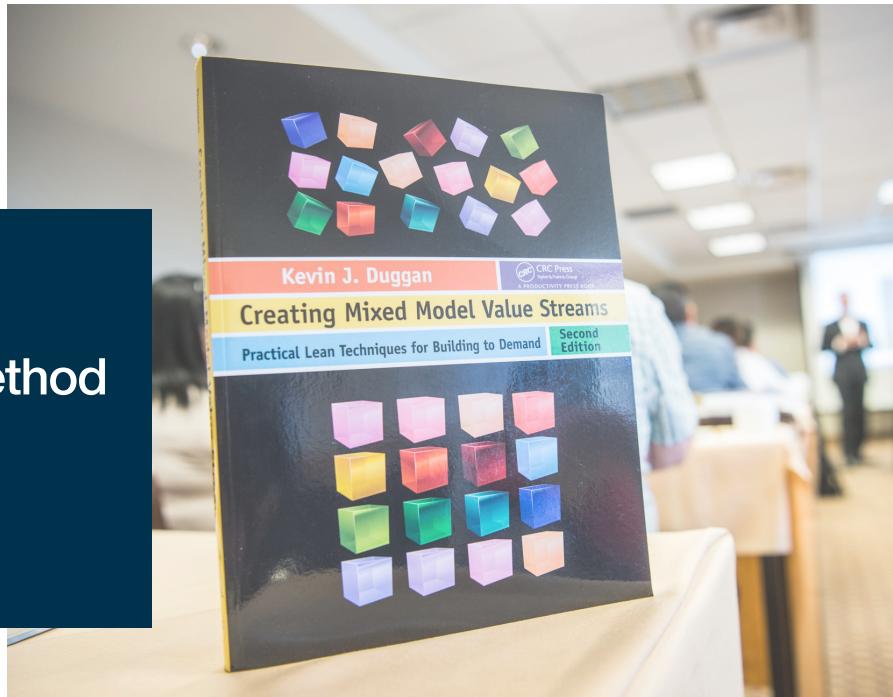


Value Stream Mapping Method for Mixed Model Flow

WHITE PAPER

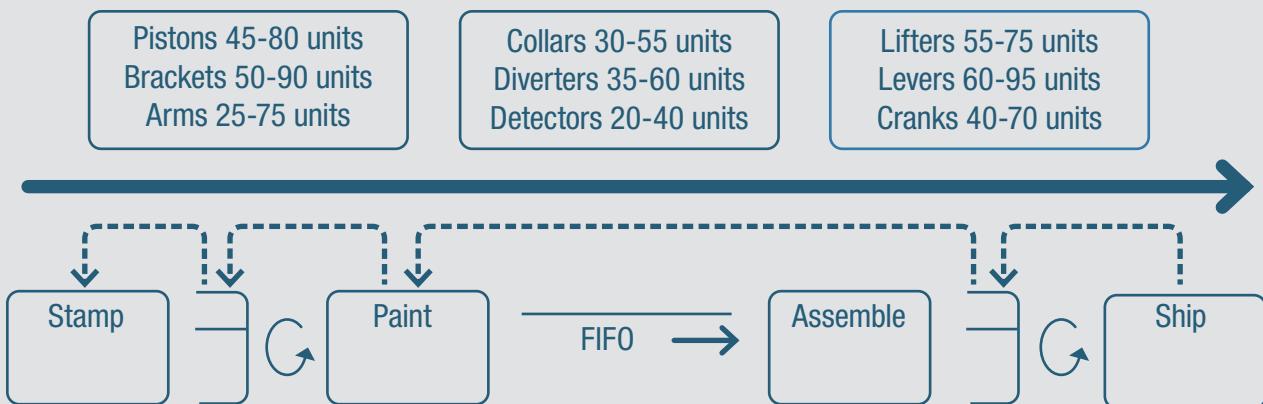


Based on the best-selling book by Kevin J. Duggan

The Impact of Product Mix on Flow

Flow is critical to achieving Operational Excellence. And while there is a lot of information available on creating flow in cells, and even in the end-to-end value stream within a factory, there is one large obstacle many companies face when trying to design flow in their operation: product mix. Product mix can have a staggering effect on flow. While products may

be grouped and shipped to the same customer on the same order, those same products grouped together raise havoc in manufacturing since they may have different cycle times, process steps, materials, and more. To address these variations, companies apply the concepts of mixed model production.



Mixed model production means producing a variety or mix of products or product variations through the same value stream at the pull of the customer. In short, it means an operation can build to demand even when the variety of products needed have different cycle times and processing steps, providing a significant business advantage. The key to establishing mixed

model flow is to create value stream maps, both current state and future state. Although value stream mapping is commonly taught to identify waste or develop an ideal state, that approach does not lead to a designed flow for mixed model, nor will it achieve Operational Excellence.

Value Stream Mapping Method for Mixed Model Flow

The value stream mapping method used to create mixed model flow is:

> **Identify product families.** Product families are groups of products that have similar process flow and similar work content. Similar means having about 80% the same process flow and less than 30% variation in work content.

> **Map the current state.** The next step is to make a current state map for each value stream that identifies “what we do and how we do it” by walking the shop floor and recording what is observed. The map captures data such as inventory quantities, cycle times, customer demand, and more.

> **Ask 10 questions for mixed model flow.** Once an organization creates the current state map, it applies a series of guidelines—not brainstorming or anything else—to it to generate the future state map.

> **Build the future state based on answers to the 10 questions.** The future state describes how the operation will perform once the guidelines have been implemented so an organization can determine its success by evaluating if the operation is performing as designed.

> **Create an implementation plan for the future state.** The final step is to create an implementation plan by breaking the future state down into implementation loops and establishing measurable goals.

Step three in this process—the 10 questions—is very important, and also where most companies go wrong, so a more in-depth review of the questions for mixed model production operations should ask during the design phase is valuable.

10 Questions for Mixed Model Flow

In some operations, following basic guidelines is enough to create robust value stream flow. However, in complex operations with many custom product variations, shared resources, and uncertain demand from day to day, operations need to design mixed model value streams by following a specific set of guidelines. These guidelines, from the book *Creating Mixed Model Value Streams*, are:

1. Do you have the right product families? Group products together based on similar processing steps and work content.

2. What is the takt time at the pacemaker? Determine the rate at which the pacemaker must produce a part to keep pace with customer demand for the product family.

3. Can the equipment support takt time? Determine if the existing machine capacity is enough to support the product family within the takt time.

4. What is the interval? Calculate how often the pacemaker will produce all the parts in the product family.

5. What are the balance charts for the products? Create continuous flow through the pacemaker by balancing work content, per operator, to takt time.

6. How will you balance flow for the mix? Determine how to handle variation within the product family at the pacemaker, either by adjusting labor, scheduling, or work balancing.

7. How will you create standard work for the mix? Establish the one best way to do a task, and then have everyone follow that method.

8. How will you create pitch at the pacemaker? Establish how often you will release and take away work from the pacemaker. Pitch is a visual management timeframe that lets you know if you are on time to customer demand.

9. How will you schedule the mix at the pacemaker?

Schedule the pacemaker to handle variation within the product family, and determine the mix the pacemaker can support.

10. How do you deal with changes in customer demand? Customer demand will vary, and you need to have a “Plan B” pre-established for when it does. “Plan B” can consist of pulling product from a supermarket, rebalancing the pacemaker, and so on.

By following the value stream mapping method outlined for mixed model flow, the end result is an operation capable of flowing a mix of parts with varying cycle times and levels of customer demand through the same value stream, all at the pull of the customer. And that is the first step in the journey to Operational Excellence.



This is an abridged version of the 10-page white paper **10 Questions to Answer Before Designing Mixed Model Value Streams** available for free on the Institute for Operational Excellence's website.

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