ADDING A MATERIAL VARIABLE IN SOLIDWORKS

OVERVIEW:

This document will show you how to add a global material variable in SolidWorks, such that is can be linked to from multiple parts/assemblies, and can be modified in a single location and have that change propagate throughout the project.

COMMENTS:

There are many methods to add global variable to SolidWorks. The method shown here (linking to a file) is not necessarily the best one, but it is simple and works well. If you are a SolidWorks expert and have better methods, please let us know.

Also, note that this new document may be inconsistent with the older methodology used in the posted SolidWorks videos. Use this method over the older one.
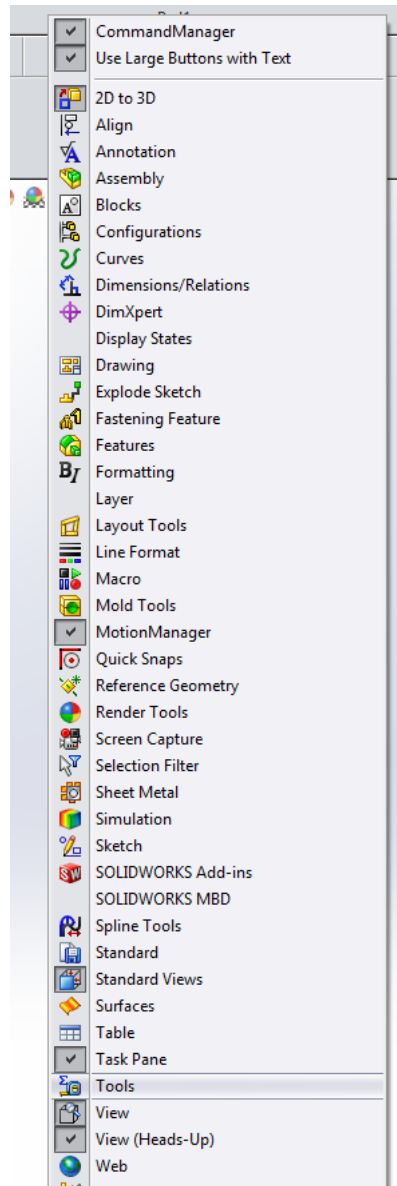
ADDING "GMATERIAL":

Typically there will be a single material that the project is made out of (usually in CMPE-118 this is acrylic, MDF, or foamcore), that is designated "GMaterial" for Global Material. The advantage of this is that the same SolidWorks parts can be prototyped out of foamcore (very cheap and fast to cut) and then the final version cut out of MDF or Acrylic without having to redesign the part. Note that some assemblies will have parts of multiple different material thicknesses, in which case you would designate each part as the material it was, rather than the global one.

The process begins with creating a new part in SolidWorks, and saving it. Once you have created a new part, you will click on the Equations icon (which looks like a blue sigma):

If you don't have it available, it means that the Tools menu is not turned on, and you will have to turn it on by right clicking on the title bar, selecting Tools. This will bring up a floating tool palette that can be docked where convenient.

| ✓ | CommandManager |
✓	Use Large Buttons with Text
	2D to 3D
	Align
	Annotation
	Assembly
	Blocks
	Configurations
	Curves
	Dimensions/Relations
	DimXpert
	Display States
	Drawing
	Explode Sketch
	Fastening Feature
	Features
	Formatting
	Layer
	Layout Tools
	Line Format
	Macro
	Mold Tools
✓	MotionManager
	Quick Snaps
	Reference Geometry
	Render Tools
	Screen Capture
	Selection Filter
	Sheet Metal
	Simulation
	Sketch
	SOLIDWORKS Add-ins
	SOLIDWORKS MBD
	Spline Tools
	Standard
	Standard Views
	Surfaces
	Table
✓	Task Pane
	Tools
	View
✓	View (Heads-Up)
	Web

Once you have clicked on the Equations icon, it will pop open the Equation window, where SolidWorks defines its variable (both local and global):
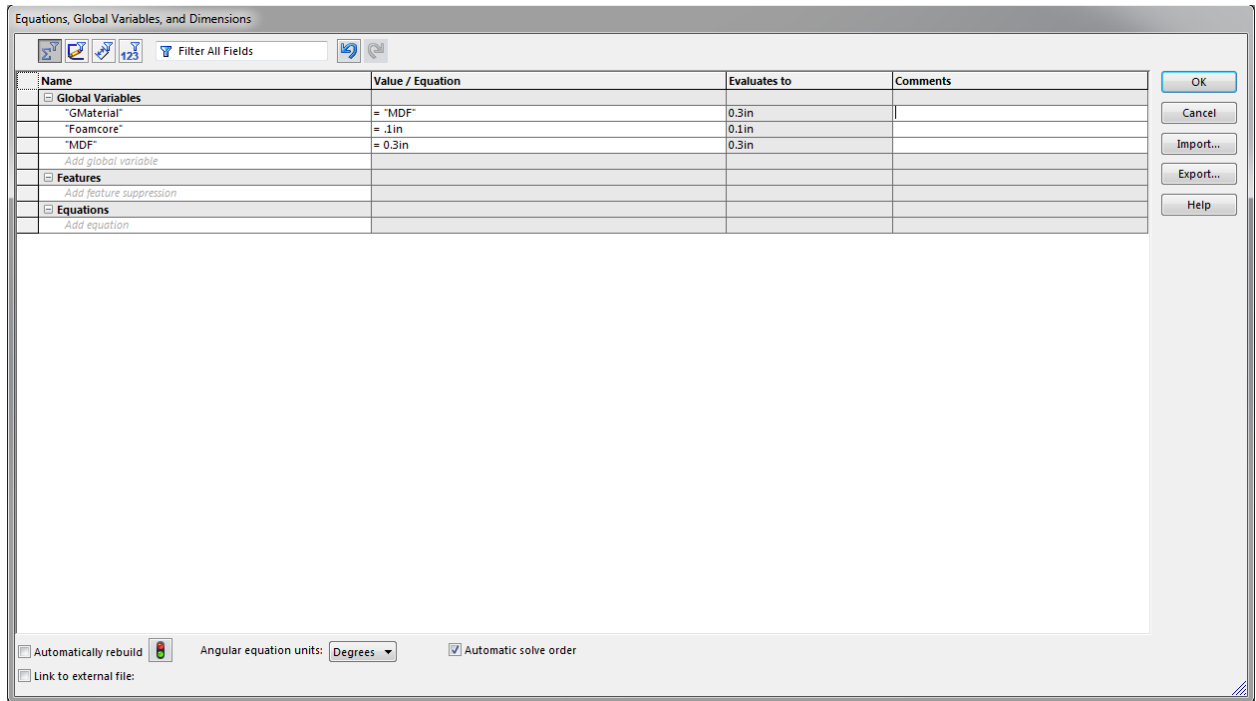
In the global materials window, type in "GMaterial," and set it to something reasonable. The quotes are important, and you need to give it an actual dimension and hit the green check mark. Repeat the process for adding "MDF" and "Foamcore." Then go back and redefine the definition of "GMaterial" to MDF by deleting the dimension you put in, and selecting Global Variables and choosing "MDF."

At this point, you have defined three global variables for this part, and will now need to create a file in which they are stored (that you will link to from other parts). Click on the bottom radio box "Link to external file." This will pop a Link Equations window:
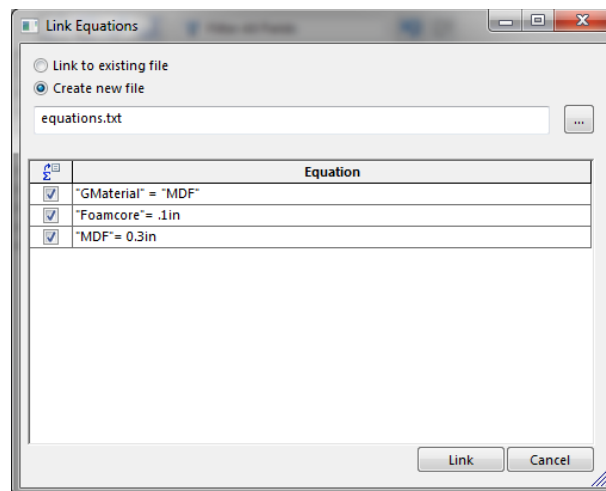

In this window, select "Create new file" and choose a new name for it and use the … to select an appropriate path to put the equations file in (it will default to Equations.txt and the folder that contains the saved part). Click "OK" and the file is created. This is where you will manipulate the values of the dimensions. Note that it is generally good practice to set the thicknesses purposefully wrong in the beginning, as you will catch places where you are using the actual dimension and not the variable.

BRINGING GLOBAL VARIABLES INTO OTHER PARTS:

Now that the equations file is defined, you can use this in any other part that you make, and link it in such that there is only one single defined value for your variables. This is the SolidWorks equivalent of using a #define in your C code.

To add the global variables, create a new part (different from the first one), and save that one as well. Click on the Equations icon, and click on the "Link to external file." This will again pop the link window, but this time select "Link to existing file" and use the … to navigate to your file.

Click the "Link" button. You might get an error because it is going in order, and "GMaterial" requires a definition of "MDF" that does not yet exist. Click on the … at the bottom of the Equation window, re-navigate to your equation file, and link it again (you might need to do this more than once).
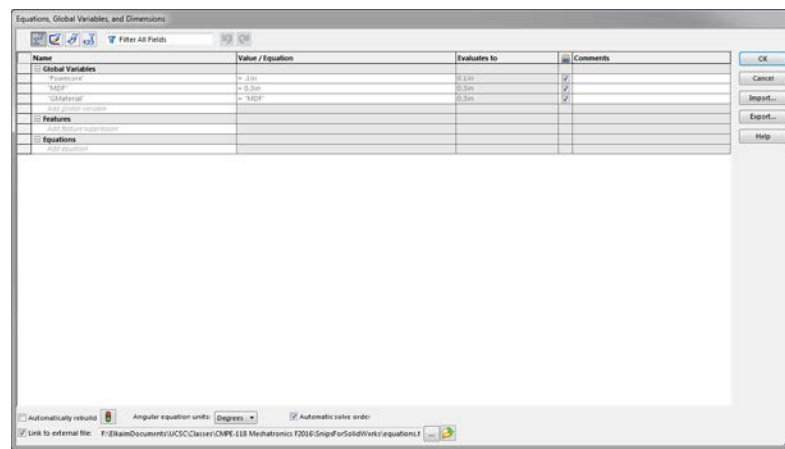
With that done, the variable are available to be used in the new part. You will notice that the variable names and their values are greyed out, indicating that they are defined in an external file, not in SolidWorks file itself. The equations file is a simple text file (but be careful in modifying it—it can be brittle to changes).

To change the variable values, edit the equations text file in Notepad++ or any other editor of your choice, and change the value of any one of your variables to something else. Click on the equation icon, and click on the stoplight at the bottom left to rebuild the variables (which will update the values from the file).

CONCLUSIONS:

Using equation text files is a handy method for defining global variables in SolidWorks. Be careful when editing the file, as stray spaces, carriage returns, and other blank text can break it. However, this method will allow you to make changes in one place, and rebuild your assemblies and have everything change accordingly.