



# Advanced Scheduling

## Vancouver Workshop

16 May 2006

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## Topics Covering

- Introduction
- The Journey
- Concurrent Scheduler Mechanics
- Scheduling in Visual
- Improving your schedule

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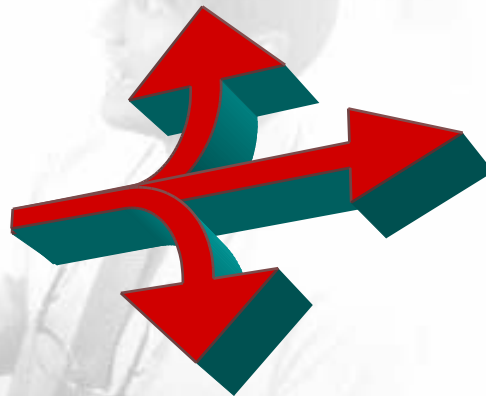
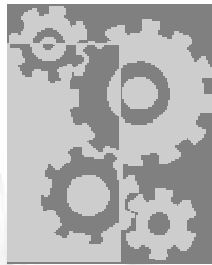
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# Introduction

What is the Concurrent Scheduler...

- **Creates the schedule or multiple schedules for the shop**
  - ◆ Makes decisions based on data entered into the database by the user...

When a job will get done...**TIME**



What will get done...**Work Order/Part ID**

**Concurrent Scheduler: Decides**

Where a job will get done...**RESOURCE/operation**

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# User Enters into the Data Base

- The Concurrent Scheduler performs computations based on the entered data. Some of the entered data is mandatory and some is optional...

Forward  
Schedule

Want  
Date

Qty

Part ID

Work  
Order ID

DB

Resource ID

Finite or Infinite  
capacity

Calendar  
exceptions

Run type...pcs/hrs,

Run time

Scrap factors



DBR

Easy Lean

TOC

Scheduling

Intergraded ERP

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## Empty Schedule

Mon	Tue	Wed	Thur	Fri	Mon	Tue

Resource 1

A

Wed

B

Thurs

C C C

Fri

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## Schedule by Want Date

Mon	Tue	Wed	Thur	Fri	Mon	Tue
		A	B	C	C	C

Resource 1

A

Wed

B

Thurs

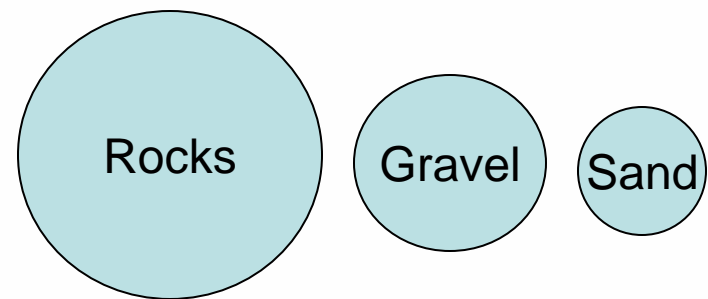
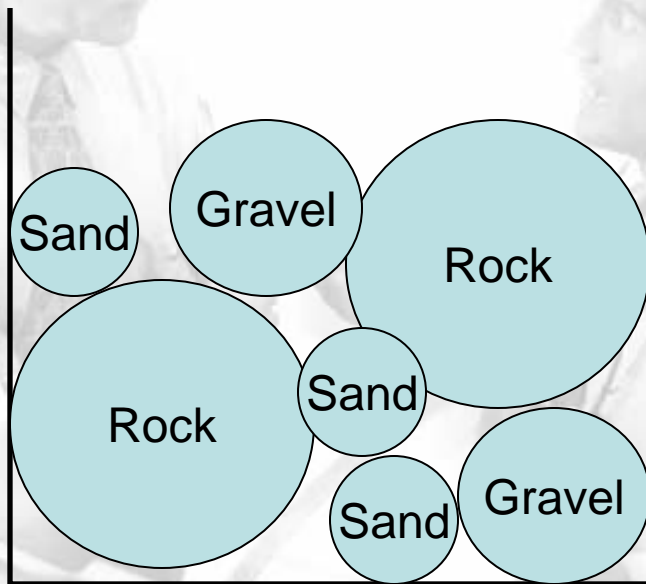
C C C

Fri

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# The Glass Jar



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## Schedule with Priorities

	Mon	Tue	Wed	Thur	Fri	Mon	Tue
Resource 1	B	A	C	C	C		

A

Wed

B

Thurs

Rock = Priority 1

C C C

Fri

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# SCHEDULING IN VISUAL

Two components of a schedule are

Capacity

The time I've got

Load

The time I need

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# SCHEDULING IN VISUAL ELEMENTS OF CAPACITY

## Calendars

- describe the normal working days, starting time, number of shifts, and shift duration of the manufacturing facility or a particular resource.

## Calendar Exceptions

- describe deviations from the normal working days, starting time, number of shifts and shift duration of the manufacturing facility or a particular resource.

## Resources

- What has the capacity you want to schedule

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# SCHEDULING IN VISUAL

Day of Week	1st Shift Start	Shift 1	Shift 2	Shift 3
Saturday		0.00	0.00	0.00
Sunday		0.00	0.00	0.00
Monday	07:00:00	8.50	8.50	7.00
Tuesday	07:00:00	8.50	8.50	7.00
Wednesday	07:00:00	8.50	8.50	7.00
Thursday	07:00:00	8.50	8.50	7.00
Friday	07:00:00	8.50	8.50	12.50

Delete Selections

Treat All Release Dates As Hard In All Schedules  
 Use All Supply Before Applying Lead-Time In Material Checks

Scheduling Notch Size in Minutes (1 to 6, or 10)

- Some companies leave an open shift each week to ensure they meet the schedule by week's end.

# SCHEDULING IN VISUAL

Resource Calendar Exceptions

Schedule ID: All Resource ID: PRESS 15

Start Date	End Date	1st Shift Start Time	Shift 1 Duration	Shift 2 Duration	Shift 3 Duration	Shift Capacity
02-Jan-2006	02-Jan-2006	07:00:00	8.50	8.50	0.00	
03-Jan-2006	03-Jan-2006	07:00:00	8.50	8.50	0.00	
04-Jan-2006	04-Jan-2006	07:00:00	8.50	8.50	0.00	
05-Jan-2006	05-Jan-2006	07:00:00	8.50	8.50	0.00	
06-Jan-2006	06-Jan-2006	07:00:00	8.50	8.50	0.00	
07-Jan-2006	07-Jan-2006	07:00:00	8.00	8.00	8.00	
08-Jan-2006	08-Jan-2006	07:00:00	8.00	8.00	8.00	
09-Jan-2006	09-Jan-2006	07:00:00	8.50	8.50	0.00	
10-Jan-2006	10-Jan-2006	07:00:00	8.50	8.50	0.00	
11-Jan-2006	11-Jan-2006	07:00:00	8.50	8.50	0.00	

Save Close Insert Delete

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# SCHEDULING IN VISUAL

## GENERAL CALENDAR January

SUN MON TUE WED THU FRI SAT

	<b>1</b>	<b>2</b> 24	<b>3</b> 24	<b>4</b> 24	<b>5</b> 24	<b>6</b>
<b>7</b>	<b>8</b> 24	<b>9</b> 24	<b>10</b> 24	<b>11</b> 24	<b>12</b> 24	<b>13</b>
<b>14</b>	<b>15</b> 24	<b>16</b> 24	<b>17</b> 24	<b>18</b> 24	<b>19</b> 24	<b>20</b>
<b>21</b>	<b>22</b> 24	<b>23</b> 24	<b>24</b> 24	<b>25</b> 24	<b>26</b> 24	<b>27</b>

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# SCHEDULING IN VISUAL

## WHAT TO SCHEDULE - RESOURCES

### Bottlenecks

- The most common error is to try and schedule everything. Only the bottlenecks matter.



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# SCHEDULING IN VISUAL

## WHAT TO SCHEDULE - RESOURCES

### People vs. Machines

- In a press shop we schedule presses (machines) because the operator is a given. This is the most common scenario in repetitive manufacturing.
- Some companies have more machines than operators so they are scheduling skills. This is the most common scenario in a job shop.

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# SCHEDULING IN VISUAL

## WHAT TO SCHEDULE - RESOURCES

What are your resources

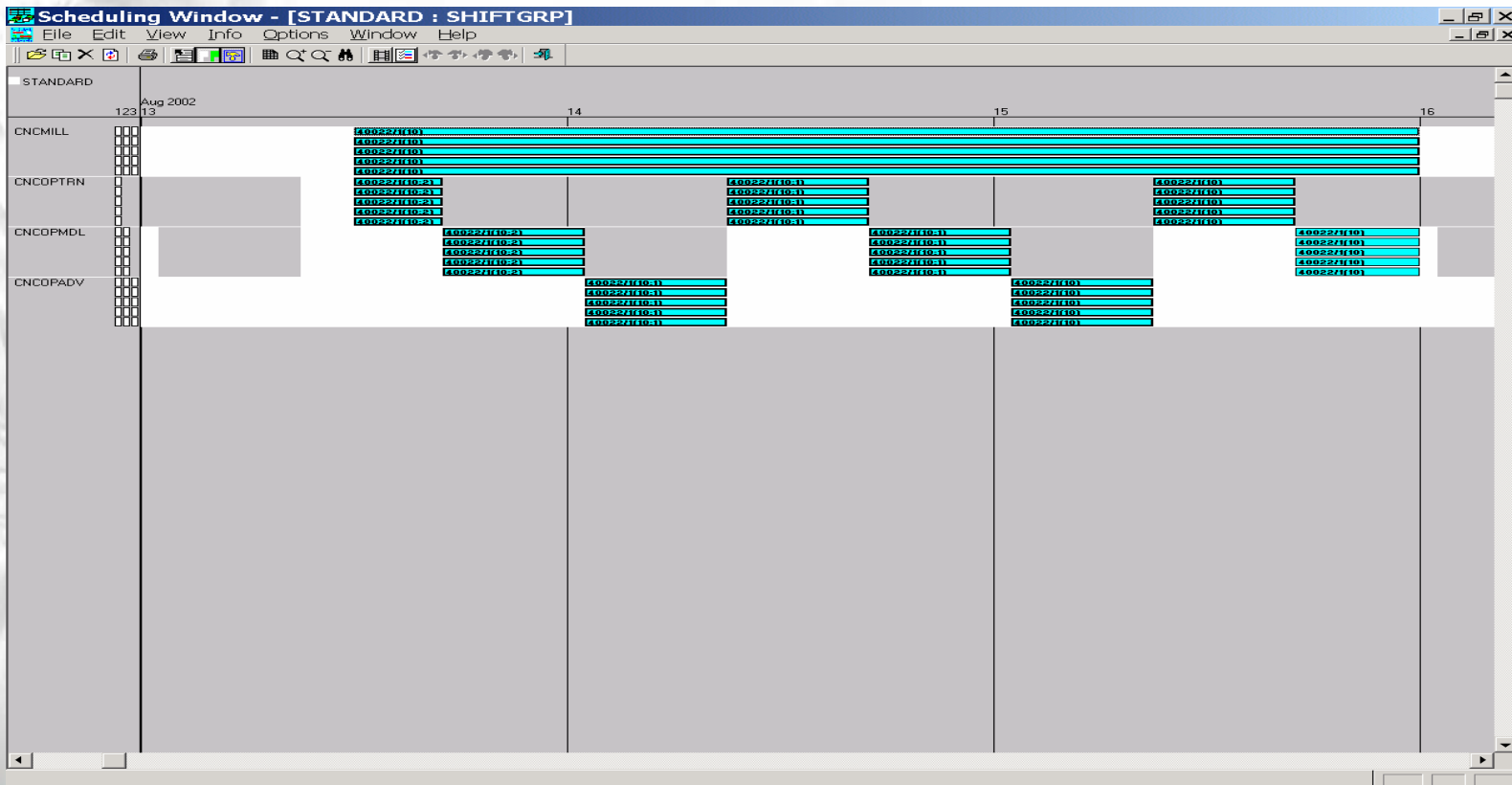
- Don't have more resources than you need. Think of work cells or production lines. Use groups.
- If you are scheduling people then do it by skills. Use groups. Use schedule members by shift.
- The fewer the resources the more accurate you will be.

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# SCHEDULING IN VISUAL

- Schedule Resources by Shift within a Group





# SCHEDULING IN VISUAL

## WHAT TO SCHEDULE - RESOURCES

Operation - M J123 Seq# 10

File Edit Info Options Macro Window Help

Type: STAMPING Resource ID: PRESS 11 LEXN 100 TON  
Operation Seq #: 10 Service ID:

Setup/Run Other Costs Advanced Scrap/Yield Service Quotes User Defined

<Resource ID>	Description	Setup	Run	Dur%	At Sta
→ INSPECT	INSPECTION	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	100	<input checked="" type="checkbox"/>

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# SCHEDULING IN VISUAL

## WHAT TO SCHEDULE – ORDERS

This is the load part of the equation. It is the demand placed on the capacity.

Keep the number of orders on the schedule to a minimum. It reduces your workload and increases your accuracy.

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# SCHEDULING IN VISUAL

## WHAT TO SCHEDULE – ORDERS

### Planned Orders vs. Firmed Orders

- In a repetitive MRP environment the planned order is fine. Only firm it up as it becomes necessary.

### Firm/Released vs. Unreleased

- In a job shop/multiple leg environment you should keep legs unreleased until necessary.

# SCHEDULING IN VISUAL

Material Planning Window - [J106]

File Edit View Info Options Notes Window Help

Part ID: J106  
ANTENNA CLIP FEEDER

General Codes Part Info Summary Dr

Primary Warehouse: AMSC  
Primary Location: STOCK

Material Planning Window - Search

Part qualifications

Warehouse ID: [Dropdown]

Part ID: [Text]  
Description: [Text]  
Planner user ID: [Text]  
Buyer user ID: [Text]  
Planning leadtime: [Text]  
On hand quantity: [Text]  
Primary Warehouse ID: [Text]  
Preferred Vendor ID: [Text]  
Manufacturer: [Text]  
Manufacturer Part ID: [Text]  
Product code: [Dropdown]  
Commodity code: [Dropdown]  
Fabricated: Fabricated [Dropdown]  
Purchased: Not Purchased [Dropdown]  
MRP is required: Don't care [Dropdown]

MRP exceptions

Exception qualifications (last MRP run)

Issue is late by: [Text]  
Order is late by: [Text]  
Release is late by: >0 [Text]  
Sugg release is late by: [Text]  
Order projected early by: [Text]  
Order projected late by: [Text]  
Stockout by: [Text]  
Overstock by: [Text]  
Release near:  True  
Sugg release near:  True

Part must have ALL of these attributes (and)  
 Part may have ANY of these attributes (or)

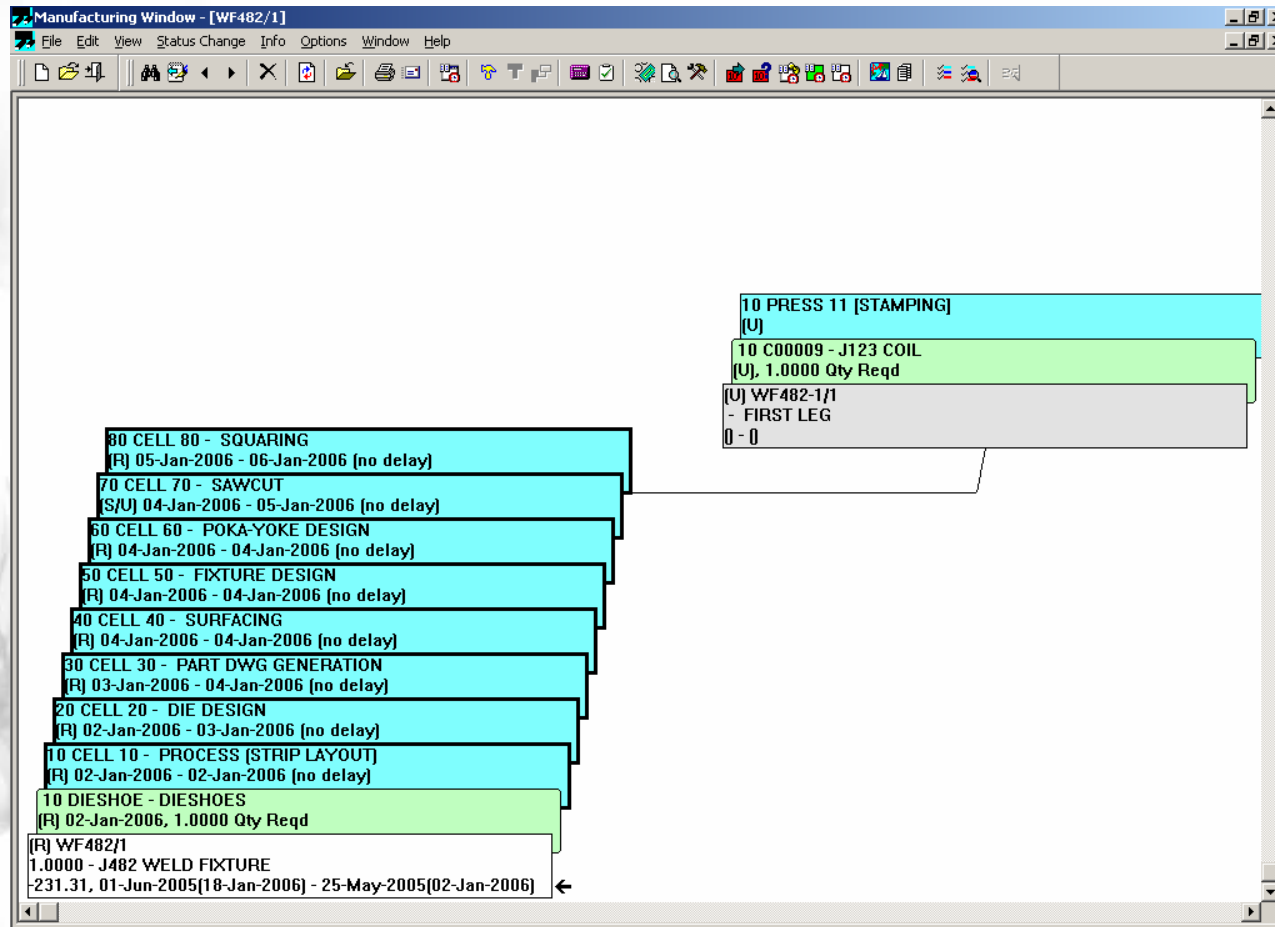
Search Clear Save QBE

Enter any combination of information you wish to search on.  
Use wildcard specifications (%x\_x%) or prefixed operators (>.>=<.<=).

Demand Warehouse	Date Required	Total Qty Required	PL WE246A/14	1,290,039						
AMSC	07-Dec-2005	5,000								
TN	03-Jan-2006	5,000								
AMSC	03-Jan-2006	5,000								
AMSC	06-Jan-2006	5,000								
AMSC	06-Jan-2006	7,800								
TN	09-Jan-2006	5,000								
AMSC	09-Jan-2006	5,000								
TN	12-Jan-2006	5,000								
AMSC	13-Jan-2006	8,600								
TN	19-Jan-2006	5,000								
AMSC	20-Jan-2006	8,600								
TN	26-Jan-2006	5,000								
AMSC	27-Jan-2006	8,600								
AMSC	03-Feb-2006	8,600								
AMSC	10-Feb-2006	8,600								
AMSC	17-Feb-2006	8,600								
AMSC	24-Feb-2006	8,600								
AMSC	03-Mar-2006	8,600								
AMSC	10-Mar-2006	8,600								
AMSC	17-Mar-2006	8,600								
AMSC	24-Mar-2006	8,600								
AMSC	31-Mar-2006	8,600								
AMSC	07-Apr-2006	8,600	0	8,600	PL WE246A/14	1,290,039				
AMSC	14-Apr-2006	8,600	0	8,600	PL WE246A/15	1,281,439				
AMSC	21-Apr-2006	8,600	0	8,600	PL WE246A/16	1,272,839				

Start | C:\D... | VISU... | Appli... | swo... | Sche... | SCH... | Man... | Mat... | Mat... | 19:48

# SCHEDULING IN VISUAL



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# SCHEDULING IN VISUAL

## HOW TO SCHEDULE


### Forward vs. Backward

- The Visual default is to backward schedule. Almost all manufacturing environments are forward schedule.

### Check Materials

- It depends. Usually not. Depends on your industry type.

# SCHEDULING IN VISUAL



**Work Order Header**

Type  
 Engineering Master  Work Order  Quote Master

Part ID   New Part

Part Description

Warehouse ID

Base ID/Job ID

Eng ID/Lot ID

Split ID

Release Date

Want Date

Quantity

Specifications

General | User Defined

Engineered By

Engineered Date

Drawing Number

Drawing Revision

Drawing File

Product code

Commodity code

Traveller Printed

Current Part Stage

Current Part Rev

Forward Schedule from Release Date

Treat Release Date as Hard

Blanket Order

Co-Products Variables ECN Detail Doc Ref

Pict/Object Macros G/L Accts

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# SCHEDULING IN VISUAL

## HOW TO SCHEDULE

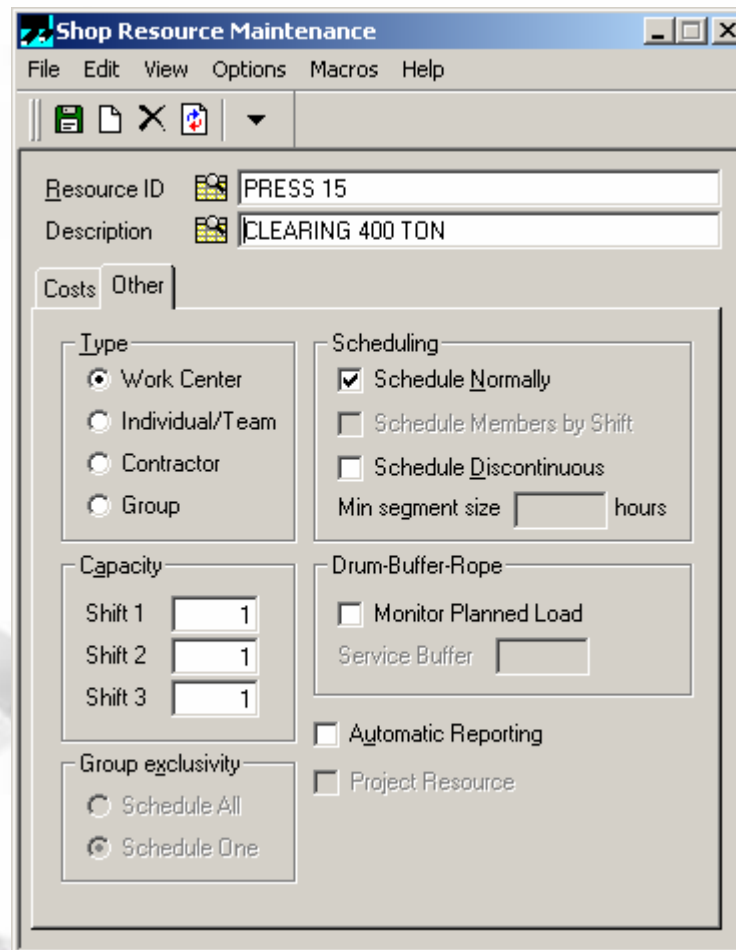
### Finite vs. Infinite

- An infinite schedule can be used to find the earliest date an order can be done but the standard schedule must be finite.

### Schedule Normally

- Turn this off on a resource to fake an infinite schedule for that resource.

# SCHEDULING IN VISUAL



The screenshot shows the 'Shop Resource Maintenance' window with the following configuration:

- Resource ID: PRESS 15
- Description: CLEARING 400 TON
- Costs: Other
- Type:  Work Center,  Individual/Team,  Contractor,  Group
- Scheduling:  Schedule Normally,  Schedule Members by Shift,  Schedule Discontinuous, Min segment size: [ ] hours
- Capacity: Shift 1: [ 1 ], Shift 2: [ 1 ], Shift 3: [ 1 ]
- Drum-Buffer-Rope:  Monitor Planned Load, Service Buffer: [ ]
- Group exclusivity:  Schedule All,  Schedule One
- Automatic Reporting:  Automatic Reporting
- Project Resource:  Project Resource

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# SCHEDULING IN VISUAL

## HOW TO SCHEDULE

Work Order Priority

- Sand Gravel Stones.....


Fit Tolerance

- Keep it loose

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# SCHEDULING IN VISUAL



**Preferences** [X]

Options | After forward pass | Allocations | Material

Schedule Horizon  days

Fit Tolerance  percent

Schedule pieces if run minutes per piece is at least

Schedule only remaining setup time

Generate

Work order audit       Throughput audit

Operation audit

Sort by

Order want date       Priority, create date

Priority, want date

When "schedule as of" is today

Default "at time" to midnight

Default "at time" to current time

Schedule started work orders

Normally

First, don't freeze started operations

First, freeze started operations

Ok

Cancel

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# SCHEDULING IN VISUAL

## MAINTAINING THE SCHEDULE

Look At It

- Neglect is not cure. Issue the Dispatch Reports and find out why they don't work.

Fix It

- Fix run rates
- Fix your due dates

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# SCHEDULING IN VISUAL

## MAINTAINING THE SCHEDULE

Clean Up The Dust Bunnies

- Under-produced work order don't close on their own.....

Report What You Did

- Auto Reporting
- Barcoding

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## Improving your Schedule

- *The Scheduling Window is telling me to run some jobs first even though they are not the ones we need.*
- *There are a lot of little jobs that the Scheduling Window says I should be completing even though they are done.*
- *Operations are not scheduled to run concurrently*
- *I have four welders but the job only uses one even though it could use all four.*
- *For some operations I need to schedule more than one resource. For instance I may need to schedule the press and the tooling at the same time.*

## Improving your Schedule (2)

- *The schedule seems to want to start my first job last*
- *There are so many resources on my Scheduling Window display that I have to scroll up and down to see what I need to see for my department.*
- *I have so many resources to schedule that I don't seem to have time to review them all.*
- *I'm forward scheduling all jobs but my work order refuses to start earlier*



## Continuous Return on Investment

Infor continues to enhance its products in response to evolving customer needs.

Shop 9000 continues to deliver new tools and techniques to help customers use Infor's VISUAL Manufacturing more efficiently.

This combination allows customers to *'continually'* improve their business.

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