



## THE PACEMAKER STAGE

### *CONTROL POINT IN A LEAN SUPPLY CHAIN*

### by Bill Belt

How can you know in advance if customer demand will be covered, if a specific customer order will be delivered on time or not? In a factory, the Master Production Schedule lets the human planner know. But when configuring supply chains, and sending production outside or offshore, people often forget this essential control point.

One metalworking company, which like machine its parts in-house, decided like many others to externalize its machining, to reduce costs. Closing the loop on the MPS, relatively easy when everything was on site, has become much more complicated. For one thing, the subcontractors don't have the same level of knowledge for planning nor the same culture for meeting the dates. Some don't even have a planning system, their computer programs being limited to calculating the cost of shop orders.

Another company, wishing to profit from lower costs in certain faraway countries whose direct labor costs were 40 times lower, sent offshore all of its operations of this type. Since that day, the company has never earned a profit. The Master Production Schedule, which had worked well previously, has become the last thing on their minds, far behind their worries with Quality and logistics.

A third company completely reconfigure it supply chain, all the way from raw material cutting through fabrication and including final assembly and delivery to logistic platforms for distribution. The financial analysis promised cost reductions of around 50%.

The reality has been completely different. In addition to offshoring the operations, the human responsibility for covering customer demand was offshored as well although this was not clearly perceived at the outset. The real MPS—the pacemaker stage which sets the pace for the whole upstream supply chain and determines customer service for the downstream supply chain—is located in a low-cost country. The customer-service catastrophe which ensued has completely erased the hoped-for savings and has caused considerable losses. Notice that the cause of the catastrophe was neither the competence nor the motivation of the people in the faraway company in the low-cost country, but rather the lack of perception of the company which had configured its supply chain for purely cost-related reasons.

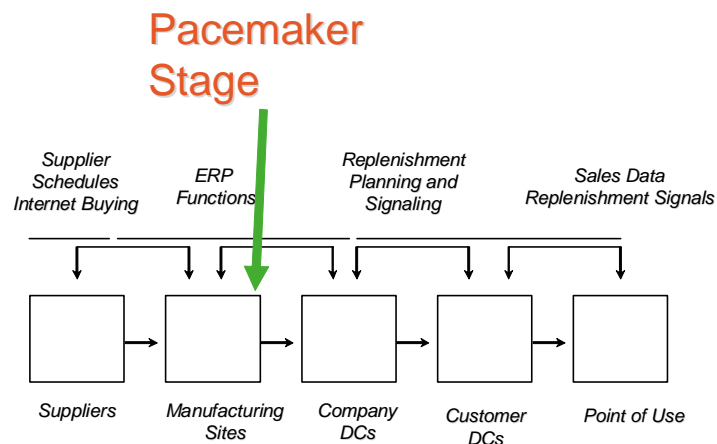
To better understand the concept of the pacemaker stage in a supply chain, let's look at the definition of a pacemaker process in a factory:

The pacemaker process is the only point in the process which will be scheduled; it is typically where customer demand arrives. It does not correspond necessarily to the bottleneck process in the Theory of Constraints. Takt and cycle time are calculated for the pacemaker process, which sets the rhythm for pulling production from upstream stages.

If the supply chain were simply one company, the pacemaker stage would be the shop or the operation managed by the MPS. In fact, the ideas of Lean Production apply just as well to the pacemaker stage as to the pacemaker process in a factory. If the pacemaker stage, wherever it may be located in the supply chain, cannot meet the takt time, or if the upstream stages cannot meet the takt time emanating through the pull signals from the pacemaker stage, the supply chain will not function well and its customer service will be poor.

In many cases, people try to create computer systems capable of managing the Master Production Schedule for distant factories. This is one of the dreams of Advanced Planning and Scheduling systems (APS). Like most dreams, it is unrealizable. In reality, the factory, or the stage in the supply chain which is the demand-capacity control point, manages its response to customer demand all by itself. Experience shows that it is next to impossible to manage the MPS at a distance, even moreso in a supply chain where the pacemaker stage may be five or six countries away.

The best configuration for a supply chain would place the pacemaker stage near customers. For example, the finish-to-order stage for European customers should be in Europe, and the one for Asian customers in Asia, even if component fabrication takes place somewhere else for economic reasons. The factory finishing to order would manage its Master Production Schedule itself, even if customer order entry were diffused throughout the downstream supply chain.



--courtesy Chris Gray, Gray Research, [www.grayresearch.com](http://www.grayresearch.com)

The supervision of the operational supply chain would be done as usual at the strategic level of the supply chain, via the Sales and Operations Planning (S&OP) process. There would be a site-level S&OP for each factory and a regional or supply-chain S&OP to manage factories as a group.