20 Practical Uses of Dynamo for Revit to Improve Team Efficiency

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Class summary

Through practical applications of Dynamo for Revit workflow concepts, project teams can anticipate improved efficiency and productivity through various phases of the project. This course will apply to any user, across all disciplines, who has a general understanding of Dynamo and is looking to extend its functionality within Revit workflows.
Key learning objectives

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

- Generate graphs in a clear and organized fashion to make them intuitive for team members to use
- Apply Dynamo for Revit for managing data
- Understand the application of Dynamo for Revit for automating object placement and manipulation
- Increase the applicable functionality of graphs across multiple disciplines
About Us
Presenters

Matthew Anderle

Building Information Modeling (BIM) Director for the Buildings+Places business line of AECOM, with focus on the Americas. He is a BIM and technology evangelist with over 16 years of experience establishing global BIM workflows and standards around content, training, interoperability, and BIM consultation as a service. His experience spans over multiple market sectors with emphasis on large healthcare facilities, data centers, aviation, government projects, and residential. Anderle serves AECOM as a leader in the advanced and efficient implementation of BIM processes for a variety of project types. He manages and directs large project teams on interoffice BIM collaboration workflows, enabling continental offices to work as one entity.
Ron Allen

BIM Manager with AECOM through the Buildings+Places in the Greenwood /Denver Office. His professional career started in Architecture in 1998. Since 2006 he has worked production and BIM management on several projects across many Architectural Business lines from interiors, through residential, production housing, commercial, low/mid/high rise, hospitality, medical, military, industrial, themed, and transit. In his current position at AECOM and an Arc IV/BIM Manager he is continuing the integration and exploration of new and useful technologies including Databases, LIDAR, UAVs, Photogrammetry, IOT, Electronics, VR, AR, Model manager, Model compare, the A360 Suite including Autodesk Navis, C4R, BIM 360 Glue, Docs.
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Building iconic skyscrapers. Planning new cities. Restoring damaged environments. Connecting people and economies with roads, bridges, tunnels and transit systems. Designing parks where children play. Helping governments maintain stability and security. We connect expertise across services, markets, and geographies to deliver transformative outcomes. Worldwide, we design, build, finance, operate and manage projects and programs that unlock opportunities, protect our environment and improve people’s lives.

We are AECOM. Built to deliver a better world.

- ~US$18 billion of revenue during fiscal year 2015
- Ranked #1 in Engineering News Record’s “Top 500 Design Firms” for 7th consecutive year
- Named one of Fortune magazine’s “World’s Most Admired Companies” for the second consecutive year
Getting Organized
Dynamo Graph Organization

- Standard Graph Organization
- Use Node Groups
- Consistent Color Key
- Intuitive Graph Functionality

Graph Color Legend:
- Blue: User Selections, Settings, and Credits
- Green: Discovery and Retrieval of Information
- Gray: Processing Data
- Pink: Creating Elements in Dynamo
- Purple: Creating Elements in Revit
- Orange: Writing Data
Dynamo Graph Flow

- Flow of Graph Example #17
Dynamo Graph Flow

- Two Results
- Clear Node Functions
- Organized Result Flow
- Central Common Data

Graph Example #17
20 Dynamo Graph Examples
20 Dynamo Graph Examples

- Grouped into Five Primary Categories
  - Output Data
  - Visualization
  - Process Data
  - Creation
  - Multi-function
LIVE Dynamo!
20 Graph Definitions
Output Data

1. Equipment To Excel

This graph selects all elements of a specified category, reports a parameter, and exports to Excel with headers.
Output Data

2. Scope Box Review

This graph identifies all view plans and exports sheet number, sheet name, and scope box name to an Excel file with headers. It also provides the ability to filter the view based on a string value.
Output Data

3. View Range Manager

This graph identifies all elements of view plans and exports view range parameters to an Excel file with headers. It also provides the ability to filter the view based on a string value.
### Output Data

#### 4. Parameter Investigator

This graph reports all available instances and type parameters of a selected category and writes to Excel.
5. Workset Reporter

This graph selects all elements in the active view and creates an Excel file that reports every element and its associated workset. While worksets are not able to be scheduled in Revit, this graph provides a QA/QC opportunity for the project team to review model element organization.
Visualization

6. Column Splicing

This graph utilizes a select node to:

- Select columns
- Input a splice offset above a specified level
- Set the original elevation at top before splicing
- Set level of column
- Set top offset of column
- Modify Revit elements
Visualization

7. Span-to-Depth

This graph provides a QA/QC opportunity to verify that span-to-depth ratios are being met in accordance with structural design criteria.
8. Slider Sun Settings

This graph identifies the presence of an axonometric view and if true, allows the user to access a slider scale which modifies sun settings based on date and time inputs for the following:

- Year
- Month
- Day of the month
- 24-hour time period
- Shadow intensity
Process Data

9. Write to Mechanical Equipment

This graph retrieves all elements of the category Mechanical Equipment and allows the user to input a value to a parameter providing the team an efficient means to populate large amounts of data without the need to generate schedules.
10. Auto-Set Equipment Locations by Space Name

This graph sets all elements of a Space or Room category, creates a bounding box of those Spaces or Rooms, and evaluates whether another category is contained within the bounding box. It populates parameters from the Space or Room to the specified element category.
Process Data

11. Pipe Height Adjust

This graph selects all elements of the Pipe category in the active view and adjusts the current offset height to a new user input offset height.
12. Caissons to Topography

This graph allows the user to select a Revit topographic element and adjust all structural foundations depth-to-rock parameter to the selected topographic element.
13. Match Elements to Reference Plane

This graph adjusts the start and end offsets of each structural member to a reference plane.
14. Space and Room Data Clear

This graph selects all Spaces and resets the name parameter to a user input value; and the number parameter with a user input starting number.
Creation

15. Sheet Creator

This graph references a user generated Excel file with a predefined sheet index, allows the user to select a title block family, and inputs a series of parameter values, filters any existing sheets, and creates the remaining list as new sheets in Revit.
16. Place Views on Sheets

This graph has two functional paths: one which captures a view list that can be filtered by the project team and outputs the data to Excel; the other path reads the Excel file with the addition of the sheet name and number and creates new sheets with the selected titleblock, and places the corresponding view on the sheet.
17. Excel Square Footage-to-Family Instance

This graph reads an Excel file with design program data, which is divided into two columns: one with planned size and the other with existing size of rooms or departments based on area. This graph then places a family instance, sizing it to match the planned and existing areas. A three dimensional text family accompanies each family instance. Parameter data is then transferred from the Excel file to each family.
18. Area Boundary-to-Floor Element

This graph identifies areas per level, generates boundary curves in Dynamo, and converts those boundaries into new floor element objects while transferring data from the original area object to the corresponding floor.
19. Create Room Plans Cropped to the Room

This graph captures all rooms in a view and filters that list against user defined name or number queries and generates a new floor plan with a crop region set to a user defined offset value. A view template can also be applied at the time of view creation.
§ 20. Linked Elements Intersecting Spaces Data Transfer

This graph analyzes parameter data from linked model elements which intersect the active model Spaces and retrieves parameter data from the intersecting linked elements and compiles requested data into each space.
#1 The use of a **consistent color schema** to organize your Dynamo Graphs will make them more intuitive for your team and improve comprehension of functionality.

#2 Start a “**library graph**” of common node groups for your company to reference to increase the speed of new Dynamo graph development.
Thank You

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