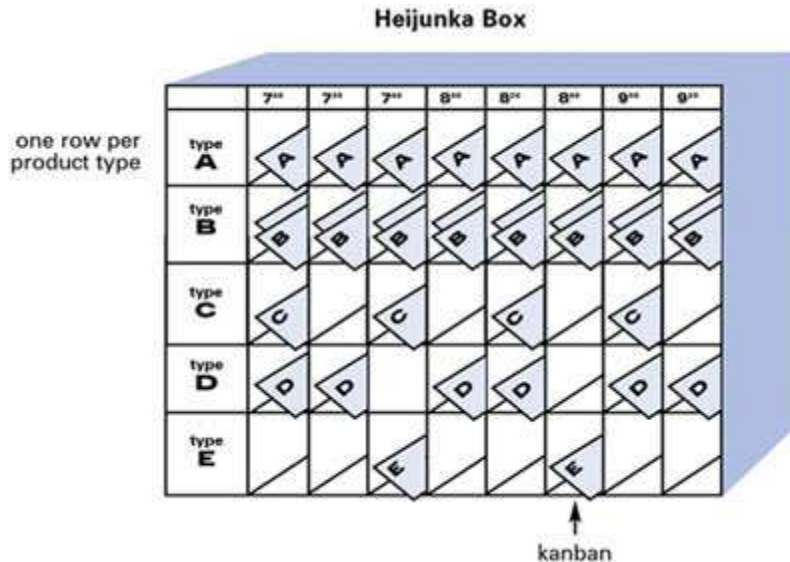


The heijunka box -- A simple tool for leveling production

For lean managers who accept the notion that leveling by volume and mix produces benefits throughout the value stream, the problem remains of how to control production so that true heijunka (leveling) is consistently achieved. Toyota came up with a simple answer many years ago in the form of the heijunka box.



A typical heijunka box has horizontal rows for each member of a product family, in this case five. It has vertical columns for identical time intervals of production, in this case 20 minutes. Production control kanban are placed in the slots created, in proportion to the number of items to be built of a given product type during a time interval.

In this example, the shift starts at 7 a.m. and kanban are withdrawn by a material handler every 20 min. for distribution to the pacemaker point along the value stream. (In a lean production system of this type, there is only one pacemaker point along the value stream where production instructions are introduced. From that point back up the stream, parts are replenished at each break in continuous flow by means of simple pull loops from upstream parts supermarkets.) In the first 20 min., the value stream will produce one kanban of Type A, two kanban of Type B, one kanban of Type C and one kanban of type D.

Whereas the slots represent the timing of material and information flow, the kanban in the slots each represent one pitch of production for one product type. (Pitch is takt time multiplied by pack-out quantity. This concept is important because it represents the minimum amount of material that can be moved from one operation to the next, and the number of items called for by a kanban are sized to this amount.)

In the case of Product A, the pitch is 20 min., and there is one kanban in the slot for each time interval. However, the pitch for Product B is 10 min., so there are two kanban in each slot. Product C has a pitch of 40 min., so there are kanban in every other slot. Products D and E share a production process with a pitch of 20 min. and a ratio of demand for Product D versus Product E of 2:1. Therefore, there is a kanban for Product D in the first two intervals of the shift, and a kanban for Product E in the third interval, and so on in the same sequence.

Used as illustrated, the heijunka box consistently levels demand by short time increments, 20 min. in this case. This is in contrast to the mass-production practice of releasing a shift's, or a



day's or a week's worth of work to the production floor. Similarly, the heijunka box consistently levels demand by mix. For example, it ensures that Product D and Product E are produced in a steady ratio in small batch sizes.

Production process stability introduced by leveling makes it vastly easier to introduce lean techniques ranging from standard work to continuous flow cells. As the mura (unevenness in productivity and quality) and muri (overburden of machines, managers and production associates) introduced by traditional production control recede, muda (waste) declines as well.

When every process is leveled by volume and mix, it is a different world for employees -- who are no longer overburdened; for customers -- who get better products on the date promised; and for manufacturers -- who get to keep the money saved when muda, mura and muri are all reduced.

About the author

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