Autodesk Consulting Add-on Utilities: COBie Toolkit and BIM Coordinator Tool

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FM3145   We will discuss recent Autodesk Consulting projects with a focus on two new utilities that we are using to help customers. First, we will present the functionality of the COBie (Construction Operations Building Information Exchange) Toolkit for Autodesk® Revit® software. COBie is a United States-originated data standard for exchange of building systems information between designers, construction firms, and building owners. The format for delivering construction handover data is a predefined spreadsheet file with specific worksheets, many of which can be populated directly from a Revit intelligent model. The standard has recently been adopted by the United Kingdom and tested on pilot projects using the evolving Revit COBie Toolkit. Next, we will discuss BIM Coordinator. This technology preview, available from Autodesk Labs, assists project team members with building and site grids in Revit and AutoCAD® Civil 3D® software to effectively organize the project data in shared or related coordinates. This utility is essential for spatial collaboration across disciplines.

Learning Objectives

At the end of this class, you will be able to:

- Understand details of the COBie standard, including the original U.S. and recent U.K. version

- Export comprehensive COBie XLS(X) files from Revit

- Use the BIM Coordinator tool to improve interoperability between AutoCAD Civil 3D and Revit

- Define specifications for custom add-on tools to extend Autodesk BIM applications

About the Speakers

Miro has an extensive combined engineering and IT background, with a Dipl.Ing. degree in Civil and Structural Engineering, Ph.D. in Numerical Methods in Engineering and 25 years' experience in commercial engineering software development and customization. He's been with Autodesk in UK for over 12 years, initially as Developer Consulting Specialist and currently as Solution Architect with Autodesk Consulting (AC). His specialty have been APIs for all Autodesk® AEC and BIM products, a topic on which he has conducted numerous training sessions, given many conference talks and provided direct technical support. For the last 7 years, he's been applying combined API, products, industry and process analyses knowledge to architecting and developing consulting solutions that extend the functionality of Autodesk BIM/AEC products and integrate them within various specific customer workflows and processes.

Rich is the AEC Business Development Manager for Autodesk, Inc., responsible for advancing Building Information Modeling to building owners. In this position, Rich promotes the role of BIM in the building lifecycle for Operations and Maintenance, Facilities Management, GIS and Building Control Applications. Rich has been at Autodesk for 15 years and has held various sales and technical positions. He has 30 years industry experience in Facilities Management, Operations and Maintenance BIM, CAD, and GIS applications and has been involved in consulting, implementing and customization of these applications as well as integration with various systems and enterprise applications. Prior to Autodesk, Rich worked for a software reseller as Vice President, managing all sales, support and consulting services.

Summary

The end-user functionalities and features of the tools demonstrated and discussed in this presentation are summarised in separate sections of this document, including all the relevant screenshots.

The tools emanate from a combination of specific customer engagements, overlapping requirements from wider Revit user community and strategic Autodesk initiatives. Some of them are (or will very soon be) available publicly on Autodesk Labs or Subscription sites, while the others are available via Autodesk Consulting offerings.

All the tools have been developed using Revit API. For those who want to learn more technical details on that topic, there are quite a few dedicated classes at AU, with the summary of resources is provided in the last section here. The presentation itself does not deal with any programming details, though some sample code is provided in additional materials for those interested.

Classification Tool for Revit

This tool can be used as a standalone utility, but any data added via it is also systematically integrated with the COBie tool (see later) for extracting the "Category" value therein.

Classification of BIM components is a very important aspect for specific users, and even more for many "downstream" usage of BIM data created in Revit. Attempts to standardize the nomenclature resulted in several standards, most notably Omniclass (mostly in USA) and Uniclass. For more details, see:
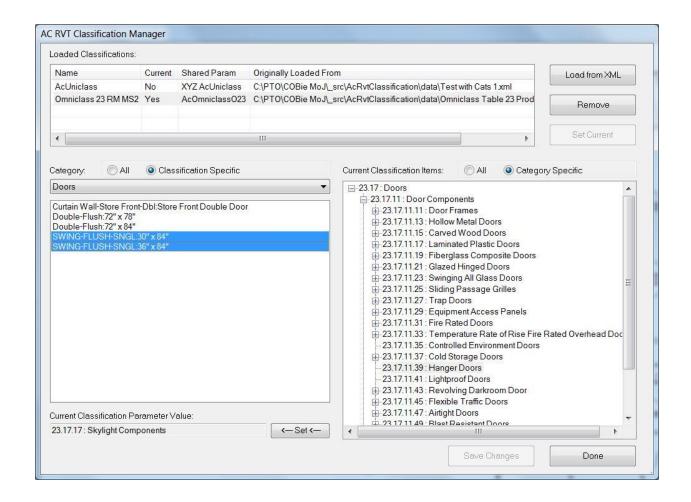
- http://www.omniclass.org/

- http://www.cpic.org.uk/en/uniclass/

Out-of-the-box Revit includes native Omniclass parameters for all RFAs, but no framework for adding any other classifications. The way that it has been natively implemented has some scope for improvement, mostly in the following areas:

- It can classify only standard (ie RFA) family instances and does not work with system and special family instances like walls, floors, roofs, pipes, ducts and importantly rooms/spaces.

- The naming can get quickly out-of-date based on new classification versions. Editing of the definitions in "" file is not officially supported, terse (categories represented by "magic" ID numbers) and only a single Revit category can be "associated" with each item

The tool developed to address some of these issues therefore uses share parameters to store any number of "AcRvtClassification"-s, each defined in an XML file that can also be re-imported to update definitions if they change later. The parameters are applied on the project (RVT) level, so that all components' Types (system and standard ones, ie any category that can be used in Type-Binding) can be classified. Special cases include Instance-binding classification parameters for Rooms, MEP Spaces and the very facility via Projec singleton, all fully integrated within each AcRvtClassification XML and corresponding UI.

The parameters are created automatically in background and populated in a single-stop Classification manager UI Dialog via "<- Set <-" button:
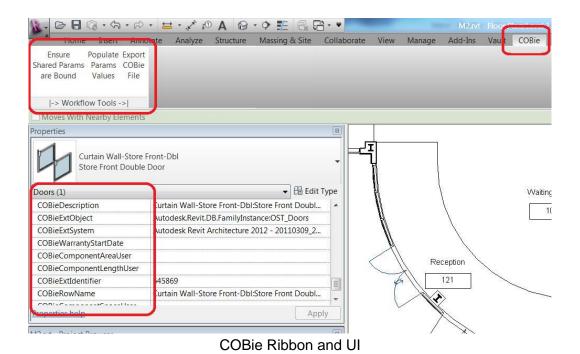
The full User Guide and XML samples are available in the additional class materials ZIP in "AcRvtClassification" subfolder.

For more information on the topic of BIM Classifications, including some usage of the very tool, we recommend FM3222 presentation at AU2012 on Tuesday 27th at 17:30 – "COBie and the Common Language".
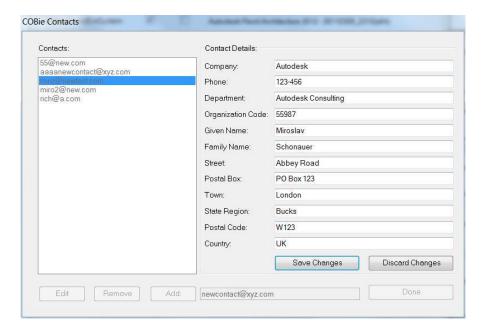
COBie Revit Toolkit
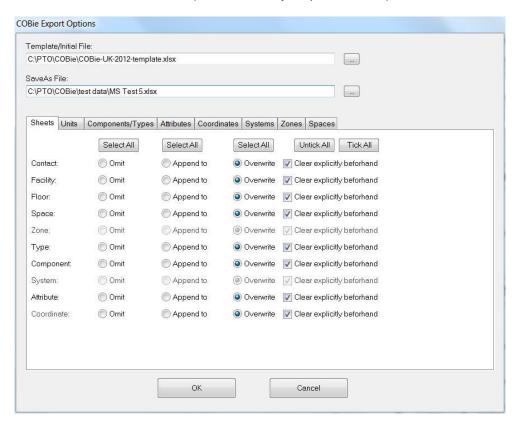ToDo: add some references for more info

COBie Ribbon and UI
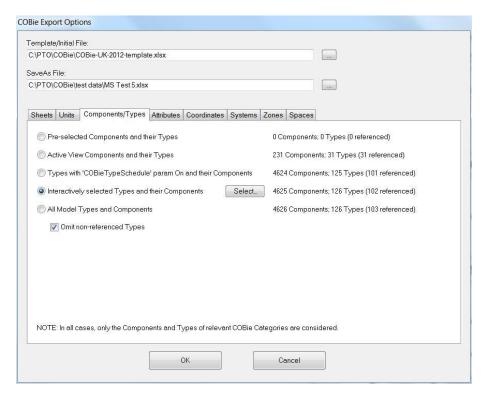

Command Populate Params Values
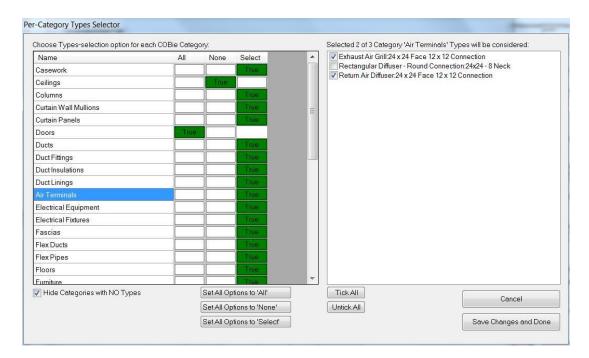
Contacts (via CreatedBy ellipses button)

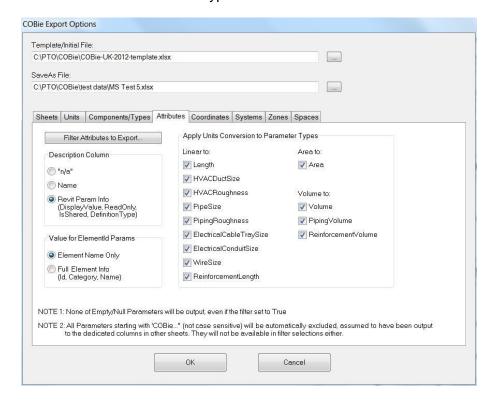Command Export – Main form and Sheets Tab
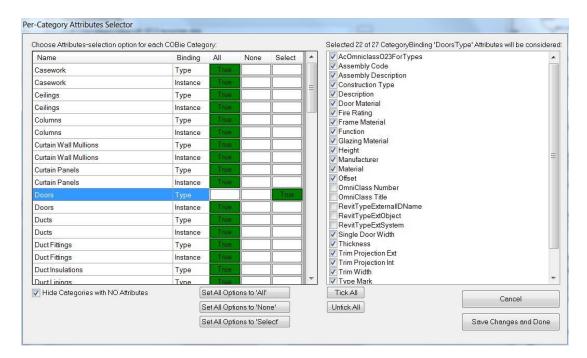
Command Export – Units Tab
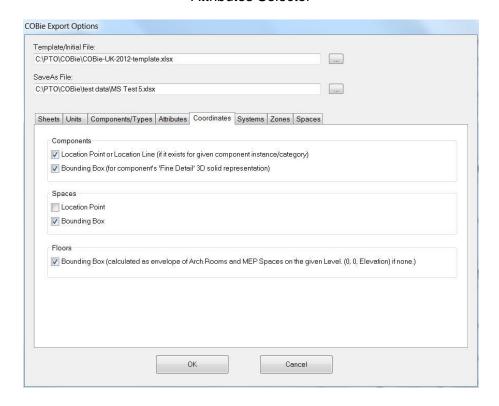

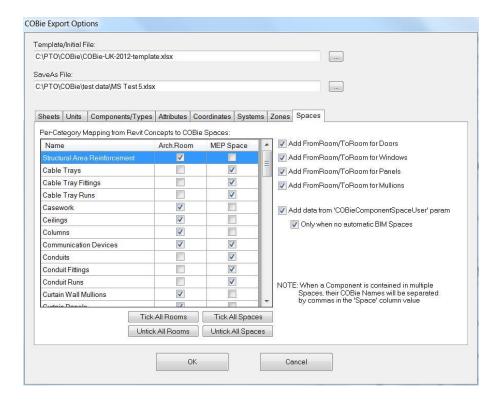Command Export – Components/Types Tab

Types Selector

Command Export – Attributes Tab

Attributes Selector

Command Export – Coordinates Tab

Command Export – Spaces Tab

BIM Coordinator Tools for AutoCAD Civil 3D and Revit

ToDo… (will be updated in the Final version just before AU)

Data Transfer Tool for Revit

ToDo… (will be updated in the Final version just before AU)

Revit API Resources

Assuming that you are familiar with .NET programming (typically C# or VB.NET), the best place to start with is the Revit Developer Center: http://www.autodesk.com/developrevit. Also very useful:

- The Building Coder, Jeremy Tammik's Revit API Blog: http://thebuildingcoder.typepad.com
- Discussion Groups: http://discussion.autodesk.com > Revit Architecture > Revit API
- API Training Classes: http://www.autodesk.com/apitraining or
- Autodesk Developer Network: http://www.autodesk.com/joinadn
- DevHelp Online for ADN members: http://adn.autodesk.com

Revit SDK

The SDK is provided with the product:

- From installer under "Install Tools and Utilities"
- Web and download version <extraction folder>\Utilities\SDK\RevitSDK.exe

SDK Installer in Revit 2012 temporary setup files

- C:\Autodesk\Autodesk_Revit_Architecture_2012_ENU_Win_32-64bit\Utilities\SDK\RevitSDK.exe

Latest SDK update is posted to Revit Developer Center

- http://www.autodesk.com/developrevit

SDK Documentation

Read once:

- Read Me First.doc
- Getting Started with the Revit API.doc
- Revit Platform API Changes and Additions.doc

Keep at hand always:

- Revit API Developer Guide.pdf
- RevitAPI.chm
  - o What's New section is similar to Changes and Additions doc

Read if needed:

- RevitAddInUtility.chm – installer
- Autodesk Icon Guidelines.pdf – user interface
- Revit Server SDK – file access on server
- Revit Structure – section definitions and material properties
- REX SDK – Revit extensions framework

Important utilities:

- Add-In Manager
- RevitLookup

SDK Samples

Documentation:

- Revit 20Xx New Samples.doc
- SamplesReadMe.htm

Utility

- RevitAPIDllsPathUpdater.exe

Main samples solution

- SDKSamples2012.sln + all the code projects