Wilson Perumal & Company

Spotlight

Plant Loading

What is Plant Loading?

The process of determining which products a firm will manufacture at which of its facilities and in what quantities is known as Plant Loading. These decisions can have far-reaching implications for the firm's operational and financial performance by impacting capacity, inventory levels, distribution costs and service levels. Understanding and balancing the trade-offs between these competing priorities will optimize Plant Loading and thus, overall costs.

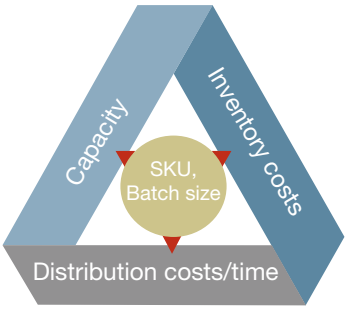

Figure 1. Plant Loading Decision Interactions

Why is Plant Loading important?

More optimal Plant Loading can help a company increase capacity and reduce overall manufacturing and distribution costs without system-wide elimination of product offerings and often without investment of additional capital. WP&C developed an approach to address the complex interactions involved in Plant Loading – one that takes a holistic view of these dynamic and cyclical processes. Understanding the trade-offs between greater production capacity and reduced inventory helps define optimal production runs and scheduling.

Most currently available plant loading applications do not dynamically model and account for the complexity of plant loading decisions. By not doing this, they do not optimize overall production efficiency and instead optimize for what they do dynamically model – typically that is distribution costs. This can lead to many products being produced at multiple locations. Additionally, master scheduling is often focused on the minimizing inventory and can result in many cut-ins on the production schedule and further erosion of production efficiency and volume.

As the production-inventory curves in Figure 2 show, longer production runs will increase production volume but will also increase inventory levels. Concentrating production with fewer products at each plant then shifts the curve down and to the right, further increasing production volume while reducing inventory levels. However, distribution costs will also rise and need to be considered when making these decisions. Our experience has shown that, depending on the industry, the additional production capacity from improved Plant Loading can be worth 20x the additional distribution/inventory costs.

Example of how Plant Loading is used?

An infant formula manufacturer was making a large variety of products (milk, soy, lactose free, organic, etc.) across plants originally built for high-volume, low-variety production. The company was capacity constrained with its large, capital intensive manufacturing plants and was forced to outsource some production, at significant cost, to meet growing demand.

By quantifying the complexity-related tradeoffs, and optimizing across capacity, inventory and distribution costs, the company was able to increase its production volumes by 10% at its existing facilities, without investment of additional capital and without changes to the overall product portfolio. The value of this additional capacity was 15x the impact on distribution and inventory costs.

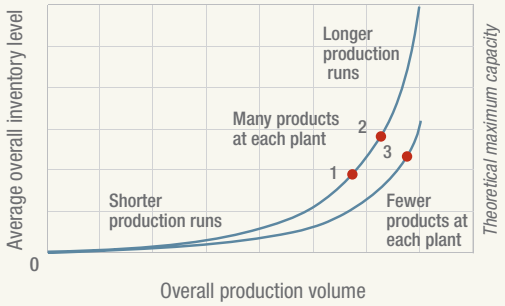

Figure 2. Shifting Production Volume-Inventory Level Curve by Changing Plant Loading