MECHANICAL BIM CONTENT

A Unified Approach

The goal of this document is to promote an American industry standard approach for the creation and sharing of Autodesk Fabrication BIM content between manufacturers and mechanical contractors. The goal of this approach is to define the role of the manufacturer and the role of the contractor within the technology platform.

MANUFACTURER'S RESPONSIBILITY

- Dimensional Accuracy for Spooling & Prefabrication
- Software Joining Methodology
- Reporting Data for Material Procurement

CONTRACTOR'S RESPONSIBILITY

- Specifics Within Each Contractor's Technology Environment
- Labor Values*
- Material Pricing Values*

*The intention is for the content to provide a hook into third party databases so that contractors have an ability to marry content with pricing and labor values.

MCAA

Memorandum

To: All MCAA Members

From: MCAA Technology Committee

Disclaimer

The MCAA WebLEM committee is looking for reactions and opinions regarding a plan to standardize Autodesk Fabrication BIM content. The nature of this endeavor is highly technical. Due to this the following memo is intended for Autodesk Fabrication Power Users, Database Managers, BIM Managers or other Fabrication system administrators.

Introduction

The MCAA is in the process of a major reimagining of the WebLEM and the overall interface between estimating data and our member companies. A part of that project involves Autodesk Fabrication™ BIM content in ITM format (from here on out referred to as content). Specifically, the WebLEM website will have links to content on the labor estimating pages. The structure will be that the WebLEM site will host links to the content, the actual content will be provided by third party content providers or manufacturers. The MCAA will be providing an API that will allow approved content providers a technical framework for connecting their content to the WebLEM site. Another part of the project is researching the viability of creating or promoting a content standard that would make the transfer of content between manufacturers and MCAA member companies more useful. As it stands right now, content created in one Fabrication environment is not necessarily geometrically correct in another Fabrication environment due to the interplay between connector definitions in the environment and product list dimensions in the ITM. What follows is a proposed standard way of trying to allow manufactures to make content as they see fit, but in such a way that there is a set method for member contractors to use that created BIM data. We will lay out this proposal in two parts, one, the manufacturer's responsibility, and secondly the contractor's method of using the content (as well as the contractor's responsibility).

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Manufacturers Responsibility

Manufacturers will be responsible for the product list ITM dimensions (See Figure 1), plus the connector definitions applied to those ITMs (See Figure 2), in the Fabrication environment that those ITMs are created in. In addition, the connectors will be grouped in the connector database by manufacture name.

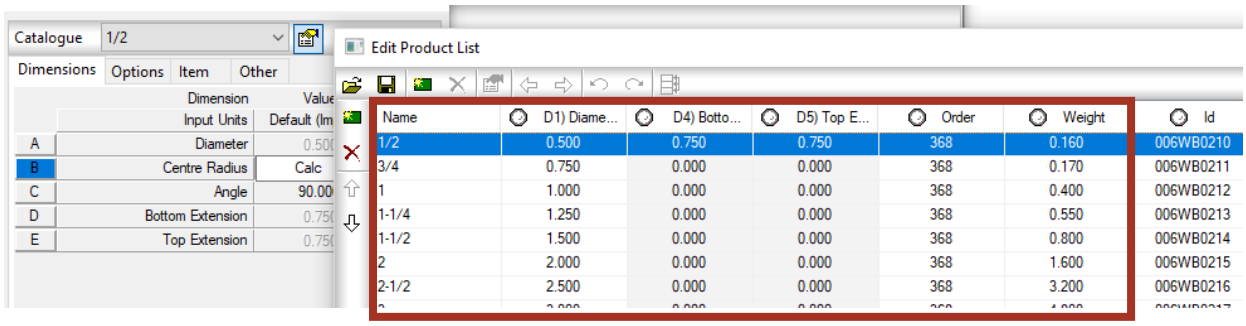

Figure 1 - Autodesk Fabrication Product List Editor

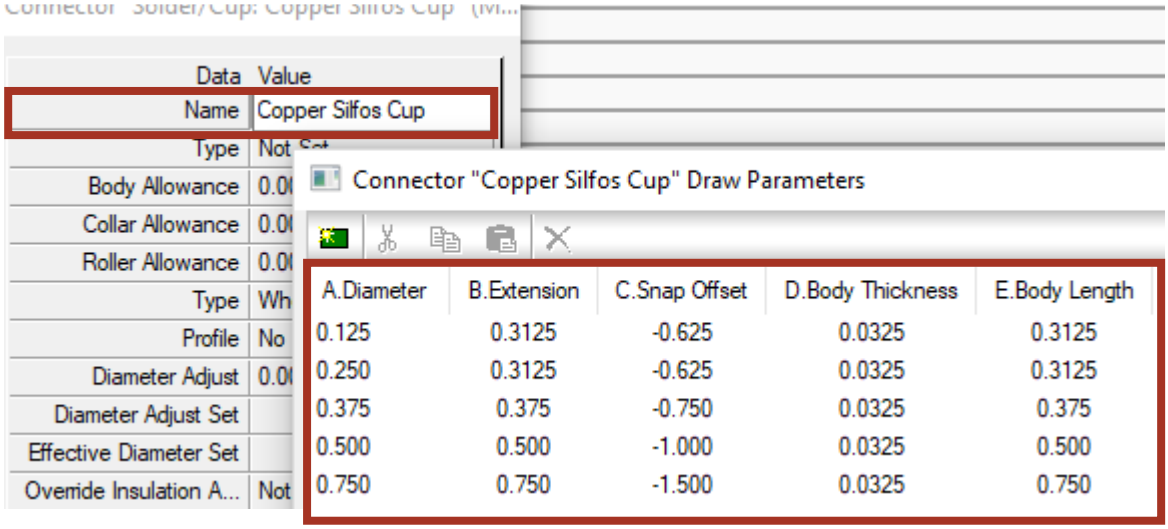

Figure 2 - Autodesk Fabrication Connector Definitions & Breakpoints

The connector names should follow this standard naming convention

- Manufacturer Name -> Material -> Joining Method -> Connector End Name
- Manufacturer Name -> Joining Method -> Connector End Name
- Manufacturer Name -> Material -> Connector End Name
- Manufacturer Name -> Connector End Name

The actual name is not what is important. What is crucial is that the name is

- Unique to that manufacturer
- Consistent with other connectors from that manufacturer

The standard also stipulates that the connector group is defined by the manufacturer and is unique to the manufacturer (corporation name or common industry product name would seem the most logical).

Some detailed notes on zero length couplings (i.e. zero length joint ITMs or zero length ITMs) follows. We are putting forward in the standard that we use, if at all possible, the actual parts to make connectivity work in lieu of separate ITMs with a zero length. We outline here 3 examples of connectivity via part ITMs, the connector definitions and grouping, connection ITMs (e.g. welds), and a slightly more complicated valve connection with commentary. (See figure 3, 4, 5)

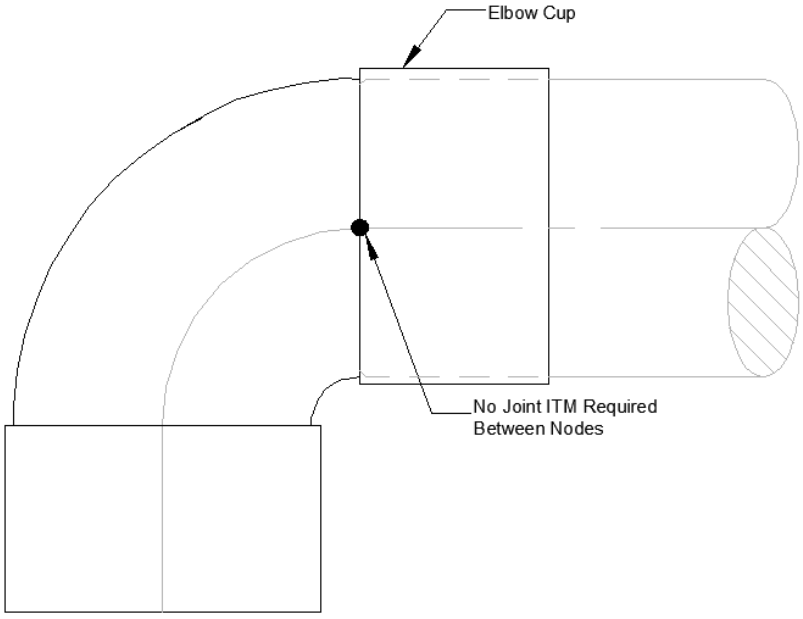

Figure 3 – No Joint ITM Example

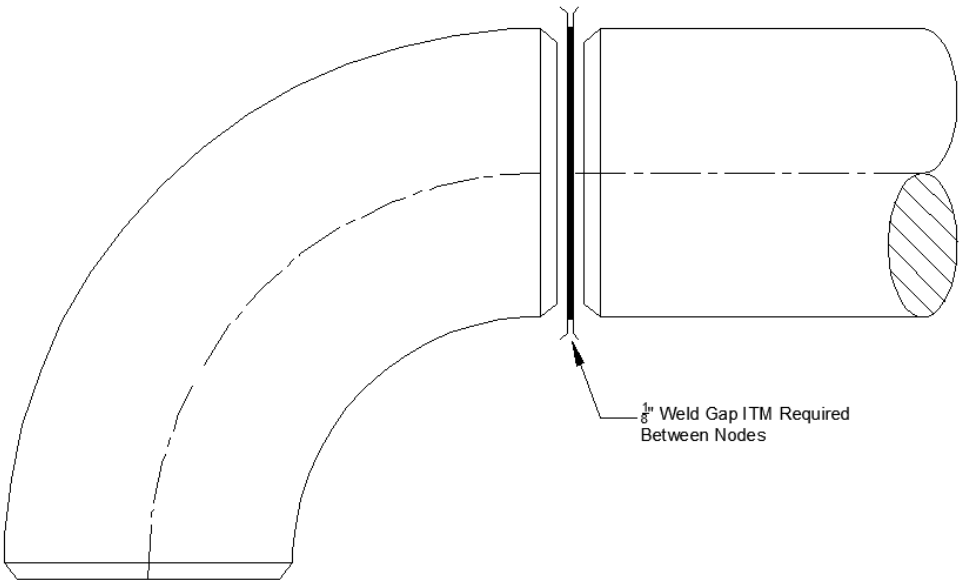

Figure 4 - Weld Gap ITM Example

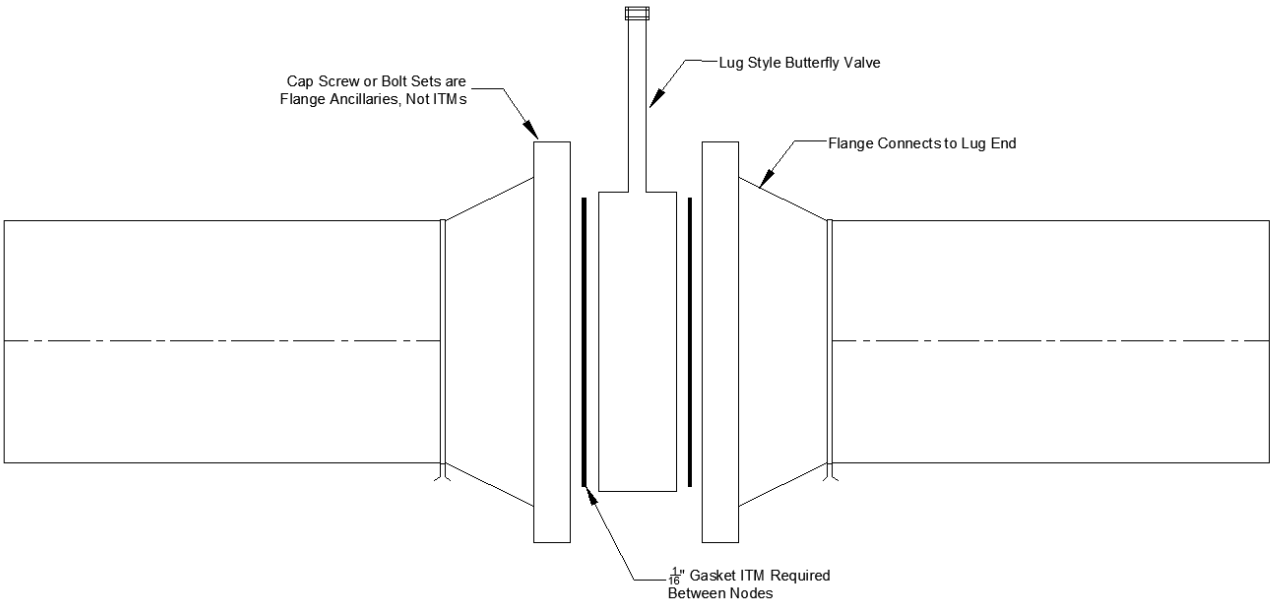

Figure 5 - Lug Style Valve with Gasket Example

The standard also asks that the manufacturer is responsible for product IDs (i.e. costing IDs…See Figure 6). These IDs should be manufacturer defined unique product IDs. The intent here is that member contractors can sign up for services with 3rd party costing data providers. We have found in our research of this part of the standard that multiple 3rd party costing data providers will also provide MCAA labor values matched with manufacturer product IDs for labor generation. We expand on this in the Contractor's Responsibility section.

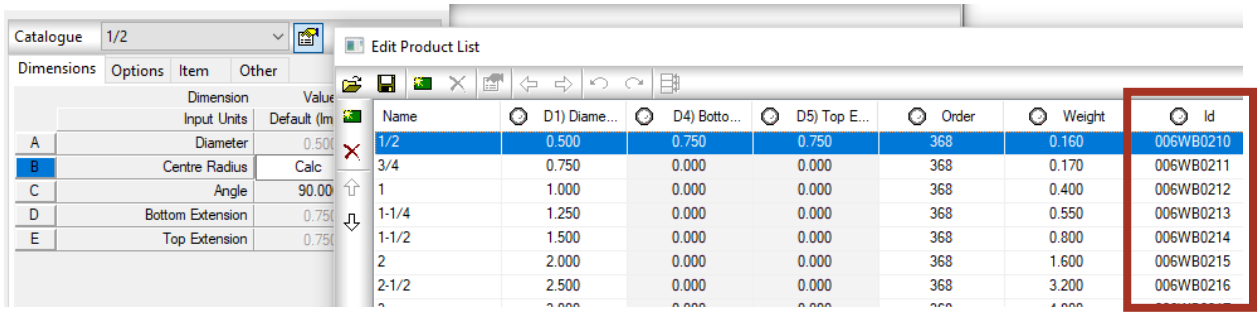

Figure 6 - Autodesk Fabrication Product List Editor Product ID

Additionally, the manufacturers will be responsible for the Order field in the product list and the Weight Field (dry weight) in the product list. (See Figure 1) What this means is that the fittings will be dimensionally correct in the manufacturers environment, and when MCAA member contractors consume this content the ITMs will be dimensionally correct in the member contractor's environment provided that the contractor's make permanent the connectors from the manufacturers.

Finally, manufacturers will be responsible for connector version control. In the Database Owner Information (See figure 7) for connectors changes to content will be versioned and a reason for the change added to content. We also ask to have the product list revision date filled out.

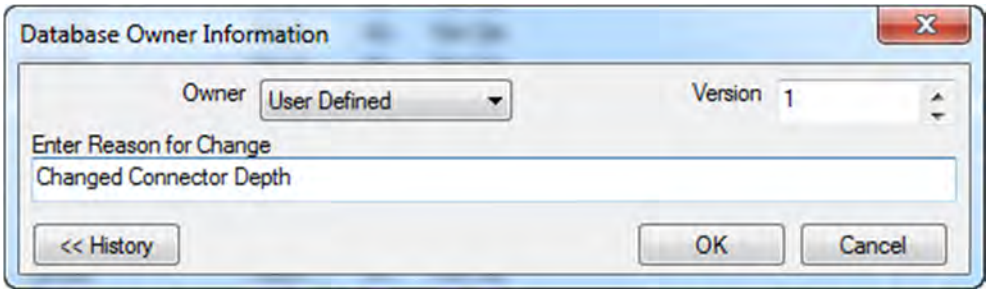

Figure 7 - Autodesk Fabrication Database Owner Information

Contractor's Responsibility

As stated above, contractors will bring in the connectors from the manufacturers with unique names from those manufacturers. This assures that the content will be dimensionally correct (assuming valid creation on the manufacturer's side). What will not necessarily work will be connectivity between the contractor's environment and existing content and the new content from manufacturers. Setting the connector connectivity fields in the Fabrication database so that content systems work as they should will be the responsibility of the contractors. It should be noted explicitly that part of this standard is that the contractors are not changing values in the product list of the content or the connector definition values in the connectors defined by the manufacturers (save for the connector connectivity field, and the estimating ancillary information).

The standard also asks that contractors are responsible for labor values and the method of attaching labor values to ITM content (breakpoint tables or product list…See figure 8), any ancillary data definitions (See Figure 9), and any costing data. However, as noted under the Manufacturer Responsibility section, if the manufacturers provide unique product IDs in the product list of the ITM content, then it should be possible by subscribing to data services from 3rd party costing data providers to obtain cross reference files that match up manufacturer product IDs, multiple 3rd party costing data provider IDs, multiple MCAA labor values (if applicable), and published list pricing. With such a data set it's possible that contractors using product list labor and product list costing could go through an exercise in data uploading to the relevant Fabrication databases to establish the correct MCAA labor values and list pricing values within that member contractor's Fabrication environment. Please note that it is expected that the labor values provided would be at 1.0 of MCAA and that any multipliers on pricing would be contractor specific. Also please note that the MCAA labor value, the list pricing values, and any multipliers would be assigned and managed in each member contractor's Fabrication database and not attached directly in any way to actual ITM content.

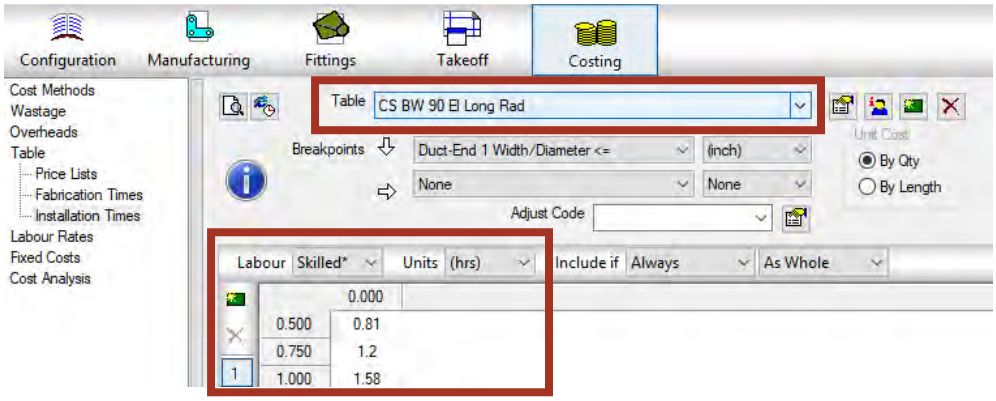

Figure 8 - Autodesk Fabrication Labor Installation Times Table

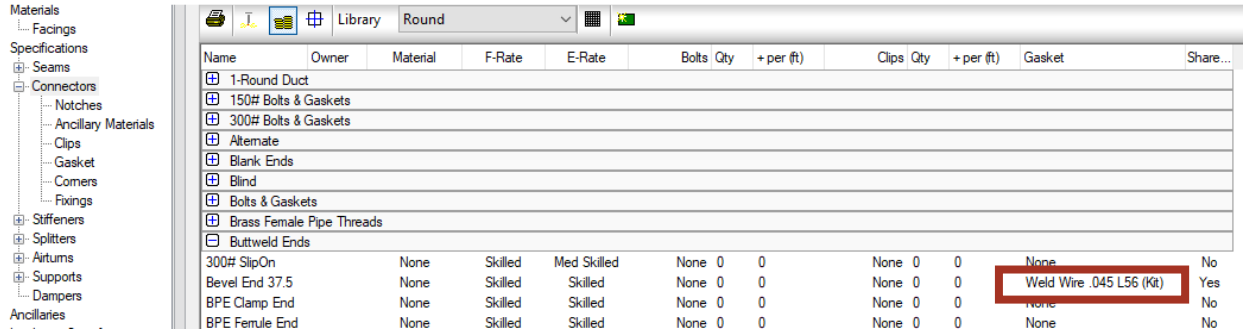

Figure 9 - Autodesk Fabrication Applying Ancillary Information

One final note on contractor responsibility, the method of defining outside dimensions (ODs) is up to the contractors. So contractors are responsible for moving any ITMs from manufacturers to a specification and/or material + spec that works in their environment. (See Figure 10)

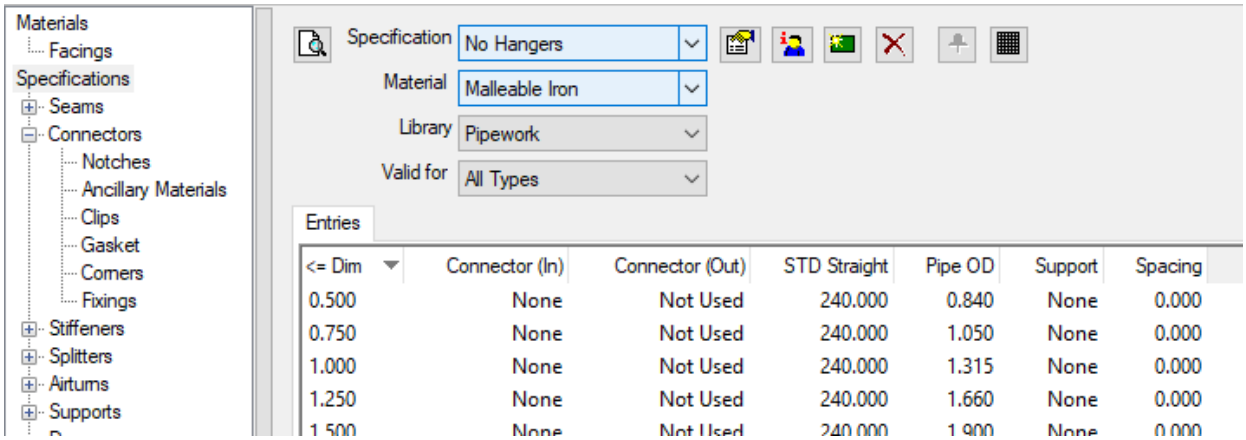

Figure 10 - Autodesk Fabrication Pipe OD Specification

A Note on Securing Labor Values

Please note that in the settings of each member contractor's Fabrication database for an AutoCAD implementation there is an important setting regarding the saving of labor and pricing data inside DWG files (See Figure 11). It is very important to check the "Do NOT Save Est Tables with DWG Database" to ensure that MCAA labor and list pricing values are stored only within the member contractor's Fabrication database and not within AutoCAD drawings.

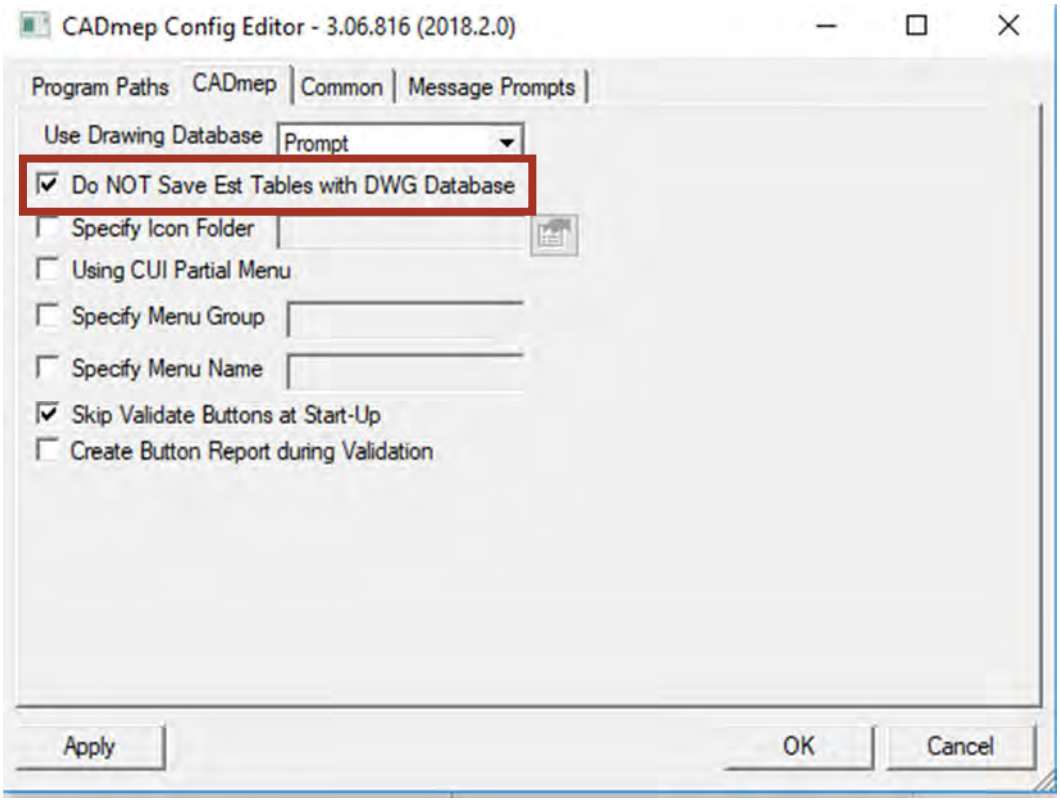

Figure 11 – Autodesk Fabrication CADmep Database Configuration Editor

A final note on securing proprietary labor and pricing values within the Revit Fabrication environment will be forthcoming following discussions with Autodesk.