Following the path -- from FCS to APS to SCS

The First Step in the Path – FCS to APS

Most ERP/MRP systems have a Capacity Requirement Planning (CRP) module, that uses a coarse 'buckets of capacity' model in an attempt to indicate capacity overloads. This does not take account of the sequencing of the work within the capacity buckets, and gives no facilities for taking account of late breaking news on existing orders or new ones arriving. This is why many MRP suppliers have added some form of graphical and interactive tool to replace CRP, either by offering tools like Preactor as an integrated part of their own package or developing their own. So, now Finite Capacity Scheduling (FCS) is doing a good job producing better sequencing and achievable schedules, that allow companies to be more agile responsive whilst maintaining customer service levels.

However MRP systems work in a way that can prevent many FCS supplier from providing an Advanced Planning and Scheduling (APS) solutions, where the scheduling systems takes into account both the availability of materials and resources whilst generating the scheduling. This is because most ERP systems take customer orders and break them down into individual parts using a Bill of Material (BoM), then aggregate the requirements for the parts into works and purchase orders. The relationship between a work of purchase order for a part and the customers is lost in this process.

To provide APS functionality the scheduling system must understand these relationships in order to know how to sequence the works/purchase orders to make, say an assembly. For example, you need to make the frame and making the frame and wheels (the process route), and the purchase lead-time for the saddle.

APS systems have traditionally been very expensive because they often duplicate MRP functionality, re-blowing the BoM to understand the links between works/purchase orders. They can also duplicate ERP functionality including forecasting systems, distribution software, so the software ends up as US$100,000+. In fact some consultants question whether you should install ERP before APS or vice-versa.

The cost of the software involved puts APS outside of the budget for most companies. In addition, the complexity of the APS system and its duplication of ERP functions means that you have to collect a lot of data to make the whole thing sing and installation can be long, frustration and expensive.

Preactor has always majored on enhancing ERP/MRP functionality rather than duplicating it, and this is also true of the APS functionality in Preactor APS. The static Material Control (SMC) module builds the relationships between the works/purchase orders during the download from MRP, thus allowing a true APS schedule to be generated. With Preactor APS costing less than US$20000, this brings APS to the masses.

The route from here can split into two parallel paths, the first is the enhancement of APS into Dynamic Material Control (DMC), and the second is the extension of APS beyond the boundaries of your organization to give you Supply Chain Scheduling (SCS).

The Second Step – Dynamic Material Control

Currently APS fixes the relationship between the works/purchase orders during the BoM explosion or during the download from the MRP system. The drawback of this is that if something change, you may want to re-allocate materials from one works order to another. In our bike example say the frames cannot be made in time, you may wish to re-allocate those 'spare' wheels and saddles to another order, rather than have them sitting in stock waiting for the frames.

We might not like this 'pinching from Peter to pay Paul' but it's a fact of life, and 'robbing' components from a delayed order to satisfy another has been with us since the concept of production control was invented. What we need is tot allocate materials, parts etc, as the schedule is being generated rather than fixing the links by pre-processing before the schedule is built. This can be considered as 'legalized robbing' based on company rules, or 'dynamic pegging' of components to assemblies.

Preactor APS has an optional module that includes this concept of Dynamic Material Control whereby the linking between works/purchase orders is carried out furing the scheduling run. During re-scheduling the planner can decide whether to keep the existing links or re-allocate the materials because a problem has occurred. As a by-product this gives traceability of which materials and components go into which customer orders.

The Third Step – APS To SCS

The next step is to extend the APS and DMC principles to the whole of our supply chain. You, your suppliers and sub-contractors are all part of the 'Team' that is endeavouring to supply the end user with the goods they require. This introduces the concept of 'teamworking', where the schedules of your plant and those of your suppliers and sub-contractors need to be synchronized, to provide the service levels your customers require.

In the past such Supply Chain Management solutions have used a single high level model of the entire supply chain. This model is not accurate enough to take into account the current and future workloads of the entire team, since much of the work of your suppliers and sub-contractors is not related to you, and cannot be included in your supply chain model.

The solutions to this problem is to make the APS system of each member of the supply chain available to all the other members, so that complete Supply Chain Scheduling (SCS) becomes a reality. In our example we would automatically interrogate the APS system maintain by the supplier of our saddles about saddle availability, and includes this data in our own APS schedule. Although we don't know the details of the saddles supplier's entire workload, we do know that it has taken into account in the delivery response that we have based our schedule on.

In a similar way, if we have to send the bike frames out for sub-contract plating, the workload of our sub-contractor plater will be taken into account when we produce our schedule.

The Preactor SCS Server (SCS 400 and SCS 500), due for release later in 2001, provide this functionality as an addition to an existing Preactor system. The SCS 400

provides Capable to Promise (CTP) or make to order functionality which is suitable for sub-contractors such as our plate above, while the SCS 500 uses the DMC techniques to provide true Available To Promise (ATP) functions, taking existing stocks into account.