BREAKING DOWN INFORMATION SILOS BETWEEN MANUFACTURING AND DESIGN:

A NEW APPROACH TO CAD/ERP DATA INTEGRATION

The challenge: dealing with silos of information

What would it be like if you discovered a critical error in a product about to go to market – all because the wrong information was transcribed into your ERP system?

What would a mistake of this magnitude cost you in terms of materials losses? Worse, in terms of lost orders? Worse yet, in terms of lost clients?

It's a fact: to create a great product, both design and manufacturing teams urgently require up-to-date, perfectly synchronized data. Despite this need, many manufacturers - including those who make ETO (Engineered-To-Order) and/or BTO (Built-To-Order) products - still use manual or inadequate CAD / ERP data integration techniques that just don't cut it.

The success or failure of your business can revolve around your ability to communicate information between all of your teams: from design, manufacturing, purchasing, estimating, costing, accounting, all the way through to sales, marketing, customer service and shipping. To avoid costly mistakes, you need to ensure the seamless transfer of information between those people on these teams that critically need it.

From CAD to ERP… and back: the nuts-and-bolts

Computer Aided Design (CAD) applications enable engineers and designers to easily and efficiently create and view 3D product designs on a computer. Today, Product Lifecycle Management (PLM) solutions are used to manage CAD data within engineering and other departments. Enterprise Resource Planning (ERP) solutions control the production planning and financials at the corporate level, drawing data from CAD / PLM and other sources.

The need to improve management of this data has reached a critical point. Driven by the need to break down information barriers between departments, companies have attempted to build bridges between these disparate system "silos" – with varying degrees of success.

Importance of the BoM

One of the most important elements of product information in a manufacturing enterprise is the Bill of Materials (BoM). Built around data usually produced using a CAD application, the BoM specifies which and how many parts and materials are needed to complete the manufacturing process, and contains data about the components and their relationship to one another. Manufacturing planners use BoMs to determine when and how materials will be ordered, to allocate human and material resources on the production line, and to manage the manpower needs of the production facility.

The BoM is a critical element in the manufacturing enterprise and represents the backbone of product definition. According to an online poll by CIMData in April 2005, 85% of PLM users consider product structure and BoM to be the most utilized PLM function – a strong testimonial to the BoM's importance.

Because of its important role tracking product configuration, most companies need to transfer BoM data to their ERP system, bidirectionally in many cases, on a regular basis. However, this is easier said than done.

Issues with CAD / ERP data integration

For most companies, business processes are not set up to work in parallel using a shared BoM. This makes the transfer of BoM data from CAD to ERP systems a critical necessity.

However, many manufacturing companies don't have a solution in place that can safely, easily and efficiently integrate CAD data into their ERP system. Problems in this area include:

- Data between CAD and ERP is continually out of sync. Specifically:
    - Engineering Change Notices not properly entered into ERP database
    - ERP data changes improperly communicated to engineering teams
- Costly and error-prone re-keying of data into ERP system
- Lost time and delayed time to market
- Decreased operational efficiency and disorganized workflow processes

Which approach can best integrate my data?

There is a confusing array of applications on the market that profess to offer complete CAD to ERP integration.

Some ERP vendors claim to offer connectivity to CAD systems, but in actual fact their application simply throws in the file pathname to the associated CAD drawings or documents. This type of solution does not allow you to achieve true CAD to ERP integration.

Other vendors sell applications that do offer CAD to ERP integration – but only work with specific products or technologies. Platform-specific, these applications keep customers captive, ensuring repeat business for the vendors by chaining them to their current CAD / ERP systems.

What the industry needs is a solution that can offer the most sophisticated level of data transfer, and the flexibility to work with virtually any CAD, PLM or ERP product.

Two distinct approaches to CAD-ERP data integration

In response to the critical need to ensure data synchronization between design and manufacturing intensive departments, two approaches exist that enable manufacturing companies to extract and transfer metadata from CAD / PLM systems directly into ERP.

The live approach
A CAD companion software application that supplies a "hot", live, bidirectional link between CAD/PLM and MRP/ERP applications.

The batch approach
A standalone application that enables users to perform batch extractions of all of the metadata found in CAD / PLM systems, in one single operation.

Manufacturing companies must first determine which approach can better ensure that everyone working in the ERP system has accurate, up-to-the minute data – while saving countless hours re-keying CAD data changes into the ERP system.

Live, "hot", bidirectional CAD-to-ERP/MRP interface

The live approach

A live approach to data integration ensures real-time, bidirectional synchronization between your CAD and ERP data. Preferably, this approach should support a complete range of CAD platforms, such as Autodesk Inventor, SolidWorks, AutoCAD, AutoCAD Electrical, Mechanical Desktop, Autodesk Map, Autodesk Architectural Desktop, AutoCAD/Mechanical, and others.

Features of the live approach
When saving a drawing, component or assembly, the user may enter or edit both CAD and ERP data, using possible values taken "live" from the ERP application. Following confirmation from the end-user, the data is updated in real-time in both the CAD system and the ERP database, ensuring complete synchronization between both sets of data.

Ideally, the live approach should be able to process a wide range of data from CAD and ERP, including:

- Part/component/assembly data;
- Bills of Materials (BoM);
- Routing instructions

Bidirectional capabilities provide "live", accurate, real-time updates propagated instantly to your CAD and ERP systems – a real plus for any manufacturer, ETO- or BTO-oriented or not. With a live approach to data integration, ERP and CAD data is always in sync, virtually eliminating costly errors on the shop floor… and elsewhere!

The batch approach

Extracting product metadata from CAD documents

A batch approach to data integration enables you to extract and export metadata from CAD to ERP systems, while providing options for reviewing and approving the data before it is integrated into the ERP system.

In this approach, the exact composition of each assembly or component found in the CAD documents should be directly exported, as well as the relevant metadata associated to it. This includes the attributes and/or properties of each component, including custom, user-defined properties.

Features of the batch approach
After the user decides where to search and output the data, the specified storage location should be scanned and the metadata extracted into an XML or tab-delimited text file. Ideally, data can be exported to an ERP system in one single, unattended operation.

Preferably, the Bill of Materials in the ERP system can be automatically updated in batch mode. Some technologies allow data to be exported on a regular basis - for example, every hour – without any human interaction.

Ideally, exported data can be used for a wide range of applications, such as:

- Building Bills of Materials
- Importing Bills of Materials from CAD into ERP systems
- Importing data into cost product calculation systems
- Creating user activity reports
- Product and spare parts catalogs

The technology should be versatile enough to support a variety of different CAD formats, ensuring that the customer isn't locked into a specific product configuration. It should also allow the comprehensive extraction of data of all supported document formats in one single unattended operation.

This approach may also require custom software development. This is usually in the form of a metadata post-processor that filters out unnecessary data and converts information to the format required by the target application (ERP, estimating, costing, catalog, etc.).

What to look for in a CAD-to-ERP integration solution

Both of these approaches introduce a whole new level of CAD to ERP integration to manufacturers, enabling you to effectively bridge the data silos between your design and manufacturing teams and reduce costly manufacturing errors.

Benefits of using these approaches include:

Synchronization of CAD and ERP data

Your ERP and CAD data is always in sync, ensuring that your design and manufacturing teams both have access to identical data at the same time.

Elimination of redundant data entry

In many companies, valuable hours are spent manually re-keying metadata from CAD into ERP. By virtually eliminating the need for redundant multiple data entry, the technology typically pays for itself in 60-90 days.

Reduced number of data entry errors

Manually retyping data inevitably leads to transcribing errors. Elimination of manual data transfer ensures that costly errors found on the shop floor are drastically reduced.

Superior management of data

With these new approaches, you can quickly and easily share product data with users in different departments across an extended enterprise, regardless of geographic location.

Improved overall productivity and time to market

By eliminating the need for error prone and time consuming re-entry of data, businesses will immediately see their operational efficiency improved. Creating a bridge between design and manufacturing information silos helps streamline workflow processes and ensures improved time to market.

Flexibility to support multiple CAD formats

A number of these solutions are designed to support multiple CAD formats, ensuring that customers do not need to stay locked into a specific product configuration.

Flexibility to support multiple ERP systems

Some CAD-to-ERP integration solutions are designed to offer the same functionality across a wide variety of ERP platforms.

Bidirectional link between CAD and ERP applications (Live approach)

The first of its kind, this technology enables users to make changes in either CAD or ERP and instantly propagate these changes to the companion system.

With a live or batch approach to data integration, you can bring integration of CAD and ERP data to a whole new level. With versatility, bi-directional capabilities, and a depth of data exchange unique in the marketplace, you will improve productivity and efficiency, reducing costly and time-consuming manufacturing errors.

Benefits for ETO and BTO product manufacturers

Engineered-to-order and Built-to-order product manufacturers face many challenges when trying to improve efficiencies and manage costs. Because their work differs from client to client, there are more design changes, more redundant data entry, and a much higher risk of error than for an out-of-the box manufacturing company.

The live approach ensures instant bidirectional synchronization between CAD and ERP data, guaranteeing that design and manufacturing teams have access to identical data at the same time. Complex changes can be made in either CAD or ERP and then quickly transferred to the companion system, without the need to perform redundant data entry. This radically reduces the number of costly transcribing and manufacturing errors.

With the live approach, ETO and BTO oriented manufacturers are empowered to respond to customer-specific orders more rapidly, more accurately and with increased cost-effectiveness.

The live approach – a case study

The challenge

Cogismaq is an ERP software developer that has been particularly successful with ETO and BTO product manufacturers. Their success is largely based on a strong product, backed up by expertise on the business issues of their customers. They have experienced remarkable growth over the last few years. However, they had identified with many of their customers a crucial and growing problem with the handling of CAD and ERP data - specifically, unsynchronized CAD and ERP data, triple data entry, and damaging delays in vital data updates.

Cogismaq needed a third party solution that they could seamlessly integrate into their successful *Genius* ERP application. They decided that the selected partner should use the live approach, which offered them a better guarantee of success.

The solution

Cogismaq selected Elmo Link, an OEM (Original Equipment Manufacturer) companion product to CAD applications such as Autodesk Inventor, AutoCAD and SolidWorks, that could deliver the most advanced and efficient solution to the CAD-ERP integration issues raised by *Genius* customers. Based entirely on the live approach, the new module gave Cogismaq customers the ability to easily integrate not only Bills of Materials, but also component, raw material, assembly and routing data from their CAD models to Cogismaq ERP. This dramatically increased efficiency, and substantially reduced the cost of opportunity due to redundant data entry.

In addition, the live approach allowed Cogismaq customers to drastically reduce the cost of errors on the shop floor due, for example, to the use of incorrect raw materials, or erroneous routing instructions.

"We're thrilled to be one of the very first ERP software vendors who can deliver a fully integrated CAD-ERP integration solution that boasts a live, "hot" link between design and manufacturing databases," says Marcel Lafontaine, Cogismaq's CEO. "Customer response so far has been tremendous, and we are confident that integrating an application of such power into our solution is a breakthrough not only for us, but also for our customers' efficiency and profitability."

The batch approach – another case study

The challenge

Plastique Micron is a plastics manufacturing company that possesses CAD and ERP systems critical to their design and manufacturing process. However, they experienced difficulties when trying to transfer design data from CAD to their ERP database.

At the time, their system was only capable of transferring production data to the ERP. If they wanted to transfer design data to the ERP with their current system, it had to be transferred the old-fashioned way: by manually re-typing the information. This limitation would result in hours of time spent re-keying data, increasing the risk of manufacturing errors. There had to be a better way.

The solution

Elmo BoM – the batch approach – gave Plastique Micron the ability to easily extract and export relevant metadata from their Autodesk Mechanical Desktop models to ERP. By integrating the data between Plastique Micron's CAD and ERP databases, they eliminated any need to spend time on redundant data entry -reducing the risk of damaging errors.

Equally important, the batch approach allowed Plastique Micron to publish design data and metadata to their intranet – something that they had never been able to do before. "It's been great for us," says David Pouliot of Plastique Micron. "Now, our sales reps can go on our intranet from wherever they are and see design data and drawings. It makes life much easier."

Decision drivers: what to look for in a solution

Choosing the right integration solution for your company is critical. There are some important questions that you need to ask yourself prior to selecting a product. For each product involved in the selection process, it is important to assess the following:

Product drivers

√	**Versatility of application**	Supports a wide variety of CAD formats Supports a wide variety of ERP applications
√	**Bidirectional capabilities**	Bidirectional link between CAD and ERP
√	**Real-time integration capabilities**	Instant integration of your data
√	**Depth of integration**	Full integration, or a mere pointer to a CAD file
√	**Review and approval capabilities**	Ability to review & approve data before transfer
√	**Customization options**	Customized to fit your specialized needs
√	**Upgrade possibilities**	Upgrades available in the near future
√	**Technical documentation**	Documentation is extensive and sound
√	**Cost**	Cost is competitive
√	**Existing ROI**	ROI seen within three months
√	**Types of data that can be processed**	Processing of Part/component/assembly data; Bills of Materials (BoM); Routing instructions
√	**Extraction and export capabilities**	Extraction and export in one unattended operation
√	**Batch mode**	Batch mode to automatically update BoMs

Vendor drivers

√	**Breadth of technology**	Offers a range of related solutions
√	**Customer service**	Depth of customer service offered
√	**Company history**	In business for at least one year
√	**Implementation success**	List of successful product implementations
√	**Customer base**	List of satisfied customers

These criteria will help you evaluate and select the right CAD / ERP data integration solution that best meets your specific needs.

Conclusion

Product data is the lifeblood of the manufacturing organization. The fewer obstacles there are to its flow, the better.

The good news for manufacturers is clear: new solutions exist that guarantee true integration of your CAD and ERP data. With the new level of integration that Elmo Solutions offers, the chances that your company will suffer from serious errors on your product floor are drastically reduced.

With their distinctive data integration capabilities, Elmo Link – the live approach – and Elmo BoM – the batch approach – will ensure that you increase operational efficiency, eliminate needless data entry requirements, and synchronize data between your CAD and ERP systems. With their help, Elmo Link and Elmo BoM will create a bridge between your information silos, ensuring that information is transferred between those people on your team that critically need it.

Established in 1979, Elmo Solutions, a subsidiary of IRISCO du Québec Inc., develops and markets software solutions dedicated to the creation, management and diffusion of CAD/ PLM metadata. Its software solutions include:

- Elmo Search, an enterprise search engine for engineering documents
- Elmo Link, a CAD-to-ERP integration solution that supplies a "hot" link by using a "live" approach

Elmo BoM, a metadata transport solution that uses the "batch" approach

For further information, you may also email the Elmo Solutions team at info@elmo.irisco.com, or call this toll-free number: 866.522.3207, extension 248.

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