



Lean Manufacturing—Organization

Microsoft Dynamics® AX 2012 introduces a new way of modeling lean manufacturing based on production flows that consist of process or transfer activities. The production flows help modeling and versioning of lean production scenarios and keep consistency of material flow and cost.

PRODUCTION FLOWS IN LEAN MANUFACTURING

A Lean Manufacturing scenario is usually more than an agglomeration of unrelated kanban rules or material-supply policies. The flow of material and products throughout work cells and locations for a specific production or supply scenario can be described as a sequence or small network of process or transfer activities, called a production flow.

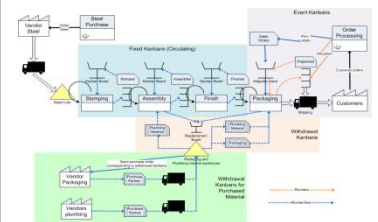
In production scenarios based on production orders, material is issued to a specific production order. During a sequence of operations, based on a bill of materials (BOM) and routes, products are created and finally received at the supplied location. The throughput time of production orders varies in ranges of minutes to weeks. All related cost, material, and labor is accumulated on the production order.

To reduce delivery lead times and excess inventory between work centers caused by batch production, lean manufacturing introduces kanban replenishment and supermarkets in manufacturing and warehouse replenishment. This usually disrupts the production of partially independent kanban cycles. The replenishment of a kanban for a semi-finished product is not triggered by an order for a finished product anymore.

To re-establish a production and cost context for the various kanban scenarios proposed in Microsoft Dynamics AX, the activity-based production flows are introduced as the backbone of lean manufacturing. All kanban rules refer to this predefined structure. The activity-based model allows the setup of a wider range of scenarios than supported by previous versions of Lean Manufacturing for Microsoft Dynamics AX—without adding complexity for the shop floor workers as all scenarios use the same activity-based user interface.

SEMI-FINISHED PRODUCTS (NON BOM-LEVELS)

Lean Manufacturing for Microsoft Dynamics AX integrates kanbans for inventoried products and semi-finished products in a single framework, offering a unified user experience for all cases. This architecture removes the need to introduce additional BOM levels to allow the usage of kanbans for semi-finished products and helps reduce inventory transactions to the minimum.



Production flow

PRODUCTS AND MATERIAL IN WORK IN PROGRESS (WIP)

The reduction of batch sizes down to the ideal state of a single piece flow in lean manufacturing can cause a dramatic increase of inventory transactions if each picking process or kanban registration causes transactions for the consumed items. The production flow architecture allows the transfer of material to the production flow with withdrawal kanbans in storage or transport handling unit sizes. The value of the issued material is added to the WIP account related to the production flow—similar to material that is issued to a production order. The same principle can be applied for products and semi-finished products. Unless they are created, transferred, or consumed within a production flow, inventory transactions are optional—not mandatory. Once the products are posted to inventory, the WIP account for the production flow is reduced by deducting by the related standard cost.

VALUE STREAMS AND VALUE STREAM MAPPING

The architecture of Lean Manufacturing for Microsoft Dynamics AX is inspired by the 5 Lean principles formulated by Womack and Jones: Customer value, Value stream, Flow, Pull, and Perfection. An approved method for implementing lean manufacturing solutions in the physical world of manufacturing is values stream mapping (VSM), introduced by Rother and Shook in their Publication “Learning to See” at the Lean Manufacturing Institute.

The result of this process, the future-state value stream can be modeled in Microsoft Dynamics AX as a production flow version. All processes of the value stream are modeled as process activities. Movements or transfers can be modeled as transfer activities if the transfer status has to be registered or if an integration to inventory picking or consolidated shipments is required.

The value stream itself is modeled as an operating unit in Microsoft Dynamics AX. This allows using the value stream as a financial dimension.

COSTING FOR LEAN MANUFACTURING BASED ON THE PRODUCTION FLOW

The periodic consolidation of the cost for a production flow corrects the related WIP account and allows determination of variances for the products supplied by the production flow.

CONTINUOUS IMPROVEMENT

To better support continuous improvement, the production flows are implemented in time-effective versions. This allows copying an existing production flow version, including all related kanban rules, to a future version of the production flow, and modeling the future-state production flow before validating and activating it for production. Existing kanbans from old production flow versions are automatically related to the new version to ensure a seamless material flow on the transition date and beyond.

The 5 Lean Principles:

- *Customer value*
- *Value stream*
- *Flow*
- *Pull*
- *Perfection*

SIMPLICITY

It can be discussed whether an implementation of lean manufacturing should be necessarily very simple to set up. However, for more advanced requirements, a framework that is too simple leads to usability restrictions and in the worst case to inconsistencies and redundancies. For the implementation of Lean Manufacturing for Microsoft Dynamics AX 2012, we have chosen the production flow and activity approach that allows modeling of simple and complex production scenarios in a single scalable architecture.

A closer look at the activity concept reveals a new simplicity for the users that really need it: the shop floor and logistics workers. By reporting against activity-based jobs instead of inventory transactions, a unified user interface for all lean manufacturing variants transfers the business complexity from the user interface to where it belongs: the production flow as the backbone of lean manufacturing.

Microsoft Dynamics is a line of integrated, adaptable business management solutions that enables you and your people to make business decisions with greater confidence. Microsoft Dynamics works like and with familiar Microsoft software, automating and streamlining financial, customer relationship and supply chain processes in a way that helps you drive business success.

U.S. and Canada Toll Free 1-888-477-7989

Worldwide +1-701-281-6500

www.microsoft.com/dynamics

CCAX2012BV073

© 2011 Microsoft Corporation

Microsoft