Discrete Work Order Line Scheduling

By Jim Evans

E1 *Editor's Note: Make the most of your production line scheduling with standard functionality found in JD Edwards® Manufacturing. Jim Evans demonstrates how to use the Line Sequencing Workbench to maximize production and minimize setup and cleanup time, based on the capacity of your Work Centers. Jim walks us through two scenarios: one Production Line to Work Center and one Production Line to multiple Work Centers.*

Introduction

Standard JDE® Work Order Scheduling is infinite, meaning it does not take the capacity of the Work Center into account when the Work Order is suggested. The Work Order Start and Request Dates are normally determined by MRP, or by a Sales Order line date (if line type "W" is used to create a work order from a Sales Order line).

Capacity checking is subsequently performed with the Capacity Planning batch application, which compares work center capacity to the load of scheduled Work Orders by time period. Work Order dates are then manually adjusted, often resulting in Capacity Planning regeneration until the results are satisfactory. While this process works, it is time consuming but still does not provide any assistance in determining the best sequence for open Work Orders.

Situation

The Production Shop Floor scheduler needs to know how to schedule open Work Orders through the multiple Work Centers on the shop floor. The standard JD Edwards Discrete application, Dispatch List (see Figure 1), does satisfy a basic need by displaying open work orders in date sequence by Work Center.

So what is wrong with this? For some companies, this application is satisfactory. But in other companies, it may not be enough as the Dispatch List offers no indication of the Work Center's load relative to the Work Center capacity. In other words, it does not reflect the reality of what can be made and when. Granted, the JDE planning system does provide Resource Requirements Planning to validate the practicality of the Forecast. JDE also provides Capacity Planning generation to indicate capacity problems (over or under capacity) for open work orders, which require manual date change.

Manufacturing companies that have higher requirements for scheduling accuracy and cost reduction need more detailed information from their shop floor system. They need the following benefits of finite forward scheduling:

- Forward scheduling of work orders in a preferred sequence, based on item characteristics

- Display of when work orders can be made by comparing work order time consumed to work order capacity, per shift and per day

- Minimal setup and cleanup time between work orders

Order Number	Type	Oper Seq	Oper Status	Start Date	Reqd Date	Remaining Machine Hours	Remaining Labor Hours	Remaining Setup Hours	Remaining Quantity	UM	Item Number
451039	WO	30.00		6/7/2005	6/7/2005		5.00	.20	20	EA	2005
							5.00	.20			
451021	WO	20.00		6/8/2005	6/12/2005	1.04		.50	10	EA	2004
						1.04		.50			
452437	WO	20.00		6/15/2005	6/24/2005	52.06		.50	510	EA	2004
						52.06		.50			
451645	WO	20.00		6/29/2005	6/29/2005	20.00			1		E300

Figure 1: Dispatch List

Solution

Is there a way to use basic JDE manufacturing applications to provide finite forward scheduling of work orders? The answer is "yes". If manufactured assemblies have some common characteristics that can identify a preferred sequence through a Work Center, then the JDE Line Sequencing Workbench application may be a big benefit to your shop floor scheduling needs.

Line Sequencing resides in the Shop Floor, Daily Processing - Repetitive menu (G3115). Repetitive Scheduling is designed to work in more continuous manufacturing operations with more dedicated work lines for similar assemblies. One example would be ballpoint pens. The same type of pen is made on the same line, scheduled by color, over specific time periods, such as a week.

Line Sequencing can be used as an enhancement to the infinite Capacity Planning applications. In other words, you can still get a rough-cut look at your capacity situation by work center, and then refine it by using Line Sequencing.

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The following examples will demonstrate how to use the repetitive processes, realizing some very practical shop floor scheduling benefits.

Two Scenarios

To get a better understanding of this concept, we are going to look at two examples in some detail:

- "One production line to one work center" involving wine bottling

- "One production line to many work centers" involving woodworking

One to One: One Production Line per Work Center

The first scenario looks at a beverage manufacturer that has a two work order requirement. The first work order is used to mix ingredients in batches to create the blended beverage. The second work order is used to bottle finished products in different sized bottles.

There is a one-to-one relationship of the Work Center to the Production Line. The scheduling characteristics for bottling are bottle contents (type of wine) and bottle size and shape.

The primary requirement of this wine bottling company (as is the case with many other products) is to move from light to dark colored wines. This minimizes the time and cost of cleaning the production line, because thorough cleaning only needs to be done after the darkest color has been bottled, before production starts again with lighter colors. This change over is relatively quicker, and therefore a cost savings.

The secondary sequencing requirement is to group the color of wine by bottle type, since fixtures need to be changed in the bottling line when bottle shapes are changed. This change over consumes more time, which is the reason for making it the secondary sequence.

As expected, this approach will require some very specific setups:

- Item Category Code Values added to represent colors and shapes

- Work Order Entry Processing Option changed

- Work Center "Production Lines" created

- Routing field information added

- Line – Item Relationships created

- Line Capacity defined

Let's assume that Work Centers already exist for discrete Work Orders. In order to utilize Line Sequencing, we are going to create a one-to-one relationship between a work center and a production line. Production Line FL-1 will be related to Work Center FW-1 and Line FL-2 to Work Center FW-2.

Let's first take a look at the end result, to see where we are going, and then look into the detail.

The "Line Sequence" view shown in Figure 2 displays open work orders for one Production Line, scheduled by the WO Category Code 1 and 2 values, taking into consideration the capacity of the work center by shift and day.

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