

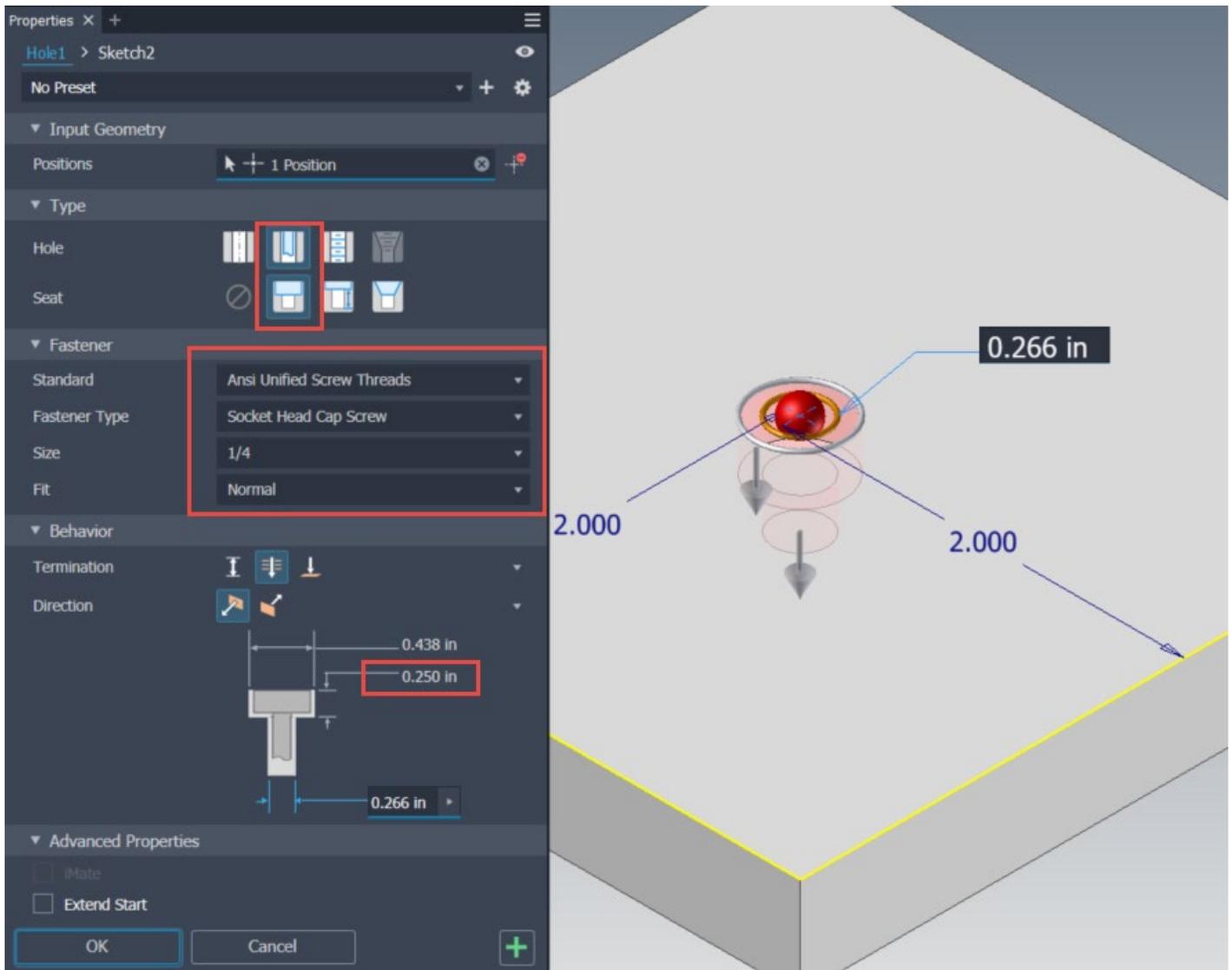
Inventor - Controlling Bolted Connections by Editing the Excel Hole Tables

In my last post, we discussed a way to control the settings of holes using the Preset tools. This is an excellent way to standardize hole configurations across a design group but does require each hole to be configured. If there is an entire category of holes to be modified, or if you'd like to introduce a new category of holes, then creating Preset holes could become a bit cumbersome. In that event, it may be easier to modify the Excel tables that Inventor uses to populate the Clearance, Tapped, and Taper-Tapped hole configurations. Below is an example of a Clearance Excel table.

1	A	B	C	D	E	F	G	H
		Sort Order -1						
2	Fastener Type	Size	Shaft Diameters			Head Dimensions		
3			Close	Normal	Loose	Diameter	Depth/Angle	Head Type
94	Socket Head Cap Screw	#4	0.116	0.1285	0.136	0.2188	0.112	1
95	Socket Head Cap Screw	#5	0.1285	0.136	0.154	0.25	0.125	1
96	Socket Head Cap Screw	#6	0.144	0.1495	0.1695	0.2813	0.138	1
97	Socket Head Cap Screw	#8	0.1695	0.177	0.1935	0.3125	0.164	1
98	Socket Head Cap Screw	#10	0.196	0.201	0.221	0.375	0.19	1
99	Socket Head Cap Screw	1/4	0.257	0.266	0.2812	0.4375	0.25	1
100	Socket Head Cap Screw	5/16	0.323	0.332	0.3437	0.5313	0.3125	1
101	Socket Head Cap Screw	3/8	0.386	0.397	0.4062	0.625	0.375	1
102	Socket Head Cap Screw	7/16	0.4531	0.4687	0.4844	0.7188	0.4375	1
103	Socket Head Cap Screw	1/2	0.5156	0.5312	0.5469	0.8125	0.5	1
104	Socket Head Cap Screw	5/8	0.6406	0.6562	0.6719	1	0.625	1
105	Socket Head Cap Screw	3/4	0.7656	0.7812	0.7969	1.1875	0.75	1
106	Socket Head Cap Screw	7/8	0.8906	0.9062	0.9219	1.375	0.875	1
107	Socket Head Cap Screw	1	1.0156	1.0312	1.0469	1.625	1	1
108	Socket Head Cap Screw	1-1/8	1.1406	1.1562	1.1719	1.8125	1.125	1
109	Socket Head Cap Screw	1-1/4	1.2656	1.2812	1.2969	2	1.25	1
110	Socket Head Cap Screw	1-3/8	1.3906	1.4062	1.4219	2.1875	1.375	1
111	Socket Head Cap Screw	1-1/2	1.5156	1.5312	1.5469	2.375	1.5	1
112	Socket Head Cap Screw	1-3/4	1.7656	1.7812	1.7969	2.75	1.75	1
113	Socket Head Cap Screw	2	2.0156	2.0312	2.0469	3.125	2	1
114	Socket Head Cap Screw	2-1/4	2.2656	2.2812	2.2969	3.5	2.25	1
115	Socket Head Cap Screw	2-1/2	2.5156	2.5312	2.5469	3.875	2.5	1
116	Socket Head Cap Screw	2-3/4	2.7656	2.7812	2.7969	4.25	2.75	1
117	Socket Head Cap Screw	3	3.0156	3.0312	3.0469	4.625	3	1
118	Socket Head Cap Screw	3-1/2	3.5156	3.5312	3.5469	5.375	3.5	1
119	Socket Head Cap Screw	3-1/4	3.2656	3.2812	3.2969	5	3.25	1

Ansi Unified Screw Threads

Adjusted Hole Settings Controlled Via the Hole Preset

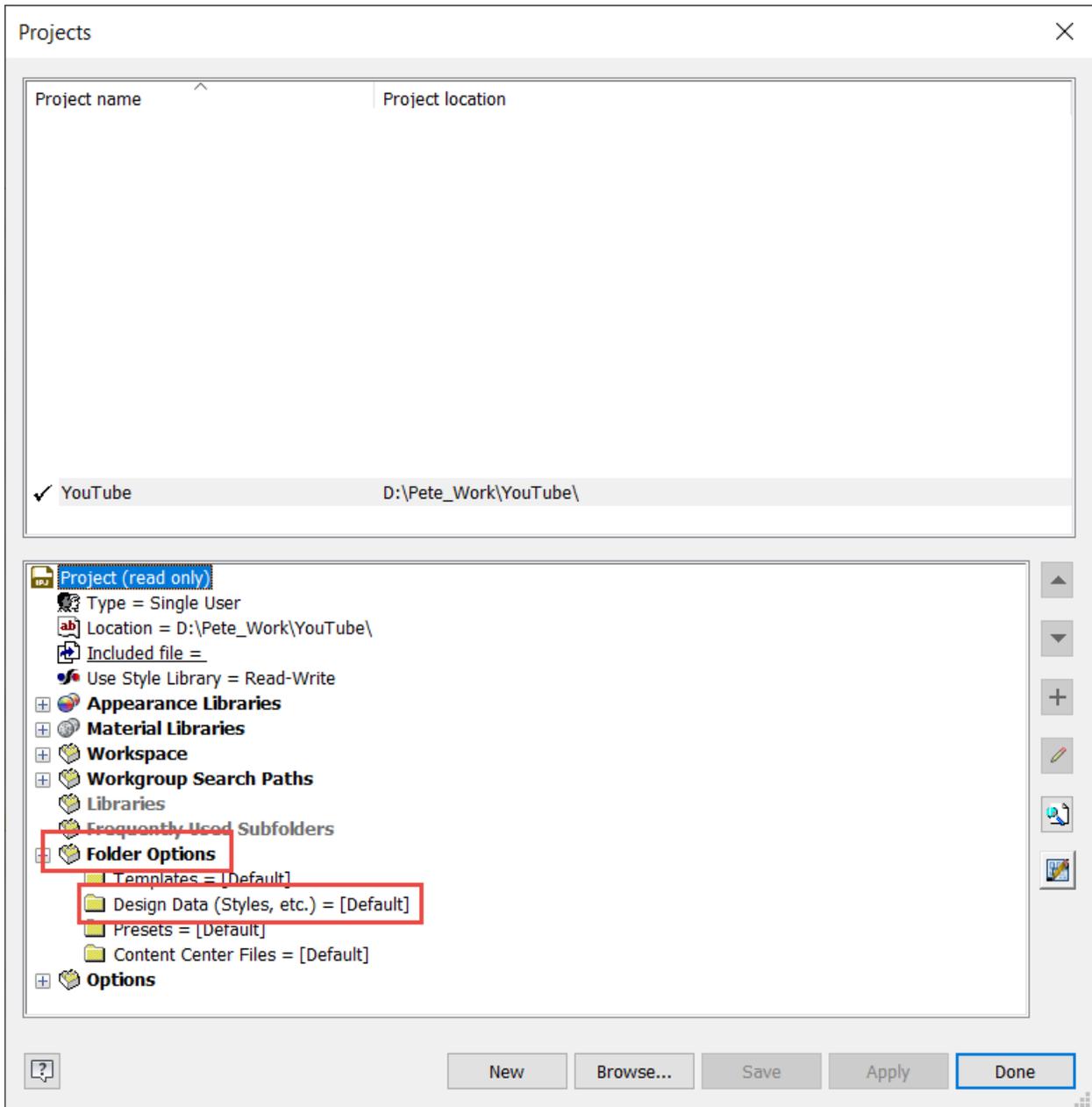


Out-of-the-Box Hole Configuration Settings Based on the Excel Spreadsheet

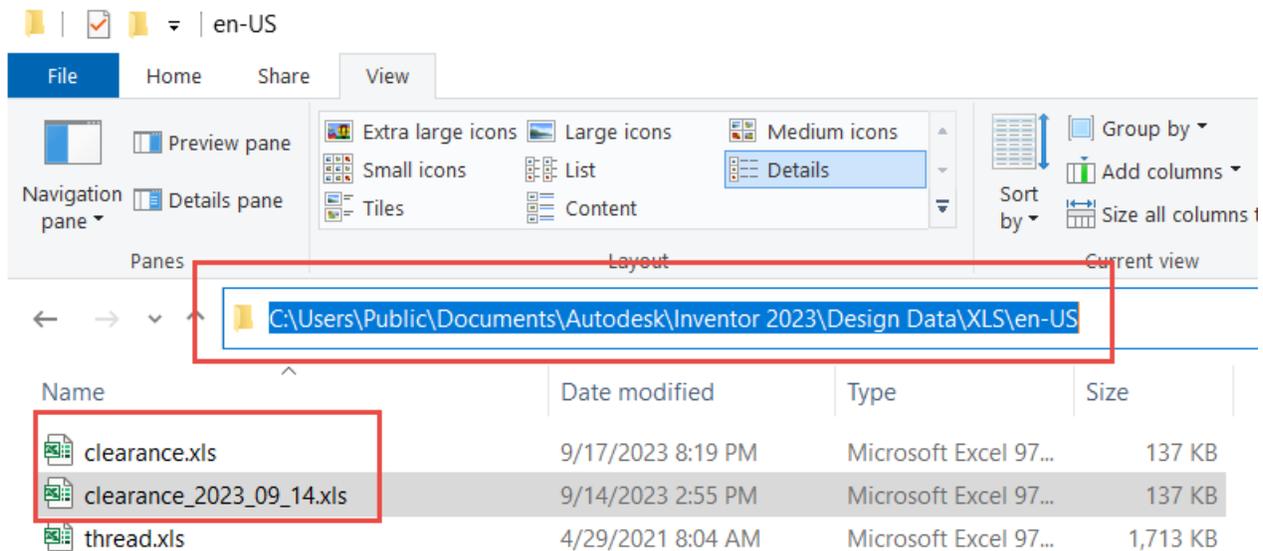
Thankfully the process for editing the Excel spreadsheets is pretty straightforward. Here are the steps below:

1. Locate the proper Excel spreadsheet.
2. Create a backup of the Excel spreadsheet to preserve previous settings.
3. Open the Excel spreadsheet and make the necessary edits
4. Save and Close the spreadsheet.
5. Launch Inventor and test the new settings (must close Inventor if the software is open when the spreadsheet is edited).

To determine the location of the Excel spreadsheets, we need to open the Project tool and identify the file paths for the Design Data. Within the Design Data, we need to navigate to the Design Data\XLS\en-US location and then make a backup copy of the spreadsheet that we'd like to modify. In this example, we're modifying a clearance hole, so we'll need to backup and modify the "clearance.xls". I typically add a date stamp to my backup files, so I have a history of the modifications that I can fall back on. Of course, if one is using Vault, then previous versions will serve the same purpose.



Find the Location of the Hole Spreadsheets in the Folder Options – Design Data



Navigate to the Design Data\XLS\en-US Location and Make a Backup Copy of the “clearance.xls”

Once inside the spreadsheet, we have to navigate to the appropriate tab. Since we’re using an imperial fastener, a ¼” socket head screw, we will switch to the “Ansi Unified Screw Threads” tab. Inside this particular tab, the clearance holes are differentiated by the different head types: flat head, hex head, oval head, and socket head. In this example, since we’re looking specifically at the socket head, we’ll look in that section and find the ¼” size and the counterbore depth. We’ll adjust that counter bore depth to 0.270” so that the fastener in the bolted connection is recessed further into the plate.

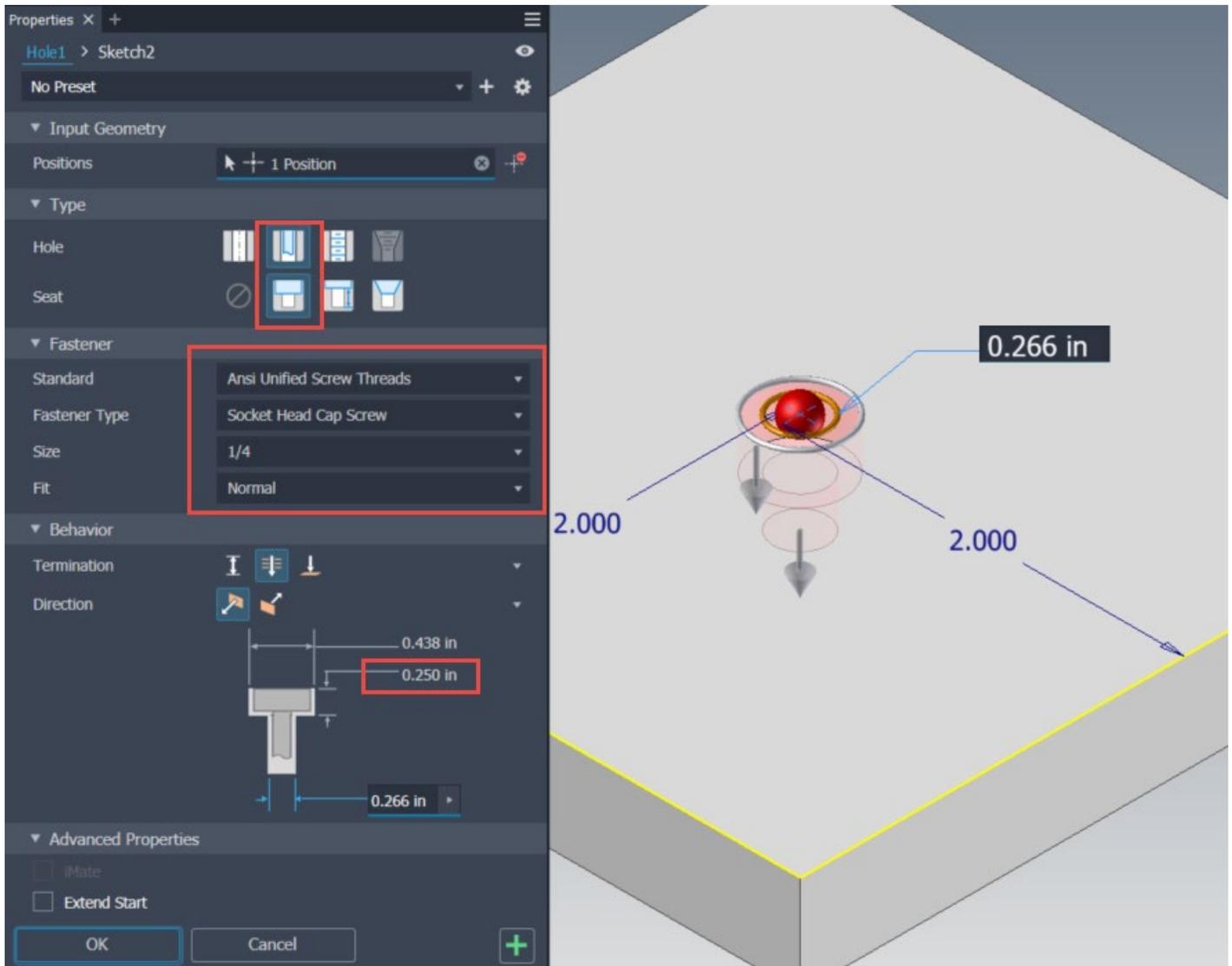
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The Original Value for the Depth of the Counterbore

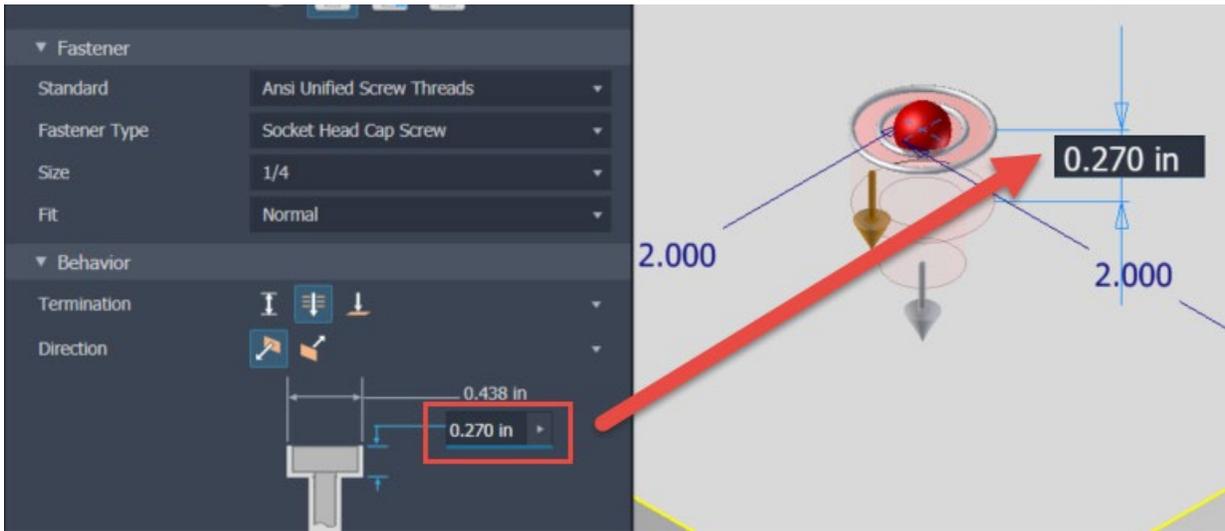
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99	Socket Head Cap Screw	1/4	0.257	0.266	0.2812	0.4375	0.27	1
100	Socket Head Cap Screw	5/16	0.323	0.332	0.3437	0.5313	0.3125	1
101	Socket Head Cap Screw	3/8	0.399	0.407	0.4187	0.625	0.375	1

Modified Value for the Desired Counterbore Depth

After closing and restarting Inventor, edit the hole feature and cycle to a different value and then back to the 1/4" Socket Head Cap Screw. Notice the value has updated to the new spreadsheet value.

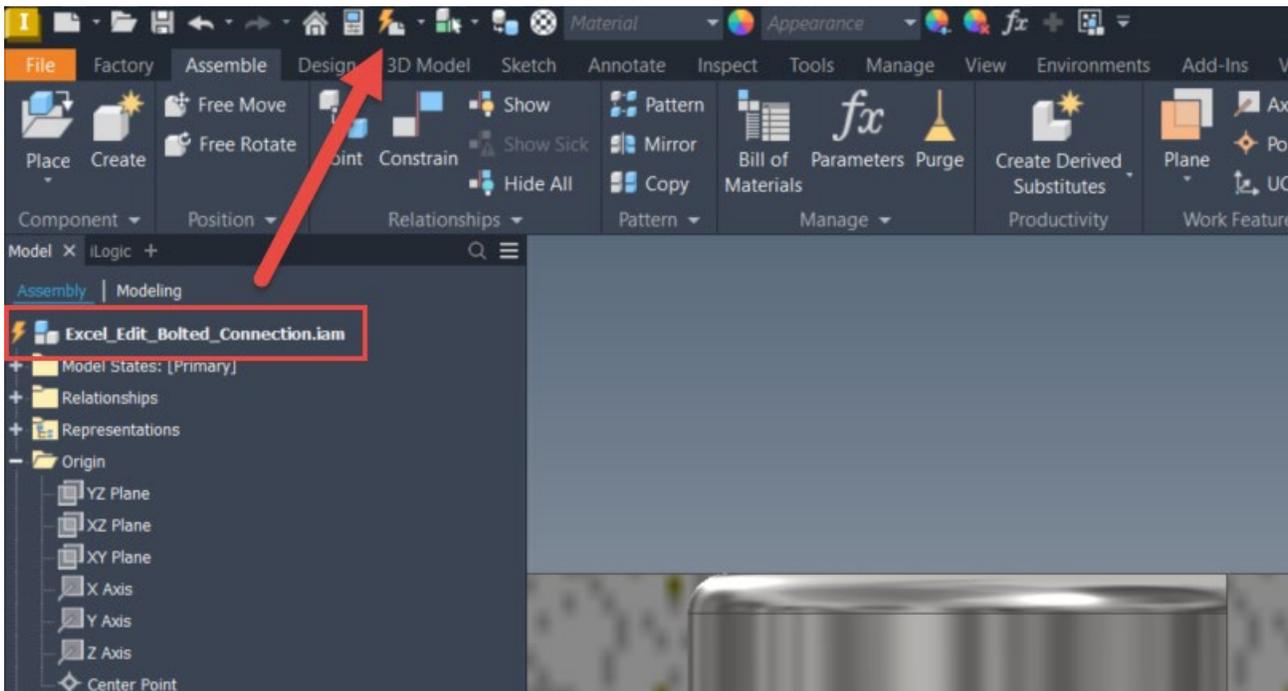


Configuration of Original Hole

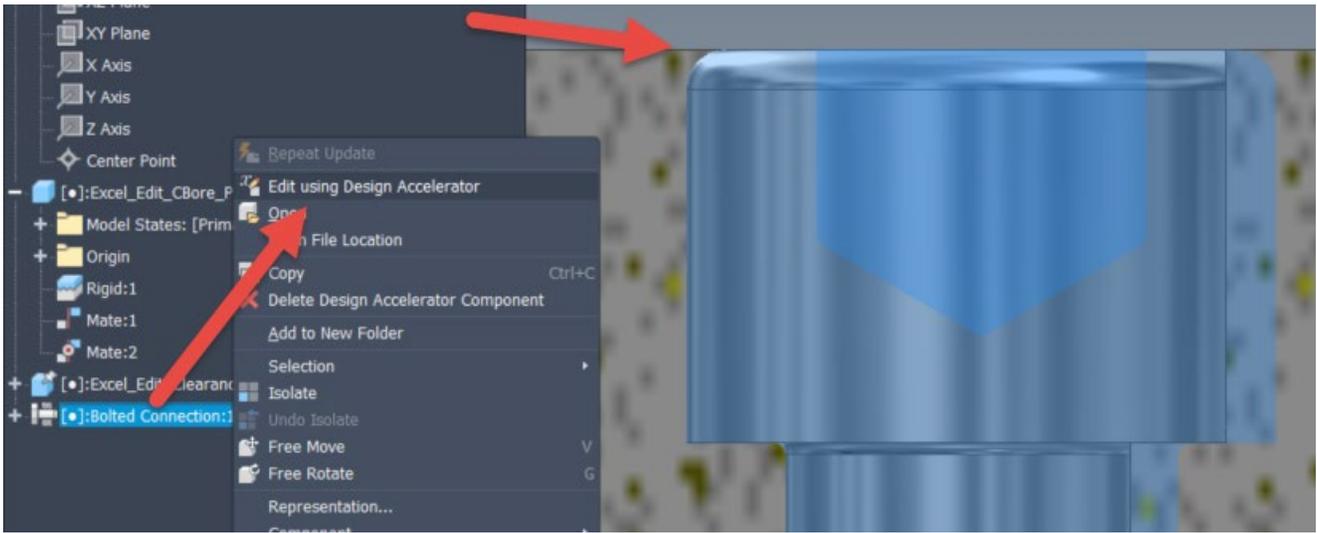


Modified Value when Toggling Away and Back to the Desired Hole

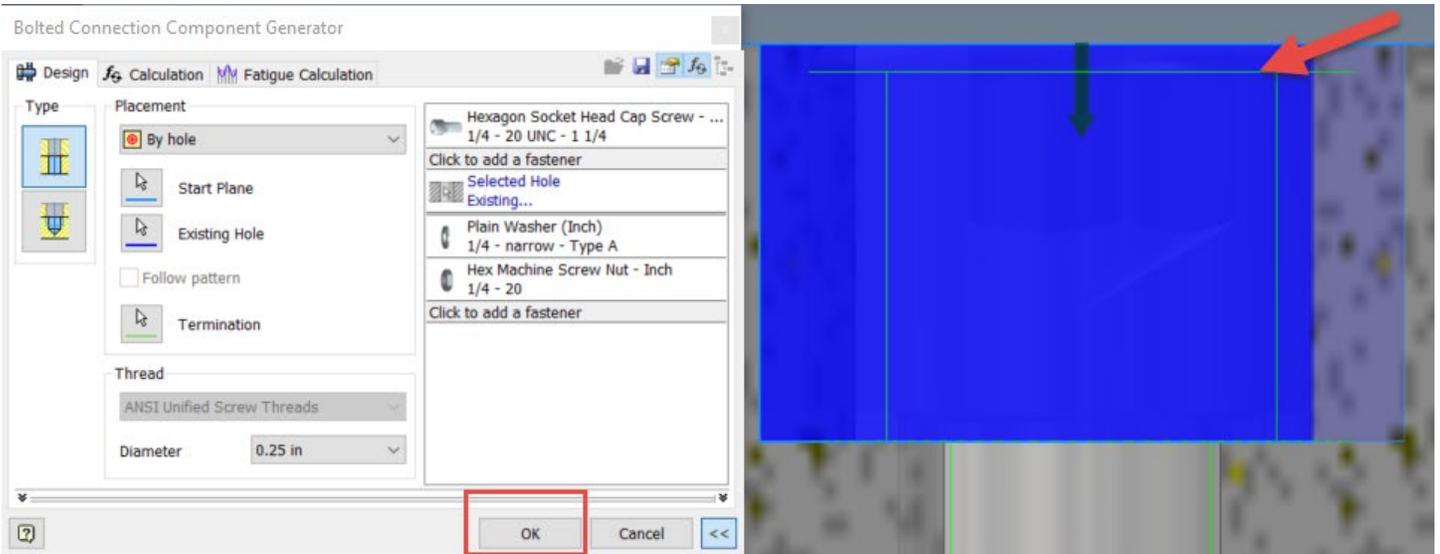
Once the hole has been modified in the part, it is time to adjust the Bolted Connection in the assembly. My **STRONG** recommendation is to use the “By Hole” option when building Bolted Connections, as this will more easily adjust to changes in the model. In our case, since the Bolted Connection has already been formed, we’ll have to take the extra step of editing the Bolted Connection itself. Fortunately, all one has to do is open the editor and click OK, so no actual changes in the Bolted Connection are required.



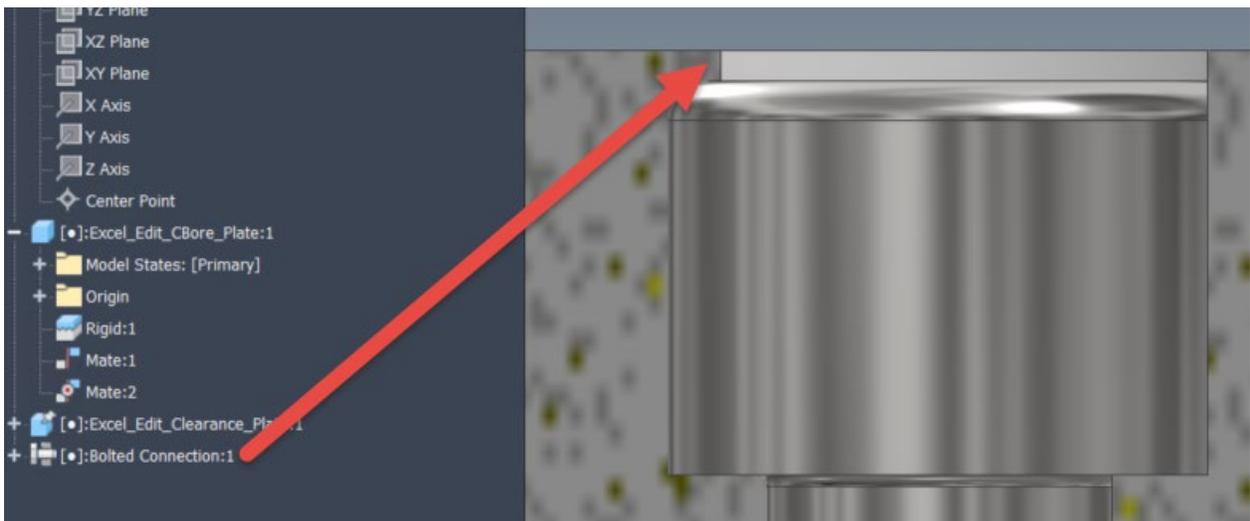
Update the Assembly, if Prompted, to Gather the Latest Component Modifications



The Bolted Connection Still Requires Editing, Even After the Assembly Update, Right-Click to do so



Merely Opening the Editor Repositions the Fastener (Note the Green Line for Top of Fastener) and Just Click OK



The Bolt is Now Recessed into the Plate

Voila! By modifying the Excel Spreadsheet and utilizing the “By Hole” option in the Bolted Connection tool, one can achieve greater control and consistency across the design group. This technique can also be a great way to create your very own Hole Tabs and control all the holes in one location. Hopefully you found this tip helpful and let us know if you have any comments or questions. Happy Blogging and have a most blessed day!