

use the market-leading software solution, AutoCAD MEP, along with next-generation fabrication design tools and technical approaches from EastCoast CAD/CAM, to deliver an integrated project from start to finish.

The Toolset

First, let's take a look at the primary set of tools that engineers, HVAC and mechanical professionals can optimize throughout various stages of a project.

AutoCAD MEP is recognized around the globe as the industry-leading solution for MEP drafters and designers. AutoCAD MEP is based on the familiar AutoCAD environment and brings a very mature toolset of system design tools that is ideal for contractors to perform construction-level design coordination and spatial relationships. Up until now, there has not been an integrated approach to leveraging fabrication specific building data throughout the project using AutoCAD MEP.

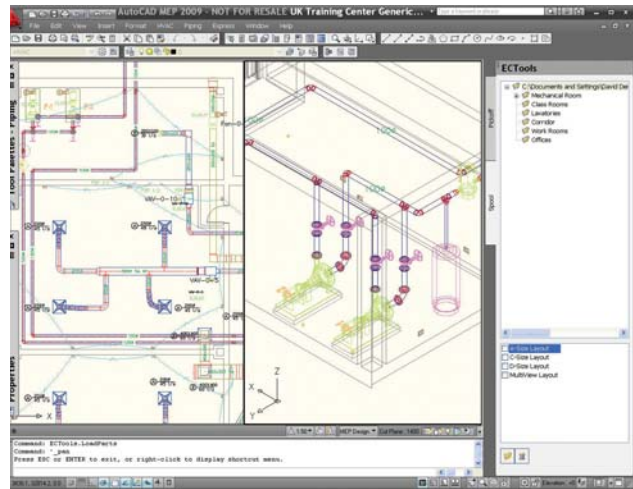
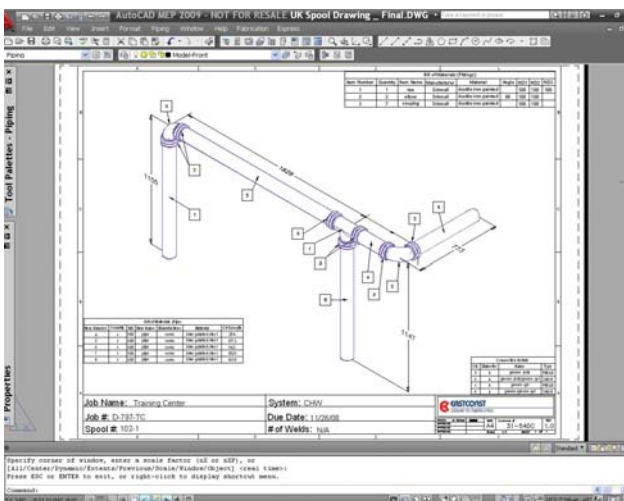
With the recent release of Fabrication for AutoCAD MEP from EastCoast CAD/CAM, contractors now have the ability to extend their AutoCAD MEP designs to fabrication. EastCoast CAD/CAM Fabrication for AutoCAD MEP provides the linchpin to leveraging real building data within and across the entire design and construction phase of a project.

Two Approaches

There are two approaches to using AutoCAD MEP with EastCoast CAD/CAM Fabrication for AutoCAD MEP. Both approaches include leveraging design data from the Revit platform. The first approach is based on leveraging information from Revit in AutoCAD MEP via Industry Foundation Classes (IFC)² and extending to Fabrication to AutoCAD MEP. The second approach utilizes the best capabilities of both the Revit platform and AutoCAD MEP working in tandem and ultimately leveraging the AutoCAD MEP design with EastCoast CAD/CAM Fabrication for AutoCAD MEP.

Workflow Approach #1: Using Industry Foundation Classes (IFC):

1. Export your Revit Architecture or Revit Structure model to the IFC file format. Revit provides IFC import and fully certified export features based on the latest IAI IFC2x3 data exchange standard.



Note:

You can export the model using the IFC format to an IFC-certified application that does not use the RVT file format. The drawing can then be opened and worked on in the non-native application.

It is important to understand that the IFC certification is based upon proper visualization on the other end of the transfer, not interoperability between the native definitions of building elements in the respective applications. Therefore, something will typically "look right," but not necessarily work as it would if natively modeled in the "receiving application."

IFC uses domain specific containers to describe real-world building objects. Those containers include parameters that have meaningful values. There are predefined "Property Sets" associated with IFC types. In the current release, these are not all directly mapped with standard Revit parameters. Many Revit parameters are placed on Custom Property Sets associated with the IFC Object. Many standard MEP elements have corresponding IFC containers. When mapping the Revit Categories to the IFC types, TXT files are used to drive that mapping.

Please note, however, that the Revit Category Taxonomy does not map one-to-one with the IFC types Taxonomy. So, in some cases, Revit Categories will not automatically map between applications. Once mapped properly, these elements do not require any specific user action to export them.

2. Import your IFC file into AutoCAD MEP. Drawing files are created and correspond to each part of an IFC project structure. The files will be xrefed together into a main host file that represents each part of the file structure in the IFC file.

Note:

In some instances, you may need to turn on some display components for certain elements to display after you import an IFC file, such as surfaces of spaces. In addition, importing IFC files results in the drawing files being organized at the same level.

3. Specify a name for the top level drawing that is created from the IFC file. This drawing contains xrefs only.

Note:

Importing an IFC file and naming it Small Office Building, creates a dwg file called Small Office Building.dwg that contains all of the xrefs that correspond to each part of the project structure contained in the IFC file.

4. Create building drawing using the top level drawing name with the IFCBuilding name appended. This file is also xrefed into the top level drawing.

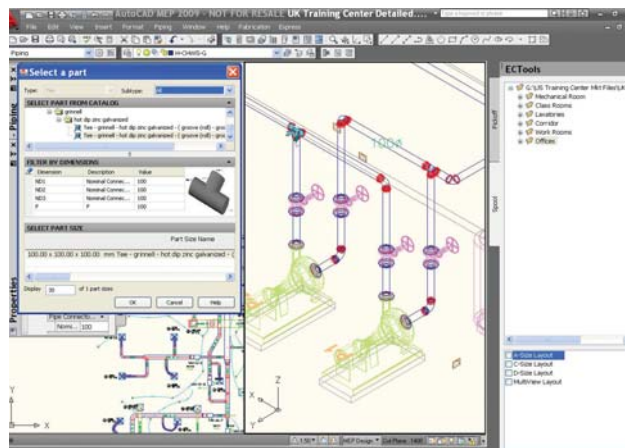
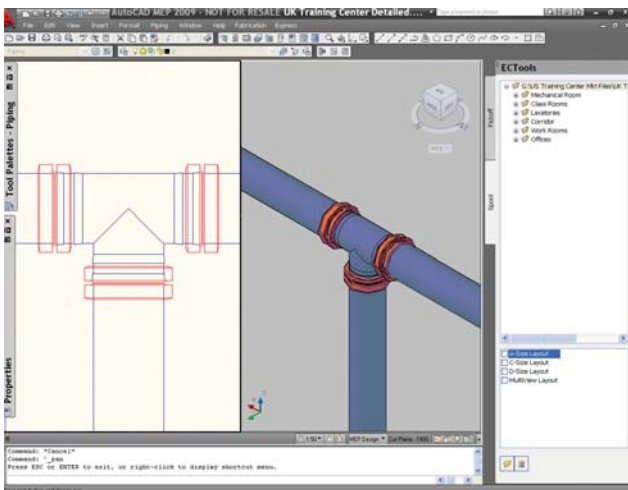
Note:

AutoCAD MEP uses the Project Name from the Export to IFC dialog as the IFCBuilding Name. This is noticeable if you are importing an IFC file that originated in AutoCAD MEP. If "Commercial Project" was the IFCBuilding name in the IFC file, then using the Small Office Building example above, the drawing name would be Small Office Building-Commercial Project.dwg.

5. Create Storey drawing for each IFCStorey contained in the IFC file. The files are created using the top level drawing name with the name of the IFCStorey appended. These files are referenced into the project file.

Workflow Approach #2: Using the best of the Revit platform and AutoCAD MEP:

1. Engineer leverages the Revit Architecture and/or MEP model to calculate the building's heating and cooling loads, and energy performance to drive design decisions and develop a high-level approach to system design. Early stage spatial modeling may be performed in Revit to best leverage the 3D environment of the Revit platform.
2. Engineer creates 2D and 3D .DWG files to represent the Building Form for reference in the AutoCAD MEP environment.
3. Engineer uses the exported geometry from the Revit model as coordination backgrounds to develop the duct and pipe systems using AutoCAD MEP. Additional calculations such as duct sizing capabilities can be done in AutoCAD MEP. Engineer either develops the AutoCAD MEP design using fabrication-ready parts from the EastCoast CAD Spec Engine (ideal), or uses AutoCAD MEP generic parts and converts them later in the process (less ideal).



4. Engineer utilizes the AutoCAD MEP for final 2D documentation and Fabrication for AutoCAD MEP for the complete Fabrication solution.

Clearly, this second approach offers a much simpler solution for engineers and mechanical HVAC contractors working on a design-build project. Because it utilizes optimal functions of both platforms, it avoids the burden of trying to map all of the data between the two environments via IFC.

Conclusion

While the need for an integrated approach to fabrication continues to grow, contractors now have a very powerful interim solution for designing and building complex commercial projects today. As we have seen, there are two ways to achieve this integration.

The first approach, using IFC mapping, can bring Revit data into AutoCAD MEP wherever there is a one-to-one mapping of Revit data to IFC. However, there are a number of remaining elements that currently do not map properly. Moreover, this approach offers only a one-way migration of data, making it difficult for many real-life project applications.

By contrast, the second approach offers a simpler, more pragmatic solution. First, it utilizes the powerful capacity inside Revit for building information modeling, and environmental analysis. Then, once this information is modeled in Revit, it can be used by design teams to complete the actual construction documentation, and coordination inside AutoCAD MEP without the difficulties associated with IFC mapping. In addition, this approach allows engineers to take full advantage of the real manufacturer content provided by Fabrication for AutoCAD MEP and use this data natively within AutoCAD MEP.

Therefore, there is no longer a need for contractors to delay or limit opportunities for bidding on construction projects. By using the tools in Revit and AutoCAD MEP with EastCoast CAD/CAM Fabrication for AutoCAD MEP—everyone in the building construction process can leverage and share real manufacturer specific content throughout the project lifecycle.

David E. Quigley, MBA, Director of Product and Business Development, EastCoast CAD/CAM, Littleton, Mass., has written extensively on software use and shop productivity.

 For more information, see inside back cover 45## or to ask a question, email: scott.grant@excitech.co.uk