

FINITE CAPACITY PLANNING

Avoid guesswork with white boards and spreadsheets: Use Finite Capacity Planning for consistent results.



Vilfredo Pareto defined the “Pareto Principle” that dictated a popular adage: **80% of the effects come from 20% of the causes**. That could mean different things for your company. 20% people in your team contribute to 80% of the output, or 20% of your tasks take 80% of your time. Or it could also mean that 20% of elements on the shop floor have an impact on 80% of company performance. Meaning a small amount of things play a huge part in if you company succeeds in delivering order.

This principle makes sense for entities that aren’t related. However, for interdependent systems, this principle applies even more strongly. As interdependence in organizations increases, the number of elements that really dictate most of the contributions is really small. So deciding where the issue is in your schedule and load planning is not trivial.

#1 reason of not doing what should be done is doing what shouldn’t be done.

-Eliyahu Goldratt (Author: The Goal & The Theory of Constraints)

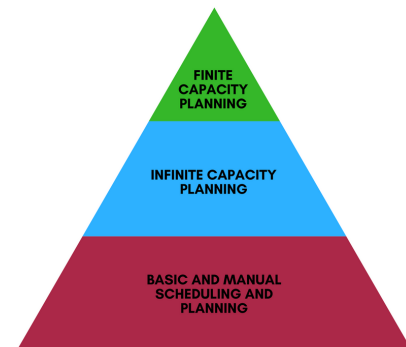
Master Schedulers or Production Planners are critical to the success of your operations. Your manufacturing operations lives and dies by how effectively people in this role can conduct the shop floor orchestra. You need nerves of steel and tactical attacks like a seasoned football coach to be able to manage many challenges like unplanned downtime, bottlenecks, rejects, shift changes, absences, cancellations, shifting priorities, urgent orders and changes in forecast. But in order to be the best master conductor of the shop floor orchestra, you need to know how to conduct it efficiently.

Schedulers have some pretty stringent constraints on what’s available.

- **Resources**
- **Time**
- **Forecast & Orders**
- **Inventory**
- **Schedule**

Basic & Manual Scheduling & Planning

This seems an almost primitive form of scheduling. Whiteboards covered in cards held together with magnets or markers specifying the flow of activity on the shop floor is a common sight in any manufacturing facility. While this gives visibility, it only gives a single point of visibility. Visual management is only useful when it can be accessed by everyone affected and doesn’t require someone to walk the entire length of the shop floor to verify something. Furthermore, because making changes to this kind of scheduling is manual, every time there is a change in materials, resources, schedules, or priorities, the scheduler has to get back into fire-fighting mode to see how to best make that change possible. This kind of “manual optimization” is at best the “least-worst”



Master Schedulers typically use one of three main approaches. Tools are available in many different aspects of operations planning and scheduling, but they can be divided up by their abilities in **three** separate categories.



80% of all effects come from 20% of all causes.

-Pareto Principle

scenario. In the long run, this often adds costs that can be avoided.

Infinite Capacity Planning

Production Planners using MRP (Materials Requirements Planning) software have been recognized on the shop floor as distinguished from the white-board schedulers. But the MRP approach is purely focused on the availability of the right parts and tools at the right workstation at the right time. Work orders and dispatch lists generated from MRP assume that capacity is unlimited. The scheduler then has to look at the required date of each operation and schedule capacity based on that. But if there are changes in capacity, the infinite capacity planning method has no way to reflect the actual events on the manufacturing floor. This presents a challenges since scheduling decisions are made well in advance with no scope or ability to adapt. And on a shop floor, your ability to adapt will dictate your overall success or failure.

But there is a little bit of a silver lining: a fair few ERP vendors have come up with strategies to include capacity planning that is either built-in or provided through a third party.

Finite Capacity Planning

The science of scheduling is in fact the art of constraint management. It is a constant negotiation between what is needed, what is available, what is possible, and who is working. It offers the most realistic model of your shop floor and recognizes the obvious limits in your plant's capacity. Accounting for material constraints, complexities in the BOMs, process conflicts, tooling conflicts, and priority conflicts is vital to meet unplanned demands and changing supply. Finite capacity planning with its real-time capability allows Master Schedulers to see data about cycle time, part rejections, estimated production time, and other key metrics instead of relying on nominal averages and wishful data. With the economic growth bringing lots of money and jobs in the manufacturing world, this cutthroat environment is already tougher to navigate. Staying ahead requires a high-wire act while juggling the priorities of everyone on the floor as well as everyone who interacts with the floor.

A shop-floor can be designed and optimized to do much more than it actually does. Responding to changes in capacity, orders, resources, and priority should be done in a way that allows you to stay ahead and pivot your production when necessary. Especially when there are surges in manufacturing demand, schedulers are always looking for ways to use tools to make that transition easier. With infinite capacity planning, the tools assume you have all the time and resources in the world. Since it takes data from MRP (which is the source of the assumption of infinite capacity), whenever you end up over-scheduling, dealing with it takes time away from daily operations. This is even more important for companies trying to grow and scale as over-scheduling is much more likely to occur due to fast moving priorities and often tight constraints on resources.

Ultimately, finite capacity planning is a methodology of optimizing and leveraging your resources for maximum productivity at the least cost. The tools required to do something this sophisticated are relatively diverse. Adopted from Taiichi Ohno, the father of Just-in-Time manufacturing, the philosophy of reducing "*Mudas*" or waste is being exercised in today's fast-paced shop floors more than ever. In such an environment, you want to make sure that the tool you are using allows you to accomplish things in a structured, time-efficient, and actionable way. If you truly want to give your Master Schedulers the tools that can help them succeed, here are the key things you need to consider when looking for the right tools.

Why Finite Capacity Planning Wins?

- **Real time manufacturing evaluation.**
- **Accurate prediction of lead times.**
- **Complete utilization of all resources.**
- **Lower inventory levels.**
- **Higher reliability of on-time delivery.**
- **Improved customer experience.**
- **Monitor increases in business.**
- **Make data-driven decisions.**



Key Features for effective **Finite Capacity Planning** Tools

- You should be able to incorporate multiple constraints into a single planning environment.
- You should be able to use your current material and production capacity to help optimize the flow of operations.
- For multi-site manufacturers, collaboration across multiple sites is vital to establish a single source of truth for your global company mission.
- Another key priority for single-site or multi-site companies is making sure that all the data is centralized such that there are no data silos.
- You should be able to respond to changing supply & demands from all your internal and external customers. This could mean the next workstation, the next line, the next plant, or the next customer.

In Summary

Running a manufacturing plant is like conducting an orchestra: running multiple sites is like running multiple marathons at the same time. This experience is often treated as chewing glass. But it doesn't have to be. Change is a natural state for shop floors and the Master Scheduler or Production Planner should be equipped with finite capacity planning so that you can aim for success not just once, but always. Responding to change can be either a massive fire-fight or it can be an analytical and optimization exercise. **Finite Capacity Planning** gives you the best shot to prepare yourself for dynamic manufacturing scopes. The right tools in the hands of the right people make all the difference.

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-ELIYAHU GOLDRATT

Want to learn more?



Let's start a conversation
at **905-305-1711**.

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