

Seradex White Paper

A Discussion of Issues in the Manufacturing OrderStream

AutoCAD – Seradex ERP Link

Many manufacturing software packages claim to link to AutoCAD. This paper will explore the different options that are available. It will also discuss the appropriate use of AutoCAD vs. the use of Seradex ERP software.

Information Requirements

Manufacturing frequently requires graphical information. Dimensioned drawings, assembly drawings and plant layout drawings are commonly used. There is also a need to handle databases of parts, bills of materials, vendors, costs, attributes and purchase orders. What options exist to deal with all these requirements?

Common software tools include programs like AutoCAD, Microsoft Office, Excel and ERP database programs. How should we decide what information “tool” to use?

Let’s look at how database tools compare to CAD tools along the following issues:



Comparing ERP and CAD

Issue	ERP	CAD
Handling of Graphical Data	Poor	Excellent
Highly variable unique data storage	Poor	Excellent
Links to CAM	Poor	Excellent
Link to Reports	Excellent	Poor
Integrated Costing	Excellent	Poor
Integrated Purchasing	Excellent	Poor
Where Used	Excellent	Poor
Ad Hoc inquiry & data analysis	Excellent	Poor
Search for a Drawing	Excellent	Poor
Engineering Change Control	Excellent	Poor

CAD handles certain tasks very well while Seradex ERP handles other issues effectively. Sometimes you need more than one tool and that’s why carpenters usually have both a hammer and a saw – one is a poor substitute for the other.

So don’t use AutoCAD when an ERP system is what you need and vice versa.

However this leads to a significant problem in data duplication and synchronization. An assembly drawing in your CAD system should match the Bill of Material’s in your ERP system.

There are several natural automation and integration points that exist between AutoCAD and Seradex ERP. There can be potential savings of hundreds of engineering hours per month. These depend on your type of business and your business processes. They include:

1) ERP to CAD

In this case information in the Seradex ERP system is transferred to the CAD system and automatically generates a 2D or 3D drawing.

An example would be the window and door industry. At order entry the user enters the width and height of a Vinyl Casement window in the Seradex product configurator. A scaled dimensionally correct drawing is generated in AutoCAD. This drawing can be used for shop floor instructions. A rendering could also be generated for marketing purposes to show your customer what they have ordered.

VBA can also be used so Engineers inside AutoCAD can search and select items from the Seradex ERP database.

2) CAD to ERP

The reverse of the above case. The user makes changes to W and H in the AutoCAD drawing and this creates a complete bill of materials in the ERP systems.

Another common task in mechanical engineering is the design of complex machinery. This machinery could include motors, hydraulic piping, fittings, PLC's and so on. At some point in a project, items need to be quantified (how many linear feet of piping, how many fittings and so on).

This process requires the automatic take off and downloading of a bill of materials from CAD into the Seradex ERP system. This automation eliminates time-consuming duplicate data entry by expensive engineering resources.

There are situations where you may receive an AutoCAD drawing from an external source, perhaps from your customer, supplier or dealer. Generally these drawings must undergo a manual "take-off" process to count the product various numbers. In messy cases these products could be assemblies blocked 1-

4 levels deep comprised of one or more blocked & attributed parts, each with their own vendor/part number/quantity counts.

Once the take off is complete the order can be sent to production and purchasing saving time and minimizing errors.

3) Bi-directional Link

This approach would allow users to make changes in either CAD or the ERP and the changes would be propagated to the other system

4) Engineering Changes

Another issue is engineering changes. Once the initial synchronization is performed a challenge exists to ensure that any changes to either the ERP or the CAD system are propagated and tracked to the other system.

Technology Platform

Visual Basic for Applications or VBA-enabled applications allow separate applications to easily share data. VBA is a powerful Microsoft standard in use by many applications.

Microsoft has integrated VBA with widely used Microsoft Office applications such as Excel, Word and Access. Opportunities abound to exchange data between AutoCAD and Office applications. You can also easily link to any popular database using ODBC connectivity.

AutoCAD and Seradex both incorporate VBA to facilitate the integration.

Seradex can access information in AutoCAD such as lines, arcs, block references and text, as well as invisible

Items such as style settings, layers and viewports.

Seradex can access the information with VBA and put it to use in various ways, such as counting the number of entities in a certain layer, or calculating the total length of pipe or wire.

After the information is extracted from a drawing it can be transferred into Seradex ERP.

Seradex ERP can also control AutoCAD using VBA to direct AutoCAD to perform tasks such as drawing lines or placing text.

The options for using VBA with AutoCAD and Seradex are virtually endless.

Further Engineering Automation

You can use VBA to dramatically improve engineering productivity – here are a few examples:

- Generate Tile Blocks Automatically
- Customize toolbars and menus
- Menu driven block librarian
- Find a drawing with a text string in the drawing
- Auto renumber balloons
- Modify block attributes automatically.
- Print all selected range of Title Blocks to a laser printer.
- Organize drawings by project
- Create and use symbol libraries
- Manage Layers
- Create Text, detailing and calculating utilities
- Automatically batch plot drawings
- Batch processes - plot, modify, scan, convert, export, saveasr12, save and retrieve groups of files
- Set the height, rotation angle, style, case of your attributes on a selection set or the entire drawing
- Create your own block libraries
- Control engineering change and revision control
- Store AutoCAD drawings in an Access database. This allows you to analyze what you have. You can

then develop reports on drawings, where used parts, by Engineer, product, date or Job.

- Customize menus and toolbars to frequently used tasks

Your CAD Standards

Establishing companywide CAD standards offers many benefits and is crucial to integration projects. Once you've developed your company's standards, you have two basic approaches for gaining compliance. You can write a company standards manual and direct users to refer to it; or, you can incorporate standards into the drawing process so they are used automatically.

VBA can be used to ensure your users' only choice is to use the standards; they will be used, especially if you make their jobs easier in the process.

Attributes, Layers, colors, text styles, line types, scale settings, blocks and standard symbols can all be defaulted using VBA.

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