

## **CIMdata Position Paper #2000-2**

### **Manufacturing Process Plans: an Integral Part of Product Definition**

#### **Position:**

As companies seek to improve their ability to bring innovative products to market effectively, they must utilize comprehensive collaborative Product Definition management (cPDm) solutions. But full cPDm solutions must include capabilities to define the product process plans, not just product components, as an integral part of the product definition. Forward thinking companies are making these moves, and suppliers are beginning to offer solutions. Companies that don't recognize the importance of this evolution and expand their vision sufficiently will fall far behind their competitors.

#### **Background**

The global market and fierce competition simply won't let companies operate as they have in the past, creating product designs in isolation and then "throwing them over the wall" to manufacturing. Why? Because manufacturing often encounters difficulties when transforming designs from engineering into a finished product on the production floor: components might be unnecessarily difficult to assemble, tolerances might be unrealistic, capabilities available in machines may not be utilized or sufficient, and capabilities or constraints in resources may not have been considered.

These problems can drive up costs, waste time, introduce errors, and stifle innovation as designs shuttle between design engineering and manufacturing engineering to "fix" problems that could have been avoided. To get the products produced in this environment, companies will often implement "quick-fix" changes just to get a workable product shipped. These changes inevitably create confusion, controversy, and other formidable problems for users to resolve.

This is not a new problem, but it is one that hasn't been effectively addressed by the vast majority of industrial organizations. Forward-thinking companies are attacking this problem by taking a different view of the development of manufacturing process design – they are realizing that these "routings" must be developed as an integral part of the product design process. Thus, product process plans (which outline the sequence of production operations necessary for production of a product, or sub-assembly) are an integral component of the product definition and must be included in any complete product definition management approach.

## **The Movement to cPDm**

The fact that there is a critical link between product structures and manufacturing processes is not a new concept. In fact, the combination of process plans and product structures has been at the core of most manufacturing planning systems, such as enterprise resource planning (ERP), for many years. This link has been necessary in those systems to provide the basis for production schedules, inventory planning, product costing, and many other activities.

Recently however, more and more companies have recognized the significance of these process plans as integral parts of the design phase of the product definition lifecycle. These organizations realize that, if they are ever going to optimize their overall operations, they must consider “how” they build products – especially complex products – as they develop the product definition.

This philosophy must be included in any strategy for full cPDm, as companies seek to effectively manage product definition to optimize their competitiveness. As traditional product data management (PDM) has evolved to the broader concepts of cPDm, the vision of “what” is included in the product definition has expanded considerably. A few years ago, most organizations thought product definition consisted mostly of engineering drawings and CAD data management. Now, companies recognize that product definition includes all components of the product, and not just mechanical parts. Thus, electronics, embedded software, and product documentation are now included in cPDm strategies. Process plans (including tooling requirements) are another extension of the product definition, and must be included in cPDm initiatives as well.

The concepts behind this current trend are not new. Earlier “concurrent engineering,” “simultaneous engineering,” and “design for manufacturability” all focused attention on this problem. But none of these initiatives resulted in the underlying approach being tied together effectively. cPDm initiatives incorporate these capabilities in order to provide the most effective solution for product definition management.

Today, new cPDm initiatives encourage companies to broaden their view of what constitutes the product definition, to enable a more competitive product development environment. A clear part of this movement is to integrate design and manufacturing more closely than ever. The objective: to develop innovative products, improve quality, shorten time to market, and lower costs. However, the changes in product development processes and responsibility associated with tying both product configuration and routing design into a seamless and collaborative effort are not trivial and require serious attention.

## **Response from Suppliers**

Driven by user demand for these integrated product and process definition management capabilities, and beginning to recognize the huge market potential, cPDm solution suppliers are scrambling to respond with attractive offerings. These suppliers are beginning to provide capabilities to develop product process plans as an integral part of the product definition, right along with the configuration of components of varying types. For the suppliers, this is a time when they strive to position themselves in the evolving market. But only a handful of suppliers have actually been delivering anything more than

Powerpoint “slideware” so far. So a major challenge for users is to separate actual capabilities from marketing hype.

Among traditional MCAD-focused suppliers, Dassault Systèmes is making significant headway with their digital manufacturing initiatives and the PPR Hub (Product, Process, Resource) of their Enovia program. But they aren’t alone, similar programs are underway at Unigraphics Solutions, PTC, and SDRC. Independent cPDM suppliers such as MatrixOne are moving in this direction as well. And leading ERP supplier SAP is taking advantage of its manufacturing roots, and already is well situated to support these needs.

## **Conclusion**

Forward thinking companies know that product definition goes far beyond traditional design engineering groups. They realize that product definition includes the definition of all components that are necessary to communicate the product effectively to manufacturing production operations. As a result, these progressive companies have focused on bringing process plan definition, traditionally thought of as a purely manufacturing activity, into the product definition process.

Suppliers are trying to address this market demand, and are beginning to offer capabilities to incorporate process planning capabilities into their cPDM solutions. But the current offerings are typically quite limited and are more vision than reality. One thing is very clear: even with technology in place, companies face many internal hurdles when they integrate manufacturing processes into product definition. However, the next step in the evolution of cPDM requires manufacturers to step up to the challenge and solve these problems. Some companies are making these changes, and are making them work. Many others are just beginning to investigate these issues. But those companies that don’t, will find themselves far behind their competitors in the very near future.

## **For further information contact:**

CIMdata  
3909 Research Park Drive  
Ann Arbor, MI 48108, USA  
Tel: +1 (734) 668-9922  
Fax: +1 (734) 668-1957  
[www.CIMdata.com](http://www.CIMdata.com)