An Introduction to Capacity Planning

JDEdwards OneWorld 2000
What is Capacity Planning for?

• Capacity Planning, in its various guises, is used to ensure that sufficient capacity is available to accomplish the planned production schedule generated by MPS or MRP.

• If sufficient capacity is not available, then you must alter the plan or the capacity.

• Capacity Planning comprises of the following types:
  – Resource Requirements Planning (RRP)
  – Rough Cut Capacity Planning (RCCP) & Capacity Requirements Planning (CRP)

• An RRP uses a long-term forecast.

• RCCP and CRP uses actual Work Orders, but RCCP works on “Critical” Work Centres only.
Capacity Planning & Material Planning in the Business Cycle

Production Plan

Resource Requirements Plan

Master Production Schedule

Rough Cut Capacity Plan

Material Requirements Plan

Capacity Requirements Plan

Production Activity Control

Input/Output Control

Strategic
Tactical
Operational
Execution
Components of Capacity Planning

- A source of Resource (hours) Supply at the Work Centre per day
  - “Resource Units” and...
  - ...a way of creating them
- A source of demand
  - Work Orders/Planned WO’s (RCCP/CRP) or...
  - ...Forecast (RRP)
- A constraint profile showing how much resource is consumed at each Work Centre to make a product
  - PDM/SFC Routing (RCCP/CRP) or...
  - “Resource Profile” (RRP)
- Critical Work Center information
  - Labour or Machines are the prime constraint
- Capacity Messages
- Work Centre Load Profile (“Time Series”)
Resource Units

- “Resource Units” are a Calendar listing of how much resource (normally in hours) is available per calendar day, per shift, per branch/plant, per Work Centre, per month & per year.

- In this example, from OneWorld, the date is February 2005

- Each day shows 8 hours resource for the Work Center “200-201 Filter”
Where do Resource Units come from?

Nbr of Work hours available per day from Manufacturing Constants for this Branch/Plant

\[ \times \]

Nbr of Machines, or Employees, at Work Centre (dependent whether it is Labour or Machine intensive) from Work Centre

\[ \times \]

\[ \ldots \text{applied for only the Work Days in the Shop Floor Calendar} \ldots \]
Resource Requirements Features

- RRP only uses Forecast as “Demand”
- RRP does not use current demand from Sales Orders or Work Orders
- It is a long-term, “Strategic”, Business tool used for planning the expansion of existing facilities, acquiring new facilities, future staffing requirements, capital expenditure, etc.
- RRP does not use the Work Order Routing. Instead it uses the “Resource Profile”
- RRP is similar to Material Planning. Whereas MRP plans for the Consumption of Component Inventory, RRP consumes hours of Resource renewed daily at the Work Centre
- Whereas MRP writes the Messages & Time Series, RRP has “Messages” telling the Planner what to do and each have a “Time Series” to show what is happening inside the Planning Horizon.
The Resource Profile in OneWorld

- The Resource Profile is ONLY used by RRP Resource Requirements Planning
- It replaces normal PDM Routing data because that data does not exist at this stage of the Business Planning cycle
- Note how the profile tells us very little about HOW the item is made. This is for good reason. The HOW is tackled by the Routing.
- The Profile’s sole concern is the amount of resource consumed at each work Centre during the manufacture of an item and ALL of its Components.
Concept of Resource Profile creation

You can “roll up” all the PDM Routings of all the Manufactured Items in the Bill of Material to create a Resource Profile - but only if you have created the PDM Routes and Bills.

Bill of Material Structure with Purchased Parts excluded

Routings for all Manufactured Parts in the Bill of Material
The Concept of RRP

Resource Profile

Resource Units

Capacity Messages

Capacity Time Series

Detail Forecast

Better Communication of Knowledge
Features of Rough Cut Capacity Planning (RCCP) & Capacity Requirements Planning (CRP)

- Whereas RRP uses a Forecast and Resource Profile, RCCP/CRP use actual Work Orders and Planned WO’s as demand & PDM/SFC Routings as the source of a constrain profile
- RCCP/CRP uses Work Centre information to identify the prime resource constraint which could be Labour or Machine Hours
- The only difference between the use of RCCP and CRP is in the selection of Work Centres involved. RCCP traditionally works on a smaller subset of Critical Work Centres.
- Whereas MRP writes Messages and Time Series, the R3382 writes “Messages” telling the Planner what to do and each have a “Time Series” to show what is happening inside the Planning Horizon.
The Concept of RCCP/CRP

- Work Order & SFC WO Routing
- MRP Messages & PDM Routing
- Rough Cut Capacity Planning & Capacity Requirements Planning
- Resource Units
- Messages
- Time Series
Capacity Messages

- Each time RRP/RCCP/CRP are re-generated, the system creates Messages to identify Work Centers whose loads are in conflict with planned capacity.

- The Message Detail indicates whether you have overload or underload conditions.

- Here we have an example from OneWorld showing Work Center “200-101 Weld” with several “Over Capacity” and several “Under Capacity” Messages.
Capacity Messages Features

- Messages can be cleared, held or deleted
- You cannot “process” Capacity Messages in the same way you can in Material Planning. You can only add remarks for each Message as a record of the actions taken, i.e., increase/decrease staff or available machines, or increase/decrease workload.
- You can access related data to confirm or change dates, amounts and Plant Manufacturing Data for the Work Center.
- During regeneration of the Plan all Messages are deleted except those that have been manually entered and those on Hold
Period Summary Review Features

- Period Summary Review
  - This Review Enquiry records which Items consume what Resource from a Work Centre, in this example, from OneWorld, Item 220 in B/P M30, consumes 148 hours of Resource, with a Forecast, from Work Centre 200-141 in the period ending 31/3/2005
Work Center Load Time Series

- This is a time phased array showing consumption of Resource in “bucketed” periods of time. This example, from OneWorld, shows:
  - “Rated Profile” is the Total Resource available in that Time Bucket
  - “Loaded Profile” is how much is loaded from Forecast or Work Orders
  - “% Resource Used” = (Rated Profile/Loaded Profile) x 100%
  - “Resource Available” = Rated Profile - Loaded Profile
  - “Accum. Resource Avail” is the accumulation through time of “Resource Available”