process improvement to take hold in any organization, business managers from the CEO on down must champion and communicate the need for and benefits of process improvement. It is crucial for management to lead the process improvement initiative and not simply assign it to someone further down the chain of command. Top management is uniquely positioned to communicate the strategic importance of process improvement and establish the mission and goals:

- **These are our core values as an organization**
- **This is who we need to be to compete and be successful**
- **These are the processes central to our success**
- **These are the benefits of process improvement**
- **This is how we can accomplish it**
This may require creating or improving a communication infrastructure to facilitate enterprise-wide efforts to reach every employee, including email, newsletters, face-to-face meetings, visual aids and company events, to name a few.

**INVOLVE ALL STAKEHOLDERS.**

While communication must be from the top down, process improvement implementation must be from the bottom up. In many organizations this can be hard. Employees need to be empowered to suggest process improvements; for some managers used to telling people what to do, it may be uncomfortable to have employees telling them what needs to be done. If management is truly committed to embedding process improvement into the corporate culture and DNA, they must be prepared to make hard decisions to support it.

Ask employees to set benchmarks and recommend targets for the next quarter or next year. Challenge them to pay attention to what works well and ask how things can be better. Soliciting input on how to improve things from all levels within your organization makes workers feel valued, encourages further input, and reinforces the goal of continuous improvement. Proactive process improvement from the bottom up also provides employees with a mechanism for self-improvement, which advances not only their careers but the entire organization as well.

Empowering employees to be champions of process improvement can be a significant change in corporate culture but it is vital for everyone connected to a process to help improve it. Everyone must be committed to working toward a common goal of continuous improvement, understanding that it benefits the company and them.

**CREATE INCENTIVES FOR PROCESS IMPROVEMENT.**

While promoting the greater common good is important for implementing process improvement, it also helps to create personal motivation for employees. By offering rewards for process improvements, such as bonuses or prizes, management can encourage workers to make recommendations. Even something as simple as public acknowledgement of a successful suggestion can be a major motivator.

At the same time, it’s important to remove disincentives. Most people fear failure, but failure leads to innovation and is an important part of process improvement. It is important to make failures opportunities to learn. One of the core tenets of entrepreneurship is “fail early and fail often” because failure eliminates ineffective and faulty courses of action and helps focus efforts on the most promising initiatives.

By encouraging continuous business process improvement across all departments and levels within your organization, you’re helping ensure not only maximum performance but long-term growth and success as well.
Incorporating best-practices and regularly analyzing ERP data against a set of specific and appropriate metrics will go a long way in aligning production Scheduling and material planning and streamlining manufacturing operations. However, by itself, the data generated by all the processes controlled and monitored by your ERP system is just information, not knowledge.

Digitization and automation are helpful tools for gaining operational efficiencies but human involvement is vital for turning information into insight and input into improvement. Continuous improvement and the ability to identify and fix bottlenecks are people-driven.

To achieve significant, long-lasting, sustainable growth, success and profitability requires the cooperation and enthusiasm of employees throughout the organization. Improvement starts within and is sustained by a commitment from the management suite and the shop floor.