Rewriting Capacity Planning

How new ERP systems change the way you plan

Introduction

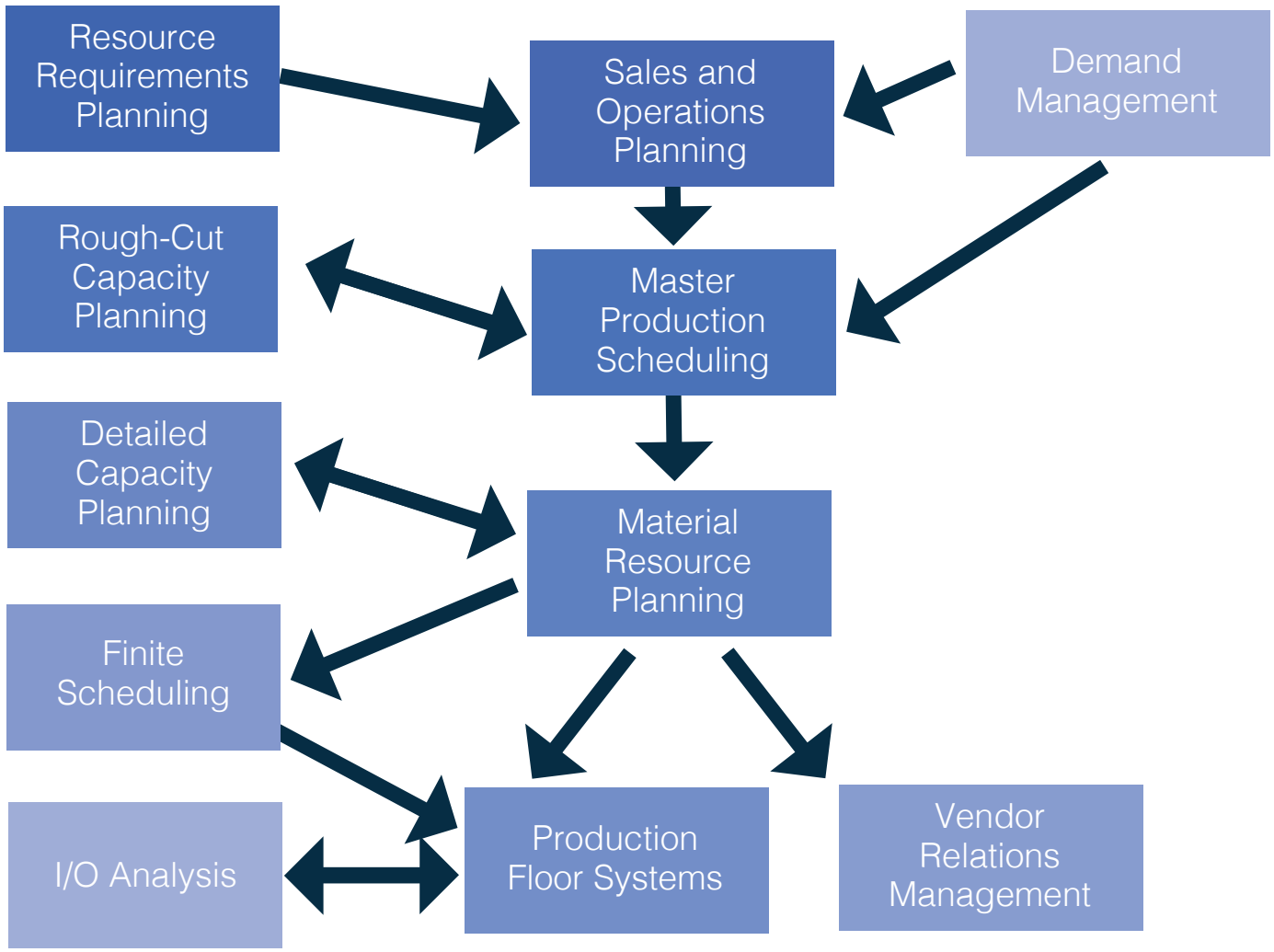
The complexities required to build an understandable long-term rough-cut capacity plan or the minutia of the detailed capacity plan could take a team of people hours to calculate and adjust. Any slip-up in this arduous and over-complicated process would lead to over-production, excess inventory, poorly used resources, and a host of other DOWNTIME wastes.

To decrease the amount of waste, LEAN thinkers have come up with many alternate forms of calculating capacity but, in the end, this is an issue that could best be solved with robost technology in the form of an ERP system.

What is Capacity Planning?

Capacity planning is the act of planning your future production needs. The goal is to help ensure that you, the manufacturer, can maintain a steady and efficient supply of products to your clients by way of figuring out what you need to have to make that supply happen. When done properly it also helps cut DOWNTIME wastes, since a lack of capacity planning can lead to over-production, and a host of other wastes. These inefficiencies always lead down the same path: unhappy customers and decreases returns.

A crucial component of understanding your capabilities as a manufacturer is knowing how much you can make and how much you need to make. To help you determine this, you need access to rough-cut capacity planning and detailed capacity planning.



Interaction between different planning systems

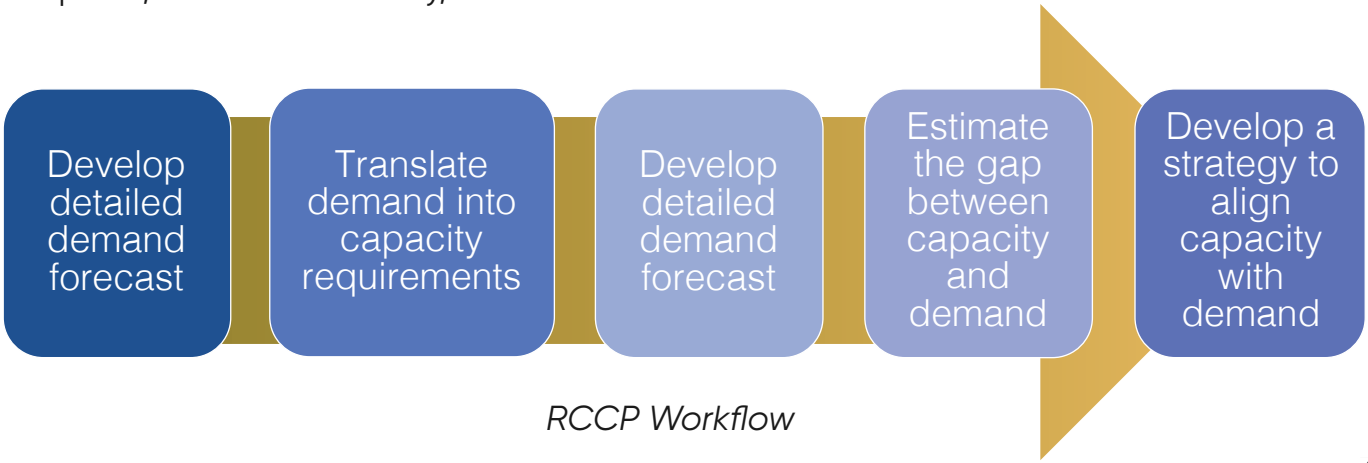
To ensure you maximize your shop floor productivity, it is vital that you know the difference between both concepts, and that they each solve a different problem:

- Rough-Cut Capacity Planning **(RCCP)** or Business Modelling, helps to ensure that you have the infrastructure you need when you need it. It is a long-range tool used to plan future production requirements, such as upgraded warehouse space, more machines, or added staff.
- Detailed Capacity Planning **(DCP)** or Finite Capacity Scheduling **(FCS)**, helps to ensure you are making full use of what you have. It is a short-range tool used to manage required production for the current and coming week, such as required overtime.

By reviewing both systems in detail, you can best discern how these tools would be of best use to your enterprise.

Rough-Cut Capacity Planning

RCCP uses models to forecast the medium to long-term requirements of your shop floor and to give you advanced warning if you need permanent capacity expansion, like a new plant, added machinery, or added staff.



RCCP Workflow

Setup for RCCP

To ensure that RCCP is working for you, it needs reliable data. Namely, what needs to be made (forecasts and sales orders), when it can be made (machine changeover, up-time, and shift hours), and how long it takes to make (part, BOM, and routing detail).

To get this reliable data, you should:

- **Get accurate average times for routing tasks.** This is pretty straight forward in that you need to know how long it takes to perform the set tasks, including first calibration and setup, for each step in the routing detail. It is advised to time the tasks over a run so that the average can be properly calculated.

- **Determine the nominal work center up-time.** This requires taking into account the weekly maintenance, possible delays from other work centers, and operator shift scheduling. In this, you can access the demonstrated capacity for the work center by analysing past performance to best gauge how many hours a day that work center / operator produce. In most cases, the 80/20 rule applies, wherein you get 32 demonstrated hours out of 40 potential hours.

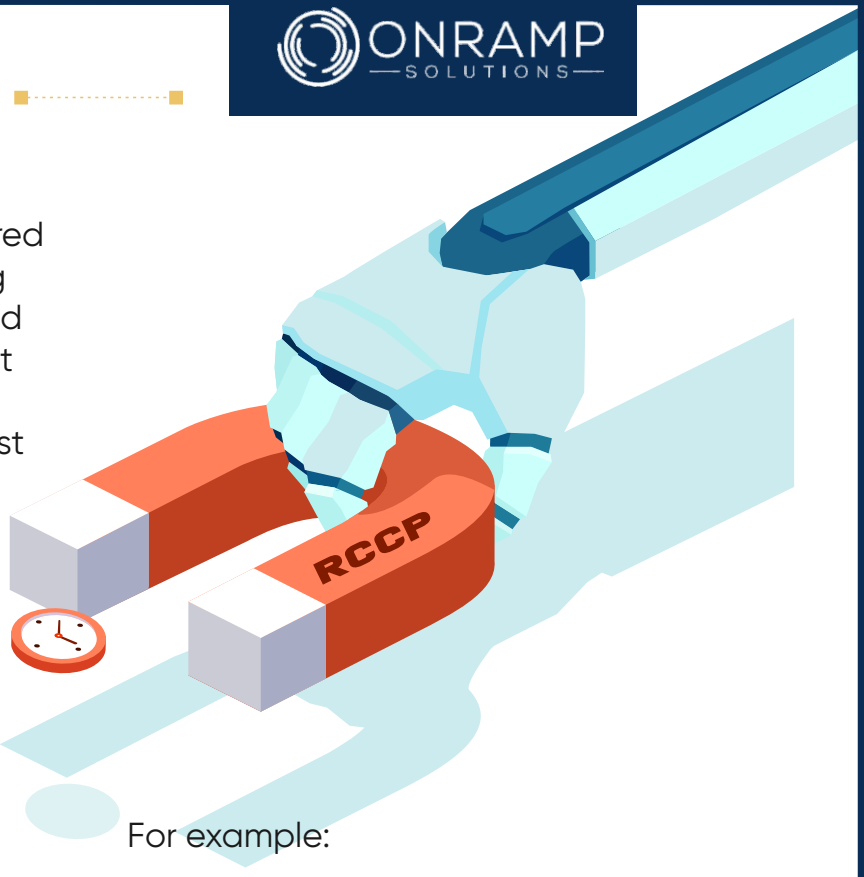
- **Determine work center changeover time.** The issue with changeover times can be based on your product or industry. Changeover may vary based on what you are producing and what you have to produce next. For example, changing a socket wrench from 7mm to 36mm or 10mm is about the same time, but changing an adjustable wrench from 7mm to 10mm takes less time than increasing the size to 36mm. This changeover variance should be managed to minimize the guesswork.

Dum-dum mystery flavour lollipops: A fun way to decrease changeover:

To save food waste and decrease changeover time, Spangler Candy Co, in Ohio decided to get smart: Instead of shutting machinery down between runs and totally emptying out the previous batch's flavor, they'll just start the next one, so that the two flavors will simply run together. So, theoretically, you could end up with Cherry-Root Beer, or Blueberry-Watermelon.

RCCP Issues

When calculating the Rough-Cut Capacity, you multiply the time required to build a part (based on your routing detail) by the number of parts required and round up the value to the nearest day. This helps to make the weekly forecast calculations faster at the cost of accuracy and productivity.



For example:

- If you have two orders that total 6 hours to make and pack, RCCP sees that order as taking a day to fulfill.
- If you have an order that takes an hour to make, RCCP still considers that it takes you a day.

- It takes 30 minutes to make and pack one part.
- If you wait to start packing when 12 parts are assembled, you save 10 minutes per part, meaning the time for each part decreases to 20 minutes.
- This means that making and packing and order for 120 parts is 40 hours, instead of 60.
- Taking into account rounding to the nearest day, RCCP would overestimate capacity requirements by 3 days, based on an 8-hour day.

Now, having the generated plan overestimate the capacity is not necessarily bad, as the report is there to forecast if your shop floor has the capacity to realistically complete the order, which it does.

Another issue within RCCP is that the capacity it considers is in terms of time to make a part and fulfill an order. However, time isn't the only variable your firm has to look at.

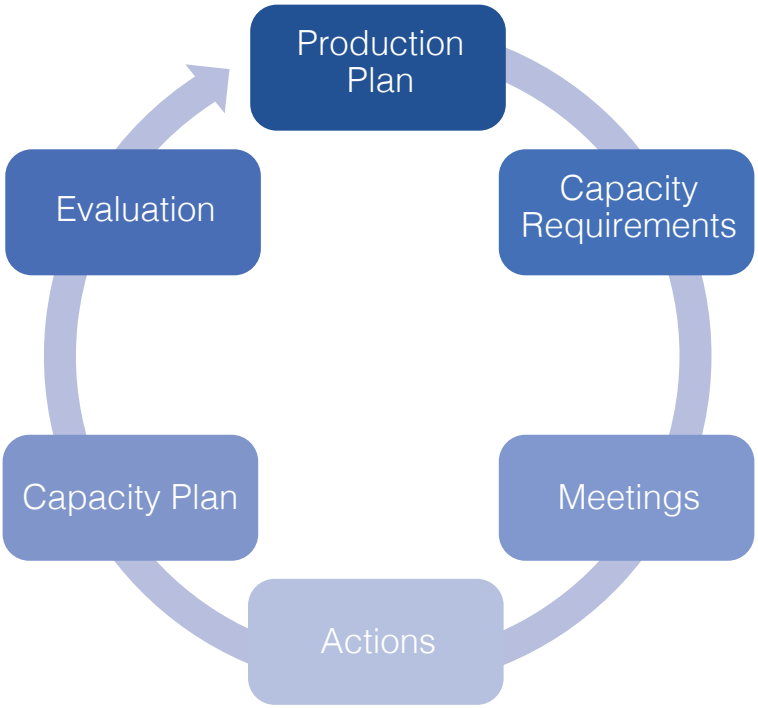
Other considerations include:

- **Warehouse space –** RCCP assumes infinite capacity, so planners should keep in mind the space required to assemble large items, store parts, or set up a new work center to accommodate the plan.
- **Working capital –** while time is forever and space can be found, management, planners, and purchasers should keep in mind that procuring materials, tools, staff, or space can eat up unnecessary capital that cannot be found until your company is paid.

The final issue within RCCP is problematic work centers. RCCP will assume that all work centers run equally well at or near 100% capacity, leaving those previously assumed overestimates closer to their natural mark.

RCCP Conclusion

While the accuracy can be suspect, and space and capital are not naturally considered, RCCP is a tool that can still be handy to today's LEAN thinking firm especially when pared with good data.



Lean Capacity Planning

All problems have a solution. In this case, the issues found in the long-term planning of RRCP can be solved as follows:

- **Lack of accuracy –** This is resolved with DCP, where the global view of RCCP is zoomed in to cover the finer details of the day-to-day activities.

- **Capital** & **space –** These are resolved by active planners with better data, where the idea of infinite can be managed based on observable information related to your firm.

- **Problematic work centers –** This is resolved by using the 80/20 rule: 80% of your problems are only caused by 20% of your work centers. These bottleneck work centers have almost definitely been recognized as such by your planners, leaving them ready to tackle and improve the problem areas with more variable time calculations and proactive management.

RCCP also informs you of what capacity you are using and what is available so that resources that are at or near critical usage can be identified and managed. Once these manufacturing resources are identified, you can plan to mitigate those shortfalls.

This usually comes in the form of one of the following two options:

- Increase resource availability by adding a production line, plant, or added shift work
- Change the planned due dates

In conclusion, capacity planning can lead to DOWNTIME waste if it is not managed carefully.

Detailed Capacity Planning

The plan generated by RCCP, with all the proper inputs, helps you determine your long-term forecasting goals in weekly, or monthly blocks. Big picture stuff, like hiring drives, plant acquisition, or purchasing equipment. The details are left to DCP. Here is where planners should look to optimize the daily productivity of your current capacity and cut DOWNTIME.

DCP needs all the same data as RCCP; that is, accurate routing times, work center times, and changeover times. But DCP works best by taking into account the added finer details of the shop floor.

Details like:

- **Operational flexibility –** knowing what work centers can fill in for another, if required.
- **Changeover variability –** knowing what tasks require more changeover time based on current and next tasks.
- **Task overlap –** knowing what tasks can be grouped together.
- **Machine metrics –** knowing what each machine and work center is capable of with which operator at which shift.
- **Operator skills –** knowing what operators are trained or cross-rained for other work centers.

This level of variability is difficult to program into a computer, but not impossible. Previously, the complexity arising from the minutia of breaking down the rough-cut weekly plan was done by a team of planners working to inform and adjust the capacity based on short-term requirements.

For example:

- RCCP scheduling states that you have the capacity to assemble and pack an order in 5 days, but your packing capacity is available on day 1 and 2, not 4 and 5, as you would expect.

Here, DCP understands how the capacity must be scheduled, not just the amount of time required to complete tasks.

DCP Conclusion

Rough-Cut Capacity Planning is used until an issue appears, like a machine breakdown or supply issues. Then, DCP should be used at to ensure jobs competing for a resource are managed in a way that maximizes productivity and ensures further delays are minimized.

ERP Capacity Planning

Nowadays, an ERP with a strong DCP module can perform the job of both long-term planning and short-term scheduling, which means what used to be a time-consuming event is quickly actioned with little stress. It's not seamless, of course, the planner still needs access to accurate data that is visualized on easy to use reports and dashboards. With these tools the planner has everything they need to ensure your productivity is maximized.

> **Good fortune is what happens when opportunity meets with planning.**
>
> – Thomas Edison

Where OnRamp Helps You

OnRamp is a single point database ERP system that was designed from the ground up to touch all your business units and improve their processes and communication with each other.

OnRamp's business model and DCP modules are made to take advantage of the push system inherent in capacity planning and tie it seamlessly with a Lean thinking Kanban pull system, ensuring you are well prepared with the best plan while helping you cut DOWNTIME waste like excess inventory, defects, over production, motion, waiting, non-utilized talent, and extra processing.

Our best-in-class ERP has no added IT systems, no other vendors, no messy 3rd party plug-ins, and no added costs. All your data instantly shared with all your business units. And to help you get started quickly and with your best foot forward, OnRamp's consulting team has decades of combined experience in manufacturing and implementing proven management methodologies that will improve your bottom line. Whatever you make, we can help you make it better.

We know manufacturing.

And we want to work with you to

make it better.

OnRamp's ERP software can help to:

Here are some of the things that OnRamp can help you improve:

PRODUCTION FLOOR:

Business Models	Detailed Capacity Planning	MRP
Production planning	Finite scheduling	EOQ calculations
Plant issue/ suggestion tools	Work center scheduling	Shop monitors with production entry capacity
Warehouse management system	Storage system management	Inventory management
Maintenance management, including preventative maintenance management	Engineering document and drawing management	Work order management
5S audits	Shipment management	Worker skill management
Gateway queues	Online inspection software	Task automation
Quality management system	Scrap management	Quality alerts
Order policy suggestions		

FRONT OFFICE:

A single database for all records	Training and skills gap analysis	Notification systems
Easy to access files and data	Team communication tools	Lead time and inventory management
Server run software with a locally installed shell	Customizable reports and documents	Paperless approval and sign-off
Customer request management	Paperless accounting	Vendor relations portal and management
Customer relation management	Project management and approval	

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