

# Piping Engineering and Fabrication News

Tolpa Technical Services

### Special points of interest:

- Piping Isometric Drawing Controls
- Bar coding for drawings and pre-fabricated pipe spools
- Flexible approaches to generating bills of material
- Coming soon: Clouds of point piping models, piping checking, batch plotting of piping isometric drawings, specs for HVAC...

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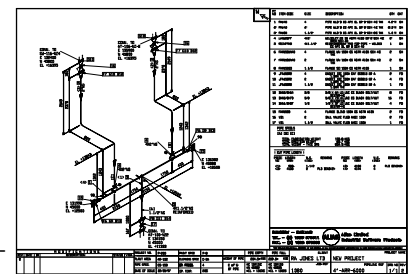
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## Piping Isometric Controls / Drawing Management & Progress Measurement

3-D piping modeling systems have the capability to generate prolific amounts of data and drawings. Drawings and bills of material are regurgitated at will, creating an instant picture of both the plant layout and the amount of materials needed to put the whole thing together. 3-D plant modeling systems are excellent at generating the current "demand". The demand however, is a constantly changing and sometimes elusive deliverable that remains fluid until the final piping isometrics are issued for construction. Piping isometric controls are required to manage the turnover of information and drawings, developed for the issue for bid, issue for construction and other staged releases of information.

Project management/ measurement systems measure progress on deliverables. Often the piping discipline earns progress on intermediate deliverables. Examples of measured progress includes the actual start of a drawing, 50% completion and ultimately the drawings formal issue.

Here we have two requirements. One to manage drawings and reports and another to measure progress. As a first step to integrating these two different systems, why not consider linking progress to controls and using piping isometric controls to measure the earned progress on a project.



Not all piping design systems include tools for managing piping isometric drawings like this one.

Here is a template that can be modified to suit each individual's purpose. Here are the key inputs; a complete set of flow sheets, a line list (a modified version of the line list will ultimately become the iso control document) and a complete set of piping orthographic drawings. Ultimately the iso control list ->

## Thinking of Bar Codes on Drawings?

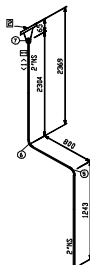
Bar codes are simple to add to drawings. It's deciding how to best implement bar coding in your drawing management applications that becomes the challenge.

The systems and equipment for bar coding used in department

and grocery stores represent considerable investment in applications development, fonts, wireless networking hardware and server(s). Application development includes more than just the program to manage the information that is selected for bar coding. Applications must

also be written for the handheld scanner. After all, was the scan to check the price, confirm existing inventory or a request to order more? Hand-held simple scanners (that interface with another computer through the use of a cradle or infrared) cost upwards of \$500. Wireless ->

### Piping Isometric Controls



Portion of a pipe spool drawing

is the line list with the following fields added akin to additional columns in a spreadsheet. Include a column for the piping isometric sheet number, the drawing file name, the extraction number (for 3-D piping systems), the designer's initials (or name), the checker's initials, the model file name (the name of the source file) and the fabrication category of the line (typically shop or field) and the dates for checking, scrubbing (picking up the checkers marks) and back checking. If the work

process includes an issue for bid and issue for construction include columns for those dates too. Include a column for the stress analyst's initials and date if stress analysis is required.

Typically the piping lead is responsible for the flow sheet check. A column can be provided for the flow sheet check and the piping leads (or person that performed the flow sheet check) with the all important date and flow sheet revision number. An additional column can be provided for the process

engineers initials or signature if process approval is required. A similar column and date can be provided for the instrument engineers approval.

Managing drawings includes managing the drawing files and the generated electronic bills of material. The material on the face of the piping isometric also exists in a material file. Intergraph PDS stores this material in a .b file. I-Sketch (by default) stores this information in a MaterialList.txt or a material.mtc file by default. ->

*“For the first time, estimators can surf the detail piping design and find exactly what they need”*

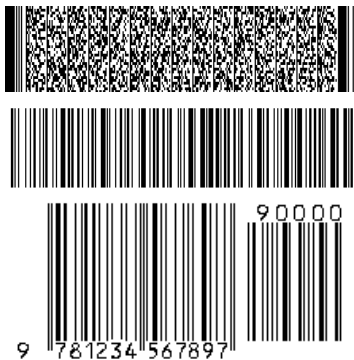
### Flexible Approaches to Generating Bills of Material

Often piping on orthographic drawings has to be taken off, planimeters driving estimating tools. Fittings are added as piping is essentially rolled into the system. Accurate take off's require drawings that are exactly to scale and experience to interpret the drawings correctly. Added to the tedium is the need to take the project off, essentially manually, prior to being able to forecast the cost.

Piping isometric drawings, with bills of material are easier to interpret, however, it still takes time to re-enter all of those materials and count all of the fit up point into an estimating system.

Engineering companies issue drawings, however, not all issue bills of material. For those that do issue drawings from any system that uses ISOGEN, the bills of material are implicitly avail-

able for the asking. Enter I-Data Integrator. I-Data integrator allows estimators to point and click their way through families of files usually organized by directory. Most often, all of the isometric files associated with an area are stored in one directory. By mousing over and selecting the files in each directory it is possible to roll up the bills of material and weld ->



Some very popular bar code systems—The bottom barcode is usually found in book stores

### More on barcodes

devices can cost upwards of \$2,500. That cost does not include any of the other wireless hardware or applications required to support it.

What is a bar code? These barcodes are machine readable, unique identifiers for specific products or commodities. Each barcode is a font, most often driven by data. In the case of

drawings, it will be a unique id on the face of a drawing most often generated from the drawing number. The drawing number, for example (90000) in the “Bookland” font appears as it does at left. Any attribute in a database, instructed to print in one of the fonts at left, will appear as shown. Advantages? In a world where repetitive key

ins are required, bar codes will always be entered correctly (that is if everything works as it should). Barcodes that occur on spool drawings, and again on spools , and again for production reports , and again for shipping, receiving and location in the lay-down yard could be a time saver. For more on bar codes contact us.

## Approaches for estimating piping quantities and welding

reports. Getting the information into Microsoft Access or Excel in this manner rolls up the quantities on the individual drawings into the appropriate categories. These categories include field welds, shop welds, field materials (bolts, gaskets, flanged valves, field run piping) and shop (large bore welded piping). Companies with mainstream materials applications or companies with in-house developed systems may choose feed their custom made solution with I-Data Integrator using the mate-

rial files delivered with systems like PDS, PDMS and Auto-PLANT. The approach here is still the same. Pick and choose the desired files and the appropriate materials and welding information is generated for the materials system.

Part of each estimators competitive advantage is company specific information on cost. Using actual material and weld counts is generally considered superior to an average cost per inch of each diameter of piping to be supplied or fabricated.

The ability to add activities to be performed on each spool and the time associated with each operation to the estimated quantity of components and welds provide an accurate definition of the expected cost. "External" labor and cost data, combined with material and weld quantities can be output as Excel, Access, XML or raw data (text files) designed to interface with your existing materials interface. I-Data Integrator is available from Tolpa Technical Services for \$1,600.00

### Output



XML



Excel



Access



Legacy Systems

Opportunities for Materials Systems Integration

## More on Piping Isometric Controls

Naturally the file name and date of the material files should also be recorded.

Still not finished...Now that material is available, as soon as the material control group has processed the materials on the piping isometric. The appropriate columns should be provided for their initials and date.

Not all the necessary information can automatically be

gleaned from the database. The main stream piping modeling applications have excellent report writing capabilities. None that we are aware of track the number of piping isometric sheets extracted from each pipeline. It goes without saying that the squad boss has to combine the report capability with some judiciously generated lists of files.

In a manual system (ultimately the same as any 2-D CAD system), lists of files and reports provide most of the content for the isometric control list. Using some simple basic rules for naming the files once can organizing the data on the computer by area, project and report type. Once organized in this way a listing of the piping isometric directory provides most of the tedious input. ->

*"The drawing transmittal can be a report from the piping isometric control spreadsheet or database. Simple counts can be converted to earned progress"*

## Next month and still coming...

So much is going on in our industry and there is just so much to say.

More on piping checking procedures for piping design.

Lot's more on as-built visualization including laser scanning and I-Sketch Field.

Tools for fabrication (bending, welding and nesting)

No cost material control systems (in Microsoft Access and Excel)

Batch plotting of piping orthographic and piping isometric drawings (AutoCAD, MicroStation and Intergraph Smart-Sketch)

Valves for HVAC, air conditioning balance valves and chilled water systems.

Tuning up spool and piping isometric drawings with Intergraph

SmartSketch.

Automatically adding details for pipe supports and welded attachments to piping isometric drawings.

Software maintenance—Is it worth the money?

Estimating costs for labor and materials.

Software tools and kits for the rapid development of piping specifications and catalogs.

Need it now? E-mail us.



Scanner for developing as-built cloud of points model



## Organization

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### **I-Sketch, I-Convert, I-Export, Spoolgen & Piping Isometric Products**

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WE'RE ON THE WEB  
[WWW.ISKETCHUSA.COM](http://WWW.ISKETCHUSA.COM)

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*Tolpa Technical Services is a full service engineering company. We provide piping engineering services and software. Being in the heart of the Gulf Coast we service mechanical contractors, fabricators, engineering companies and manufacturers. Our commitment to you is full service, with emphasis on post-award and sales services. Every application purchased from us includes services to ensure your company enjoys every possible success.*

*There are no commitments or risk associated with a software evaluation. Please contact us. We will provide you with an evaluation form asking only for your contact information. This information will be used to ship software to you.*

*Hope you have found the information in this newsletter useful. We look forward to servicing your needs.*

## **Piping Isometric Drawing Controls—Just finishing up**

Agree that it's pretty boring looking at all those columns on a spreadsheet. Information can be better presented with the use of linked worksheets in Excel and separate tables in Access. Let's make those columns relevant by looking at the sequence of events that good practice demands.

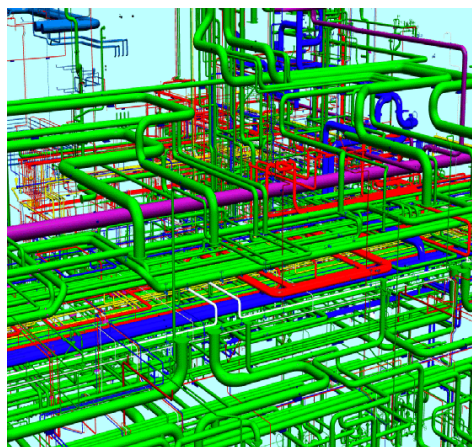
There's drawing / modeling, followed by checking, scrubbing (the model update), back checking, checker sign off, flow-sheet check, stress check, MTO, and issue for bid or construction. With all these turnovers of information, the value of a time date stamp associated with each activity is immediately obvious.

When a revision or even material substitution is made, what impact does it have on what might already be issued, fabricated or installed? Is there a change in demand? Deltas in the material take off may need to be sent to the shop or field depending on how advanced the prefabrication / construction is along.

Tolpa Technical Services has recommended isometric control procedures and drawing control databases available for Excel and Access. These systems, originally developed in Oracle have been moved to the PC platform to serve as both functional tools and examples.

For more information, contact

[info@isketchusa.com](mailto:info@isketchusa.com).



Can you imagine organized turnover of information and fabrication without piping isometric controls?