LIFECYCLE INSIGHTS

REALIZING VALUE FROM MBD INITIATIVES

5 Best Practices for Launching a Successful MBD Initiative

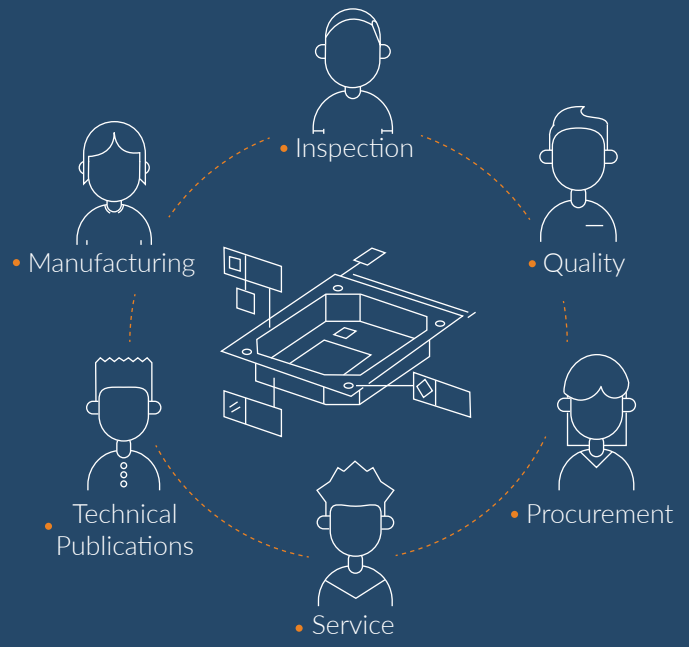
INTRODUCTION

To better balance time and complexity across the product development process, many manufacturers are looking to model-based definition (MBD) initiatives, or the practice of using 3D models with embedded product and manufacturing information (PMI) instead of traditional 2D drawings. Engineers can use an MBD to guide a wide variety of product development activities including sourcing, quality assurance, inspection, and the creation of instructions and other technical publications.

Certainly, manufacturers that wish to adopt an MBD initiative successfully need the right solution to support MBD creation and consumption. That said, they also need to think far beyond simply installing new software applications. To start, companies need to get executive leadership buy-in, and educate the workforce on the use and advantages of these innovative practices.

This eBook outlines how manufacturers can quickly and effectively get value out of an MBD initiative. It details how the engineering organization and other functional departments should create and consume the MBD to achieve consistency and success.

A reduced annotation initiative can decrease the documentation workload on engineers by asking them to only add PMI that will be used later in the product development process.



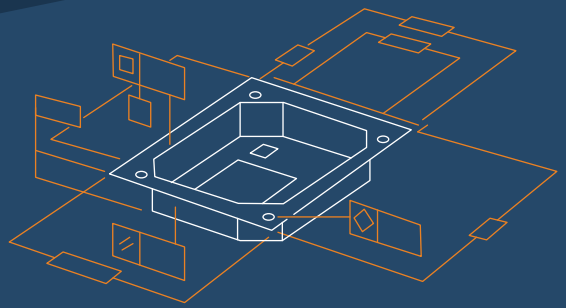
START IN ENGINEERING THE RIGHT WAY

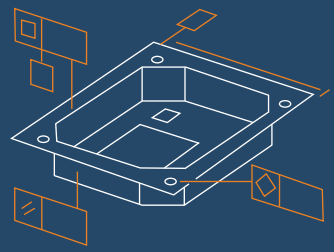
In the traditional 2D drawing approach, engineers painstakingly add dimensions to spatially locate every piece of geometry in any product design. With an MBD initiative, however, the design's geometry is automatically and explicitly located within the model, so there is a reduced need to add additional dimensions. This saves engineers considerable time and frustration.

An additional reduced annotation initiative is useful here. A reduced annotation effort shifts the engineering organization's responsibility for spatially locating every aspect of a design's geometry to simply adding the dimensions and tolerances required to verify manufacturing conformance.

Specifically, engineers need only add product and manufacturing information (PMI) if other functional departments will require it later in the product development process for other tasks.

Adopting a reduced annotation effort alongside an MBD initiative can quicken the pace of the engineering design and development process. This requires more upfront investment and time, but the rewards across the entire enterprise are worth it.





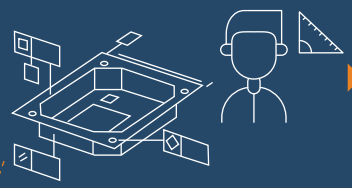
A reduced annotation initiative compliments an MBD initiative. It allows engineers to add a smaller amount of PMI that would be used later in the product development process.

TRANSITION TO MODEL-BASED PROCESSES

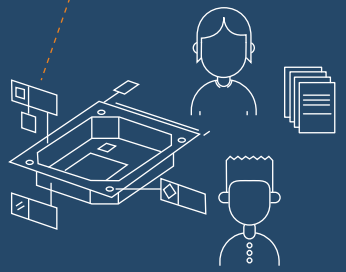
Too often, engineering teams will produce an MBD, only to have other functional departments treat the deliverable just as they would a traditional design drawing. In fact, some companies will even print out a series of views from the MBD to share with downstream departments. This misses the point, and these companies are squandering an opportunity to realize massive value.

The better approach is to employ new, model-based processes that are built to receive, access, view, and interrogate an MBD. Such processes will take different forms across manufacturing, procurement, quality, inspection, and technical publication steps. Yet, in each case, they help functional departments get the most value from an MBD.

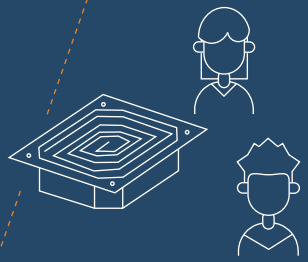
The adoption of model-based processes is a change for other functional departments. However, over time, it actually reduces the burden of interpreting design documentation. Workers in other departments are able to work with a clearer, less ambiguous definition of the design, reducing errors and potential delays that might arise from a misinterpretation.



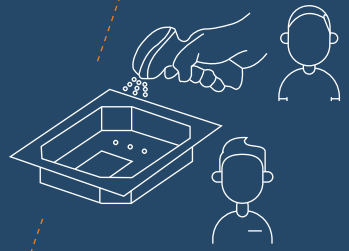
Engineering develops MBD.



Procurement uses MBD in RFQ process.



Manufacturing uses MBD to create tooling and NC toolpaths.



Quality uses MBD to inspect manufactured parts.

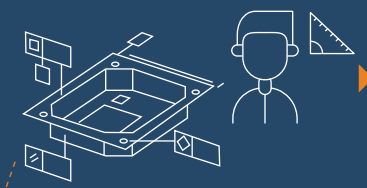
LEVERAGE SEMANTIC PMI EARLY AND CORRECTLY

Manufacturers can wring more value from an MBD approach by leveraging semantic PMI to drive automation. Semantic PMI consists of software-interpretable annotations and attributes associated with geometric entities in a 3D design model.

Today, progressive software applications can read semantic PMI and its associated geometry to automatically create deliverables including:

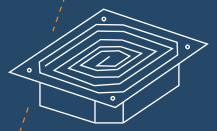
- numerically controlled (NC) tool paths,
- tolerance stack-ups,
- coordinate measuring machine (CMM) tool paths, and more.

Engineers must apply PMI to the correct geometric references to take advantage of these software capabilities. During the transition to MBD models, engineers may want to take shortcuts, relying on the same approaches they used with traditional drawings. But the details matter: Your computer-aided manufacturing (CAM) application will not understand how to read a surface finish if it has been applied to an edge. Therefore, it is essential that engineers learn how to correctly apply semantic PMI within the MBD to harness automation's many benefits.

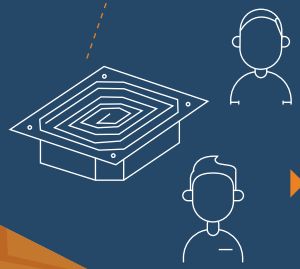


Engineering develops MBD.

Software applications read and understand PMI in MBD.



Software applications autonomously create NC toolpath.



Machinists inspect toolpath to verify it works as intended.

PROACTIVELY MANAGE CULTURAL CHANGE

Unfortunately, manufacturers can deploy the right technologies, adopt modern practices, appropriately assign responsibilities, and still fail to make the most of their MBD initiative. Cultural change is just as important to the success of any new technology-led initiative as the technology itself. Leadership is a must.

To effectively manage culture change, manufacturers need to consider several key factors. First, they must recognize and support the varied interests of leaders in functional, fiscal, and information technology (IT) organizations. Second, they must provide adequate training and support to the workforce during the change. There is great value in documenting and sharing the organization's successes along the way, especially with leadership. And, of course, it is vital to document and share evolving, standard practices so the organization can learn from earlier mistakes.

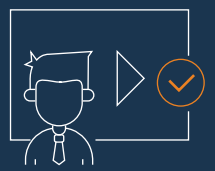
Change management is one of the most frequently overlooked aspects of adopting an MBD initiative, though it is crucial to the endeavor's ultimate outcome. It is important to invest in these areas—and engage executive leaders at the beginning of the effort—to ensure success.

- Successfully implementing an MBD initiative requires buy in from a range of owners and supporting users with training, experts, and technical support.

Functional Owner

Fiscal Owner

IT Owner



Training

Technical Expert

Technical Support

ACCELERATE THE CREATION OF DERIVED DELIVERABLES

Most manufacturers rely on a supply chain to produce products. They share design documentation with this supply chain so that it can deliver the necessary components and assemblies. So an MBD initiative needs to have supplier buy-in to succeed.

When a manufacturer has adopted an MBD initiative, suppliers providing components will need to be able to access, open, view, measure, and interrogate an MBD in order to produce those components to specifications. Savvy manufacturers can help suppliers identify potential shortcomings, and can guide them as they transition to model-based processes by sharing standard, yet evolving, model-based practices.

The switch often comes with growing pains. But by helping suppliers identify and address those issues, companies can avoid inadvertently undermining supplier participation in a model-driven development process. By addressing any issues upfront, manufacturers can smooth out the adoption of an MBD initiative for all parties.

The success of an MBD initiative often lies on the ability of a company's supply to accept and use an MBD deliverable. Work with your suppliers to assess their MBC capabilities and improve them over time.

A CHECKLIST TO GET STARTED

Starting an MBD initiative may seem daunting, but a successful transition holds significant, long-term value for manufacturers. When approached in the right way, an MBD initiative can yield results quickly. Based on our research, Lifecycle Insights recommends the following:

- Solicit support from executive leadership at the start, locating someone who can advise, support and fund the transition to model-based practices. Start the MBD initiative in the engineering department, giving the team time to become accustomed to creating an MBD with reduced annotations and semantic PMI.
- Ensure your company is leveraging an MBD-capable set of software solutions, from creating the MBD to consuming it in different applications.
- Document and share the standard, yet evolving, practices that boost productivity with your engineering and functional design teams, as well as the supply chain.
- Expand the MBD initiative into one functional department that will define and deploy model-based processes for their applications, as well as share efficiency gains with the entire enterprise. This will demonstrate the tangible benefits of an MBD initiative to the rest of the company.
- After one functional department successfully adopts a model-based process, expand by adopting a new model-based process in a different functional department.
- Select close, progressive suppliers to test the extension of your MBD initiative into the supply chain.