The BIM Interoperability Tools
Opportunities in Education
Safe Harbor Statement

- We may make statements regarding planned or future development efforts for our existing or new products and services. These statements are not intended to be a promise or guarantee of future availability of products, services or features but merely reflect our current plans and based on factors currently known to us. These planned and future development efforts may change without notice. Purchasing decisions should not be made based upon reliance on these statements.

- These statements are being made as of August 17, 2021 and we assume no obligation to update these forward-looking statements to reflect events that occur or circumstances that exist or change after the date on which they were made. If this presentation is reviewed after August 17, 2021, these statements may no longer contain current or accurate information.
Charles E (Chuck) Mies, LEED AP, Assoc AIA
Senior Manager, Business Development
Autodesk, Inc.
Who is this Chuck person?

A Little about me

• “Recovering Architect”
• 16 years at Autodesk in Technical, Sales and Business Development Roles
• 36 years in industry spread across Architecture, Construction, Facilities Management and Technology
• Involved in multiple interoperability initiatives inside and outside Autodesk
• Proud Father and Grandfather
• I Escape through Woodworking

And……..
I am a (Amateur) Rocket Scientist

http://www.kloudbusters.org/

http://www.argoniacup.com/
Purpose

Over the next few minutes...

- Interoperability Approach
  What is the value and how does Autodesk approach BIM Interoperability?

- BIM Interoperability Tools Introduction
  What is this set of tools, and what do they do?

- Opportunity In Education
  How can you use these tools?

- Questions and Answers
  Where to get the tools and where to get help?
Approach
What are the Challenges from Poor Interoperability

The cost to Owners and why Industry should be focused on solving this

- Poor use of data, coupled with highly fragmented teams, costs the US $15.8B annually on capital construction projects.
- The owner’s burden of that money wasted is about 65% of those costs during ongoing operations.

$15.8B

65%
What Value is Most Desired from Owners

Understanding the Owner's perception of value should influence education priorities

Communication
- Culture
- Knowledge Sharing
- Interoperability
- Less Silos

Asset Mgmt
- Asset Data Capture
- Accurate As-Buils
- ROI / Capital Planning

Data
- Access to Data
- Better Data
- Data Ownership
- Data Integrity
Delivering Value – The Autodesk Approach

How do we tackle BIM Interoperability to deliver this value?

Standardize → Validate → Deliver
BIM Interoperability Tools

https://interoperability.autodesk.com

- **Free** tools to help you with interoperability

- In development since 2011, **downloaded over 1.5 million times** worldwide

- They are included in the **Autodesk Desktop App** for all Revit installations

- You can also find them in your account on the **manage.autodesk.com** site

- If you have problems, let us know, we can get you the tools!
BIM Interoperability Tools
Align the Tools with Standardize, Validate, Deliver

**Standardize**
- Autodesk Classification Manager for Revit
- Autodesk Equipment Data Tool for Revit
- Autodesk Spatial Data Tool for Revit

**Validate**
- Autodesk Model Checker for Revit
- Autodesk Model Checker Configurator for Revit

**Deliver**
- Autodesk COBie Extension for Revit
BIM Interoperability Tools

Align the Tools with Standardize, Validate, Deliver

**Standardize**
- Autodesk Classification Manager for Revit
- Autodesk Equipment Data Tool for Revit
- Autodesk Spatial Data Tool for Revit

**Validate**
- Autodesk Model Checker for Revit
- Autodesk Model Checker Configurator for Revit

**Deliver**
- Autodesk COBie Extension for Revit
Autodesk **Classification Manager** for Revit

- Build “picklists” of data to allow your teams to choose from a pre-built list of values when adding data to parameters on elements.

- Includes **robust databases** for all the major classification systems: UniFormat, MasterFormat, OmniClass, Uniclass, IFC, FICM.

- Quickly apply data from **multiple classification systems** at once to all your elements.
Autodesk Equipment Data Tool for Revit

- Easily assign **family subcategories** for your equipment
- Based on the subcategory, automatically assign custom parameters to your equipment families
- **Batch update** all your equipment families with your custom parameters and pre-populated values
Easily attach your **custom parameters** to all Rooms and Areas in your model

Quickly **synchronize** the Name and Number data between your Rooms and Areas

Export your settings to import and **standardize** across all models in your projects
BIM Interoperability Tools - Standardize

Applications for Curriculum

**Standardize**

Autodesk **Classification Manager** for Revit
Autodesk **Equipment Data Tool** for Revit
Autodesk **Spatial Data Tool** for Revit

**Educational Concepts Supported**
- Benefits from using classification systems in architecture, engineering and construction
- Importance in consistency of data input and how to accommodate
- Value of standardized sets of information for each object type and the role in operations

**Applicable Courses**
- Fundamental Modeling Courses (All)
- Architectural Courses (Classification, Spatial)
- Engineering courses (Classification, Equipment)
- Construction Management Courses (Classification, Equipment)
- Construction Estimating Courses (Classification)
- Facilities Management Courses (All)
BIM Interoperability Tools
Align the Tools with Standardize, Validate, Deliver

- Autodesk Classification Manager for Revit
- Autodesk Equipment Data Tool for Revit
- Autodesk Spatial Data Tool for Revit
- Autodesk Model Checker for Revit
- Autodesk Model Checker Configurator for Revit
- Autodesk COBie Extension for Revit
Autodesk **Model Checker** for Revit

- Automatically **check your Revit models** against a set of pre-determined data standards
- Reports can be read directly or from a **Dashboard**
- Dozens of **pre-built** and tested checksets are already included for you to use or customize (Revit modeling best practices, general model health, standard and informational checks, COBie)
- Easily **create your own** custom checksets with the Configurator
- Includes **automation and scheduling**

Standardize - - - Validate - - - Deliver
Autodesk Model Checker Configurator

- **Create your own** checkset files for the Autodesk Model Checker for Revit
- **3 different** methods to build your checks (Pre-built, Wizard, Advanced)
- Ships with dozens of **sample checkset** files to use as a starting point
- Checkset files are **open-source** XML format
BIM Interoperability Tools - Validate

Applications for Curriculum

Validate

Autodesk Model Checker for Revit

Autodesk Model Checker Configurator for Revit

Educational Concepts Supported
- The use of tools for model validation and correction
- Importance of modeling best practices
- How to measure and track model health to identify trends and correct
- How to easily identify and correct model errors

Applicable Courses
- Fundamental Modeling Courses (All)
- Architectural Courses (All)
- Engineering Courses (All)
- Construction Management Courses (All)
- Construction Estimating Courses (All)
- Facilities Management Courses (All)
BIM Interoperability Tools

Align the Tools with Standardize, Validate, Deliver

**Standardize**
- Autodesk Classification Manager for Revit
- Autodesk Equipment Data Tool for Revit
- Autodesk Spatial Data Tool for Revit

**Validate**
- Autodesk Model Checker for Revit
- Autodesk Model Checker Configurator for Revit

**Deliver**
- Autodesk COBie Extension for Revit
Autodesk COBie Extension for Revit

- Setup your Revit models to capture and manage COBie data
- Export that data to a COBie compliant spreadsheet
- Includes features like a Zone Manager and customer parameter mapping
- Integrated with the Classification Manager
BIM Interoperability Tools - Deliver

Applications for Curriculum

Educational Concepts Supported

- The role of standards in data handover
- The importance of structured formats in managing and collecting attributes
- The opportunity for cost-savings in FM handover information

Applicable Courses

- Construction Management Courses
- Courses / Workshops Specific To COBie
Example Opportunity
Model Checker / Configurator
Revit Best Practices

96 checks to review modeling best practices and integrity (for Revit 2019 - 2022)

Model Performance
- How many warnings and purgeable elements?
- What are the largest families?
- How many links, raster images, and imported CAD files?

Rooms, Spaces, Areas
- How many of each?
- Are any unplaced, unenclosed, or redundant?
- Do they all have unique numbers?

Views
- How many Views, Schedules, Sheets, Scope Boxes?
- What Views don't have a template assigned?
- What Views have hidden elements?

Elements
- Any on the wrong worksets?
- Any duplicates?
- What Generic Models and in-place families exist?
- How many of each category?
- How many total?
Revit Best Practices

Quickly Check a Model Against Accepted Practices

Simple Process for Model Checking

- Install the BIM Interoperability Tools
- From the BIM Interoperability Tools ribbon menu, select “Setup” under the Model Checker
- From the publicly available checks, select “Revit Best Practices” for the version of Revit that you are using
- Select “Save and Close”
- Back to the Ribbon, Select “Run” and then “Run Report”
- When Completed, The Report will be Displayed
Model Health Dashboard Sample

23 Trackable, quantifiable checks for model health review used in Power BI Dashboard

**Model Performance**
- How many warnings?
- How many purgeable elements?
- How many duplicate elements?
- What is the file size?

**Links and Imports**
- What are the linked Revit and CAD files?
- What are the imported CAD files?
- What other imports exist (SKP and raster images)?

**Views**
- How many Views?
- How many Sheets?
- What Views are not on Sheets?
- What Views have hidden elements?

**Elements**
- How many Model and Detail Groups?
- How many In-Place Families?
- What is the total number of elements?
Project X
Model Health Latest Dashboard

Warnings Per MB

Total Warnings: 944

File Size in MB: 433 MB

Total Elements: 262K

Purgable Elements: 1693

Elements Performance

- Model Groups: 511
- Detail Groups: 12K
- In-Place Families: 555
- Duplicates: 173

Views

- Total Views: 2493
- Not On Sheets: 722
- Sheets: 318

Imports

- CAD Imports: 101
- SKP Imports: 0
- Custom Obj Styles: 1482
- Raster Images: 95

Links

- Revit Links: 15
- CAD Links: 19

Worksets and Options

- Worksets: 13
- Options: 10
Model Health Dashboard

Use the Model Checker to export consistent formatted data to track your model's health in a data visualization application.

**Single Revit Project Tracking**

- Download a sample Health Dashboard Model Checker checklist XML, a Microsoft PowerBI template, and instructions. This sample will track a single Revit project over time.
- Watch a video with detailed instructions on implementing the sample dashboard. This sample will track a single Revit project over time.

**Multiple Revit Project Tracking**

- Download a sample Health Dashboard Model Checker checklist XML, a Microsoft PowerBI template, and instructions. This sample will track multiple Revit projects over time.
- Watch a video with detailed instructions on implementing the sample dashboard. This sample will track multiple Revit projects over time.

Detailed Help Available for Setting Up the Tool

https://interoperability.autodesk.com/modelchecker.php

https://youtu.be/nUS_hE0Dn5E

https://youtu.be/_DBky01uRq4
IN SUMMARY
In Summary
Some thoughts on the tools in an educational context

1. **Model Checker**
   - Use the Revit best practices checks to ensure that your students are modeling consistent with Autodesk guides

2. **Model Checker**
   - Use the model health check and Power BI dashboard templates to understand your class’ model development from a dashboard

3. **Model Checker Configurator**
   - Develop checks that can help the students understand the importance of data and attribution

4. **Classification Manager**
   - Teach the students to use the Classification Manager to generate picklists for all common labeling and classification tasks

5. **Equipment Data Tool**
   - Learn the role of the Equipment Data Tool in some of the most requested industry trends such as Digital Twins

6. **Take Advantage of In-Revit Workflows**
   - Because the tools run inside of Revit, they create an iterative process. Check It, Correct It!
Start with the Tools Website

https://interopability.autodesk.com/

These free Autodesk apps are designed to help architects, engineers, contractors and owners with their Building Information Modeling (BIM) workflows.

Learn more on YouTube ▶

Autodesk is currently reevaluating our support of the Enhanced DWG Editor and the COBie Extension for NavisWorks plugins. During the evaluation period, we have removed the tools from the download site. Please contact BIMinteroperability@autodesk.com for questions or if you need access to either tool.
Explore the YouTube Site

https://www.youtube.com/biminteroperabilitytools
QUESTIONS