

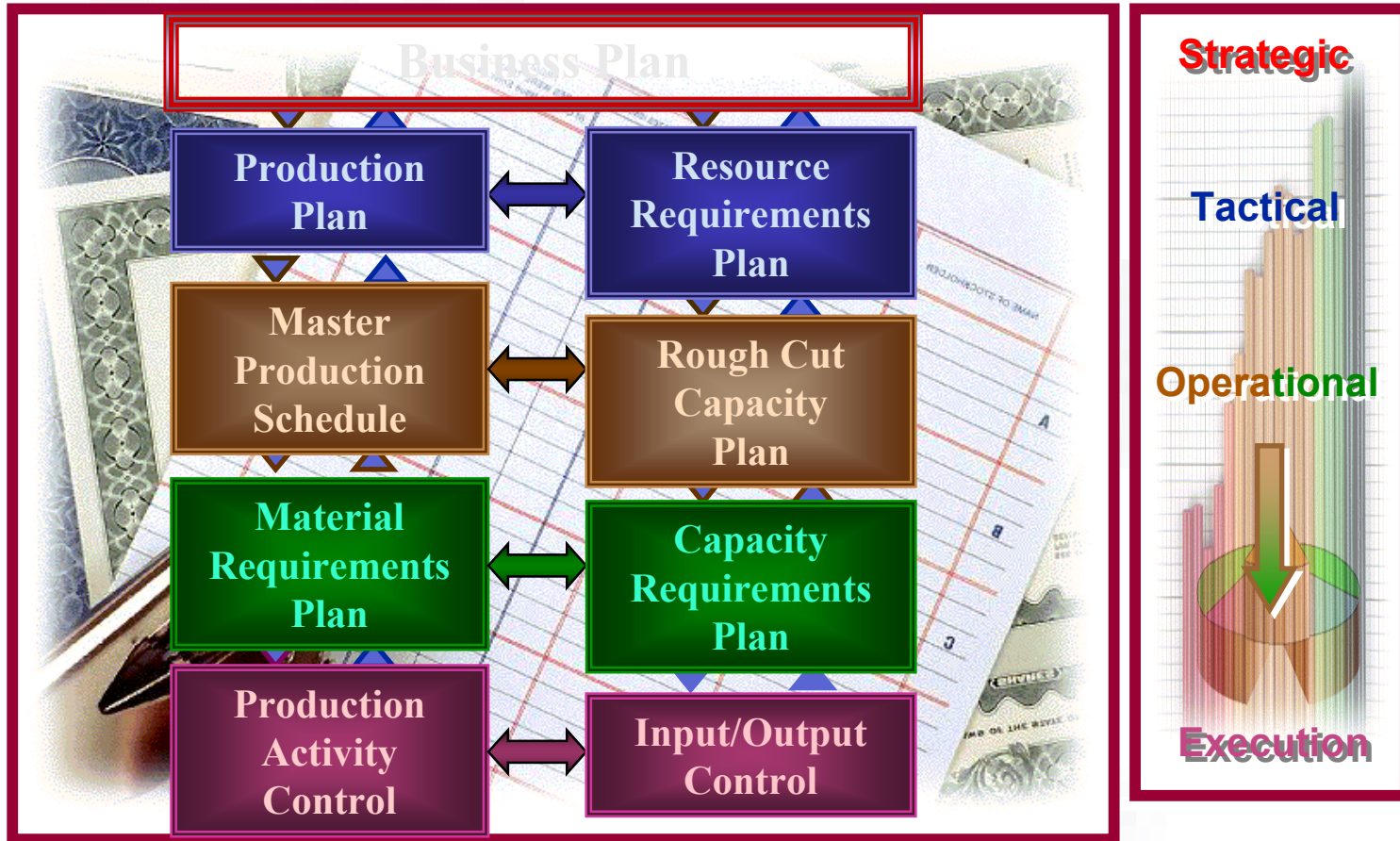
# An Introduction to Capacity Planning

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



# 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.

The screenshot shows the 'Enter/Change Resource Units' window for Work Center 200-201, Branch/Plant M30, in February 2005. The Unit of Measure is HR and the Shift is 2. The calendar shows 8 hours of resource availability for each day from February 1st to 28th. A summary table at the bottom shows 8 hours per weekend day, and a total of 152.00 Resource Units for the month.

Day	1	2	3	4	5
Efficiency	100.00				
Utilization	100.00				
Resource Units	8	8	8	8	Weekend
Resource Units	Weekend	8	8	8	8
Resource Units	Weekend	8	8	8	8
Resource Units	Weekend	8	8	8	8
Resource Units	Weekend	8			
<b>Total Resource Units</b>	<b>152.00</b>				

- 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

X

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

....applied for only the Work Days in the Shop Floor Calendar....

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The screenshot shows a software window titled 'Enter/Change Resource Units [Work Center Resource Unit Revision]'. It features a menu bar (File, Edit, Preferences, Form, Window, Help) and a toolbar with icons for OK, Cancel, Dismiss, and Abort. Below the toolbar, there are input fields for 'Work Center' (200-201), 'Filter', 'Branch/Plant' (M30), 'Month/Year' (February 2005), 'Unit of Measure' (HR), and 'Shift' (2). The main area contains a calendar grid for February 2005, with days of the week as columns and dates as rows. To the right of the calendar, there are input fields for 'Efficiency' (100.00) and 'Utilization' (100.00). At the bottom right, a 'Total Resource Units' field shows the value 152.00.

# 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

Work Center	Work Center Description	Units	UM	Unit Type	Unit Type Description	Effective From	Effective Thru	Time Basis	Offse
200-101	Weld	2	HR	1	Run Labor Hours	01/01/05	31/12/10	U	
200-101	Weld	1	HR	2	Setup Labor Hours	01/01/05	31/12/10	U	
200-103	Weld Inspection		HR	1	Run Labor Hours	01/01/05	31/12/10	U	
200-112	Cut-Off Saw		HR	1	Run Labor Hours	01/01/05	31/12/10	U	
200-112	Cut-Off Saw		HR	2	Setup Labor Hours	01/01/05	31/12/10	U	
200-112	Cut-Off Saw		HR	3	Machine Hours	01/01/05	31/12/10	U	
200-121	Mill	1	HR	2	Setup Labor Hours	01/01/05	31/12/10	U	
200-121	Mill	1	HR	3	Machine Hours	01/01/05	31/12/10	U	
200-122	Drill		HR	2	Setup Labor Hours	01/01/05	31/12/10	U	
200-122	Drill		HR	3	Machine Hours	01/01/05	31/12/10	U	
200-132	Stamp		HR	2	Setup Labor Hours	01/01/05	31/12/10	U	
200-132	Stamp		HR	3	Machine Hours	01/01/05	31/12/10	U	
200-141	Paint	1	HR	1	Run Labor Hours	01/01/05	31/12/10	U	
200-141	Paint		HR	2	Setup Labor Hours	01/01/05	31/12/10	U	

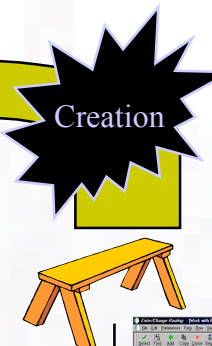
- The Resource Profile is ONLY used by RRP Resource Requirements Planning
- It replaces normal PDM Routing data because that data does not exist at this stage of the Business Planning cycle
- Note how the profile tells us very little about HOW the item is made. This is for good reason. The HOW is tackled 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

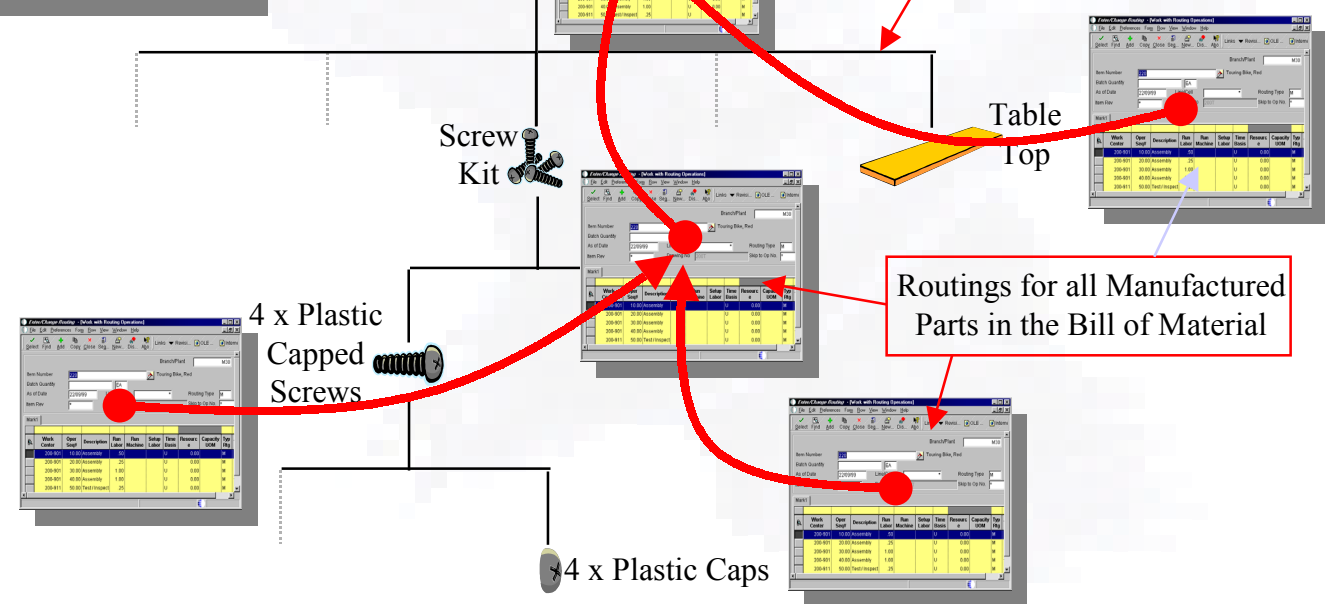
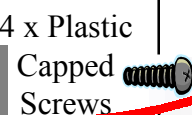
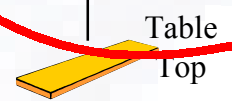
You can “roll up” all the PDM Routings of all the Manufactured Items in the Bill of Material to create a Resource Profile - but only if you have created the PDM Routes and Bills

**Resource Profile**

Work Center	Work Center Description	Units	UM	Unit Type	Effective From	Effective Thru	Time Basis	Offsr
200-101	Weld	1	HR	2	Setup Labor Hours	01/01/05	31/12/10	U
200-103	Weld Inspection	1	HR	1	Run Labor Hours	01/01/05	31/12/10	U
200-112	Cut-Off Saw	1	HR	1	Run Labor Hours	01/01/05	31/12/10	U
200-112	Cut-Off Saw	1	HR	2	Setup Labor Hours	01/01/05	31/12/10	U
200-112	Cut-Off Saw	1	HR	3	Machine Hours	01/01/05	31/12/10	U
200-121	Mill	1	HR	2	Setup Labor Hours	01/01/05	31/12/10	U
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200-122	Drill	1	HR	3	Machine Hours	01/01/05	31/12/10	U
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200-132	Stamp	1	HR	3	Machine Hours	01/01/05	31/12/10	U
200-141	Paint	1	HR	1	Run Labor Hours	01/01/05	31/12/10	U
200-141	Paint	1	HR	2	Setup Labor Hours	01/01/05	31/12/10	U



Bill of Material Structure with Purchased Parts excluded

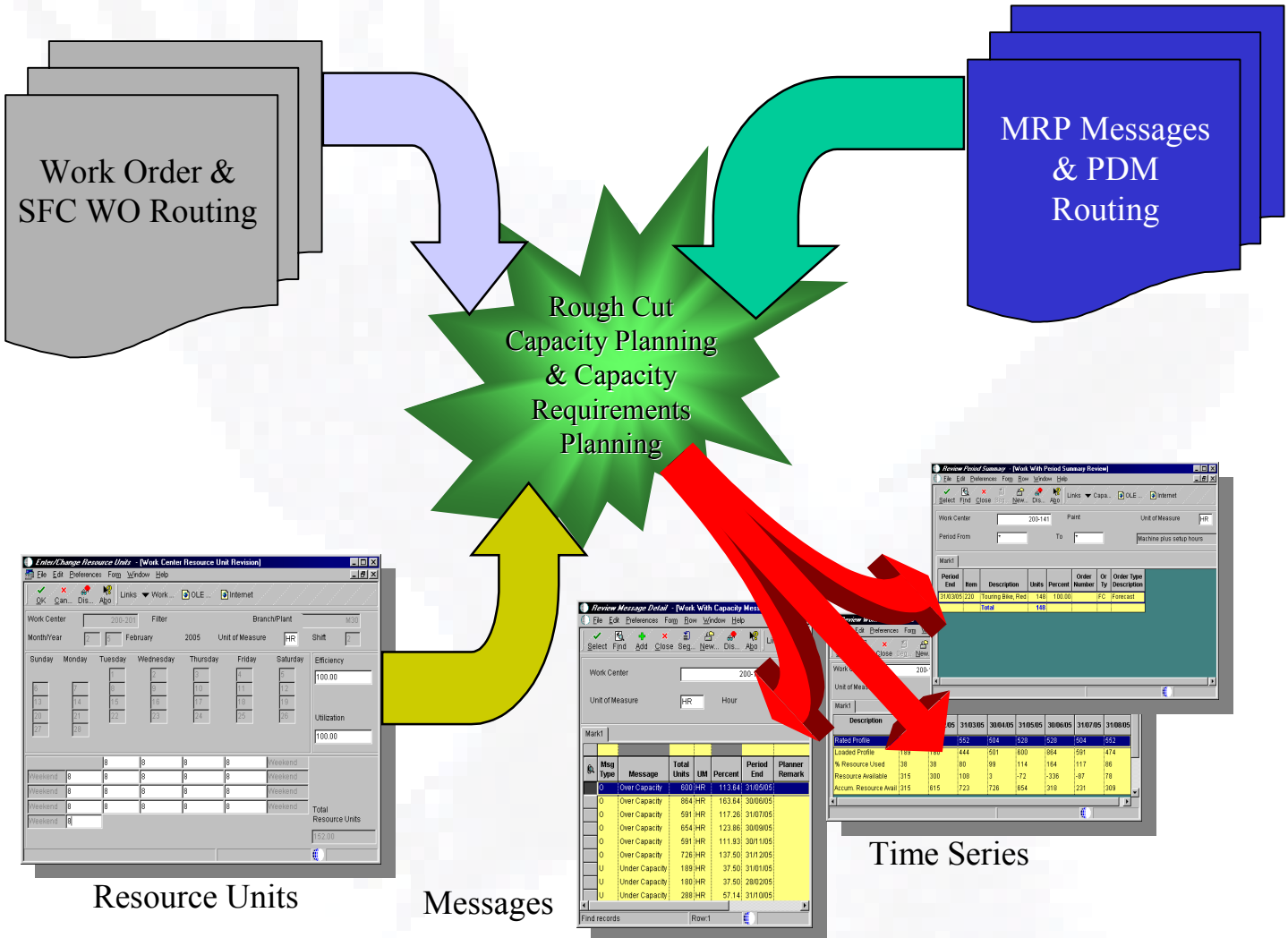




# Features of Rough Cut Capacity Planning (RCCP) & Capacity Requirements Planning (CRP)

- 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



# 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

Msg Type	Message	Total Units	UM	Percent	Period End	Planner Remark
O	Over Capacity	600	HR	113.64	31/05/05	
O	Over Capacity	864	HR	163.64	30/06/05	
O	Over Capacity	591	HR	117.26	31/07/05	
O	Over Capacity	654	HR	123.86	30/09/05	
O	Over Capacity	591	HR	111.93	30/11/05	
O	Over Capacity	726	HR	137.50	31/12/05	
U	Under Capacity	189	HR	37.50	31/01/05	
U	Under Capacity	180	HR	37.50	28/02/05	
U	Under Capacity	288	HR	57.14	31/10/05	

- 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, ie, 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

The screenshot shows a software window titled "Review Period Summary - [Work With Period Summary Review]". The window contains a menu bar (File, Edit, Preferences, Form, Row, Window, Help), a toolbar with icons for Select, Find, Close, and others, and a data entry section. The data entry section includes fields for "Work Center" (200-141), "Paint", "Unit of Measure" (HR), "Period From", and "To". Below this is a "Mark1" tab and a table with the following data:

Period End	Item	Description	Units	Percent	Order Number	Or Ty	Order Type Description
31/03/05	220	Touring Bike, Red	148	100.00		FC	Forecast
		<b>Total</b>	<b>148</b>				

# 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”
- .....between 31st January 2005 and 30th November 2005 - W/C “200-101 Weld”

Description	31/01/05	28/02/05	31/03/05	30/04/05	31/05/05	30/06/05	31/07/05	31/08/05	30/09/05	31/10/05	30/11/05
Rated Profile	504	480	552	504	528	528	504	552	528	504	528
Loaded Profile	189	180	444	501	600	864	591	474	654	288	591
% Resource Used	38	38	80	99	114	164	117	86	124	57	112
Resource Available	315	300	108	3	-72	-336	-87	78	-126	216	-63
Accum. Resource Avail	315	615	723	726	654	318	231	309	183	399	336