



Autodesk® Showcase™ Hands-On for Engineers

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ML111-2L In this class, we will look at using Autodesk Showcase to visualize an Autodesk Inventor® Mechanical assembly. We will walk through steps to author and view the Mechanical Assembly in a real time environment.

About the Speaker:

Chris Hall is currently a Technical Marketing Manager for Autodesk, supporting the Autodesk ID Products.



Autodesk Showcase software addresses the important issue of decision-making on digital prototypes. It enables designers and engineers to create accurate, realistic imagery from 3D CAD data to not only convey form and function, but also create environmental context to communicate brand character. Showcase helps users present and review models in an environment in which team members can make reliable decisions locally and via remote sessions—resulting in an efficient and economical design review process.

Importing data into Showcase (Process)

1. Select **File-> Import Models**

Change selection to **Autodesk Inventor files (*.iam,* .ipt)**

Import Inventor assembly **BevelGear.iam**

2. Set the Conversion settings to **05-Default-1LOD-VeryHigh**

A Level of Detail (LOD) is the tessellation at which the model is converted to polygons upon import into Showcase. LODs range from Low to Very High. Low LODs will result in models with fewer polygons but increased viewing speeds. Higher LODs will have a larger number of polygons, resulting in a smoother looking model but may take longer to view, which could result in a lower frame rate.



Low to Very High LODs Left to Right

Once the files are imported, examine parts of the model which have a high level of curvature to determine if the LOD is high enough. If you realize, after examining the model, that the LOD should be higher or lower than the model as initially imported at, any file can be re-imported at a different LOD and will replace the original surface set which was imported into Showcase.

If you realize, after examining the model, that the LOD should be higher or lower than the model as initially imported at, any file can be re-imported at a different LOD and will replace the original surface set which was imported into Showcase.

To modify a models LOD detail, select

File > Show Import Status

And the Import Status window will open.

Select the component that needs to be updated. The geometry will highlight along with the name of the selected component name in the Status import window.

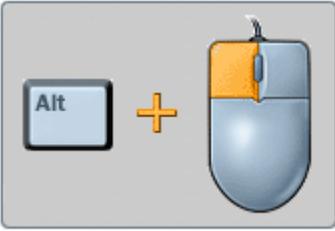
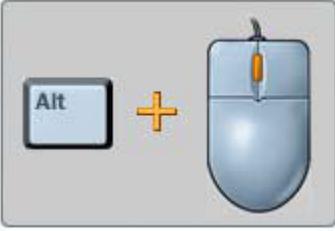
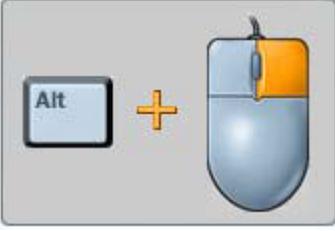
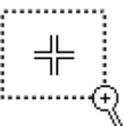
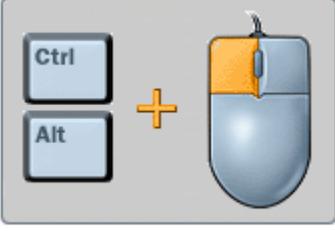
With the part to be updated identified, RMB on the Conversion setting of the selected Source file and select the desired LOD.

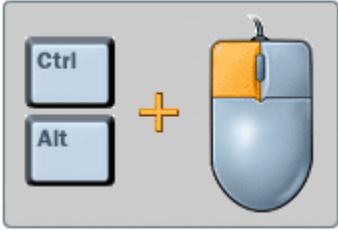
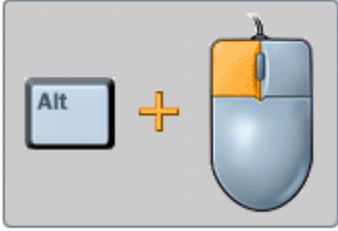
Once the selected, the Conversion settings will update. The Conversion status will change to **needs update**. Simply click on the **needs update** and the source file will be re-imported at the selected LOD.

3. With import geometry selected choose **Edit->Model Settings...** select **+Y**
4. Set a Home View = **View > Set Home View**

Navigating your scene

The mouse and keyboard combinations to orbit, pan, and zoom are identified and explained in the following table.

View Option	Keyboard Mouse Combination	Description
Orbit 		You orbit the display by pressing ALT as you click and drag with the left mouse button.
Pan 		You pan by pressing ALT as you click and drag with the center mouse button. Note: You can also pan by clicking the center button without pressing ALT.
Zoom 		You dynamically zoom in and out of the view by pressing ALT as you click and drag with the right mouse button. Note: You can also zoom by rotating the center mouse wheel.
Zoom Window Around Point of Interest 		You zoom in to a rectangular area around a point of interest by pressing CTRL+ALT as you click and drag the selection window with the left mouse button. The first point you click is the point of interest and is the center of the rectangular window.

View Option	Keyboard Mouse Combination	Description
Set Point of Interest and Center 		You set a new point of interest and have the view pan so that point is in the center of the screen by pressing CTRL+ALT as you click and drag over the location on the geometry with the left mouse button.
Set Point of Interest and Center 		You set a new point of interest without having the view automatically pan by pressing ALT as you click and drag the location on the geometry with the left mouse button.

Preparing your Scene

5. Select **Scene -> Organizer**

Scroll through the list and select the following parts:

Bevel Gear_iam.apf:BG-P-001:1

Bevel Gear_iam.apf:BG-P-004:1

Bevel Gear_iam.apf:BG-P-003:2

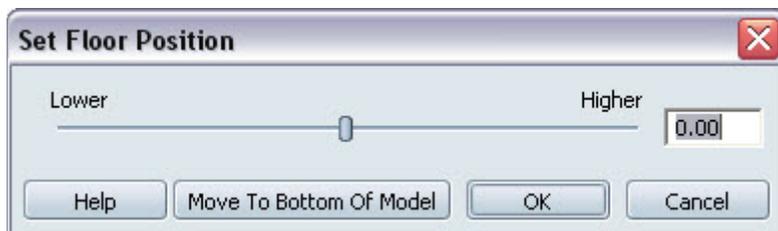
Bevel Gear_iam.apf:BG-P-002:1

Select -> Hide

6. Hit the “E” Key on your keyboard to bring up the Environments selection

Select: **ID Speed**

7. Select **Scene -> Set Floor Position -> Move to Bottom of Model**



8. Select the following parts in the scene window:



9. Select **-> Isolate Selected**
10. Select **Edit->Show Normals**
11. Select **F2** to exit Show Normals
12. Window select the parts in the scene
13. Select **Scene->Create Ambient Shadows**
14. Set Shadow presets to: **Medium Quality**

When ambient shadows are applied to a scene, it helps our object or objects look more realistic, with shadows added to corners and other dark areas of the scene. These shadows are the result of *occlusion*, or the blocking of objects by other objects to create shadows and dark areas.

It is recommended that ambient shadows be calculated before applying materials. Once ambient shadows have been calculated the results are baked on to the surfaces so that when a material is changed or modified, the ambient shadows are still relevant to the geometry, so the ambient shadow is a onetime calculation, provided that the model is not repositioned. If any of the geometry is moved or modified, then the ambient shadows must be recalculated.

Before calculating ambient shadows, the geometry normals must be orientated properly.

15. Select File -> Open Scene

Select **Bevel Gear Ambient Baked.zip**

16. Select Scene -> Show Ambient Shadows Only

Select the same command above to turn off Ambient Shadows

17. Select Material->Replace Imported Materials...

Use the following selections:

Imported Materials	Scene materials
RenderStyle_1	Metal::Brushed Metal
RenderStyle_2	Metal::Brushed Metal
RenderStyle_3	Plastic::White Matte
RenderStyle_4	Metal::Brushed Metal
RenderStyle_5	Metal::Brushed Metal
RenderStyle_6	Car Paint::Black
RenderStyle_7	Metal::Aluminum
RenderStyle_8	Metal::Aluminum
RenderStyle_9	Metal::Aluminum
RenderStyle_10	Metal::Aluminum
RenderStyle_11	Car Paint::Orange
RenderStyle_12	Metal::Brushed Metal
RenderStyle_13	Metal::Brake Metal
RenderStyle_14	Metal::Aluminum
RenderStyle_15	Car Paint::Black
RenderStyle_16	Metal::Brake Metal
RenderStyle_17	Metal::Aluminum

18. Select all of the cut surfaces and select the “M” key and apply Plastic -> Red Matte

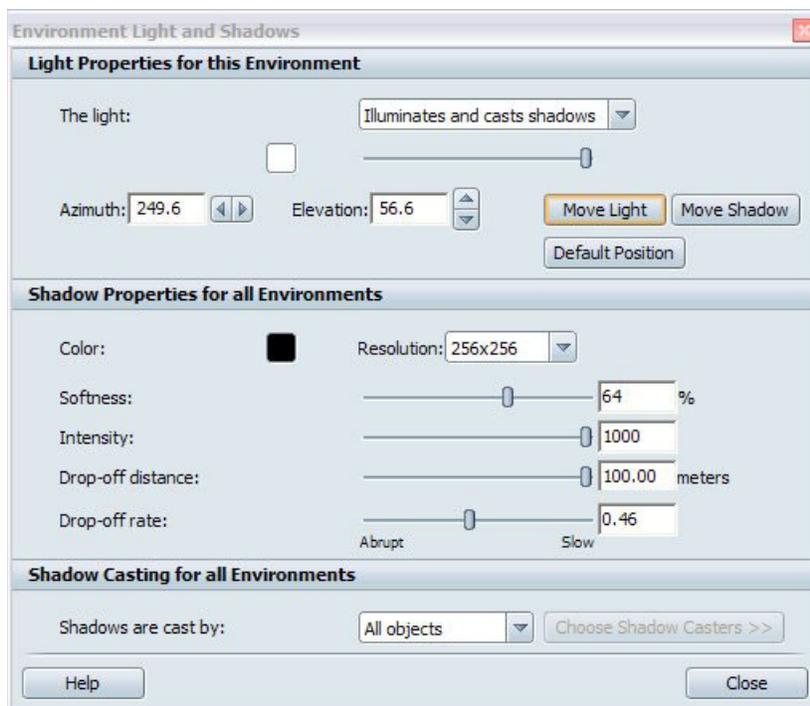
19. Select Scene -> Environments Lights and Shadows...



Lighting of the scene in Showcase is taken from the HDRI background, but Showcase does allow for additional lights to be added to the scene. The additional lights can be used to create specific highlights and shadows which can add to the realism of the render.

By default, a newly created light will only illuminate the scene, which will add highlights to the model.

20. Set the light parameter to Casts shadows only.



21. Adjust the values under Shadow Properties for all Environments to obtain the desired look of the ground shadow you would like.

Let's see how our assembly looks in different environments with materials applied.

22. Select the “**E**” Key on your keyboard to bring up the Environments selection

Select: **ExhibitHall**

23. Select the “**E**” Key on your keyboard to bring up the Environments selection

Select: **BlackStudio**

24. Select **File->Open**

Select **Bevel Gear with Materials.zip**

25. Select the “**A**” key on your keyboard to activate “**Alternatives**”

An alternative is simply a different version of the model. The difference can be in material assignment, geometry, or a positional difference. Alternatives allow multiple scenarios for the model to be created and referenced when needed. For example, material alternatives can be created to set up color and material studies for the design. Switching from one material alternative to another allows for a real-time comparison of the model materials or color studies.

Geometry alternatives allow for geometry or material to be interchanged in order to show different design directions the model could take. For example, in the provided model, different controllers can be set up as geometry alternatives.

Lastly positional alternatives can be used to reposition components of the model to help present functionality of a design. For example in a car model, the doors can be opened or closed using different positional lineups.

26. Select the “**T**” key on your keyboard to activate “**Shots**”

Once the scene and model have been set and is ready for presentation, Shots can be created as placeholders for camera angles to display specific views, details and highlights of the model without fumbling around to try and position the camera as necessary during the presentation.

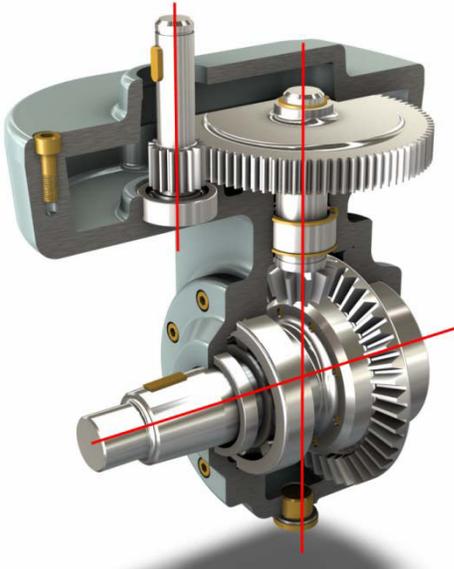
Position the camera to create the desired shot. Once the camera is set, select Scene > Create still shot.

Position the camera for the next shot, and set a second shot as above. After all shots have been created, select

27. Select the “**B**” key on your keyboard to activate “**Behaviors**”

Behaviors are controlled animations of models, or parts of models in your scene. They can be added to Alternatives or Storyboards to bring dynamic actions and functional explanations to your presentations.

There are 2 types of behaviors, turntable, and animation. For our example, we will create 3 turntable behaviors as shown in the image below.

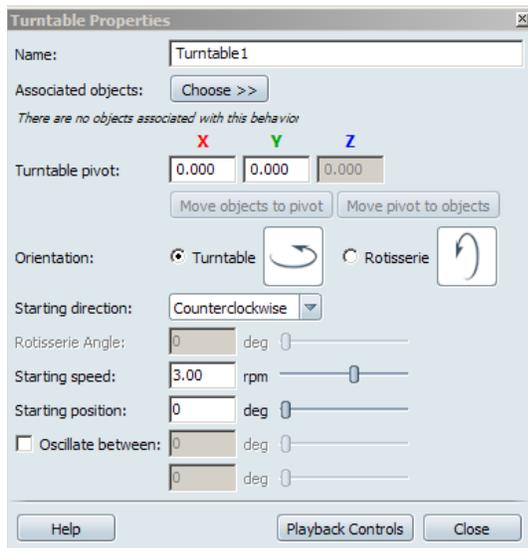


From the behaviors Menu, select New Turntable.

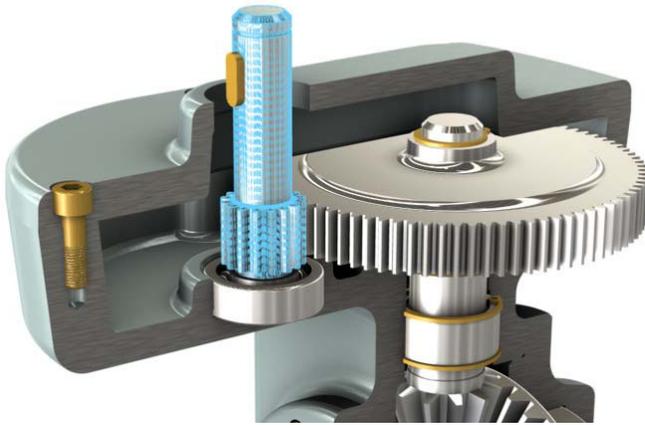


There are 3 steps to defining a turntable.

1. Determine the orientation type “Turntable”, or “Rotisserie”.
2. Position the Pivot.
3. Assign objects to the turntable.

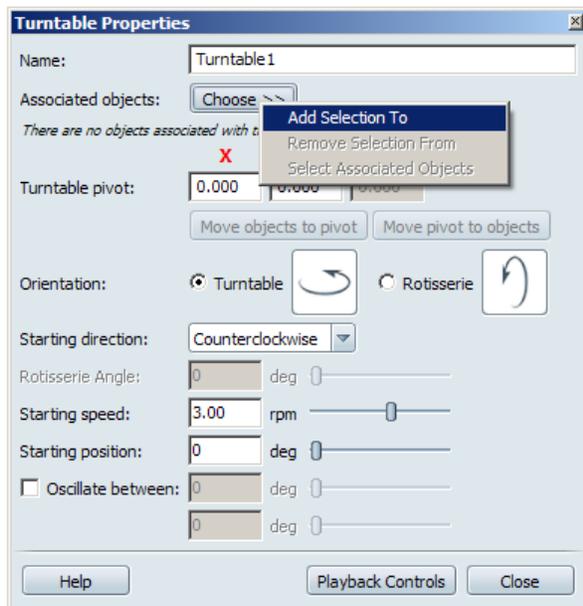


Select the object as shown in the following figure.

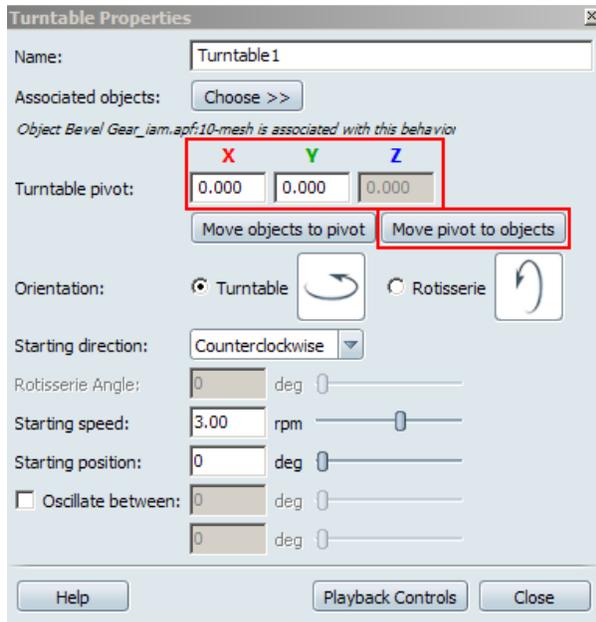


From the Dialog box Select the choose button >> Add Selection to

This will assign the selected object to the current turntable.



Once this is done, The Button labeled “Move pivot to objects” becomes visible.

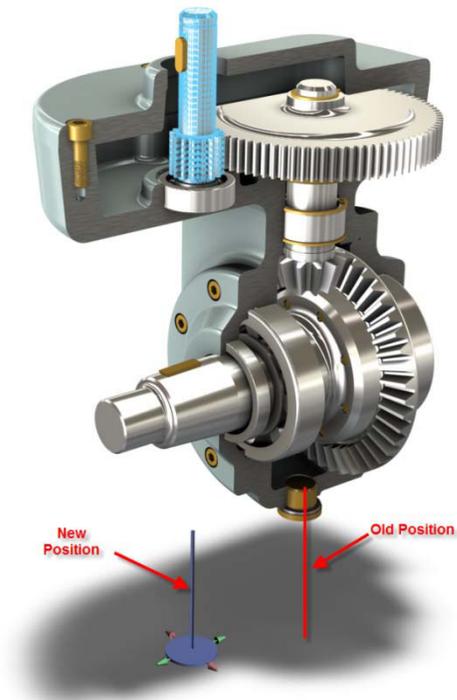


If you know the exact location of the pivot point, you can type in the coordinates, or you can select the button “Move pivot to objects”, and this will place the pivot at the center of the shaft.

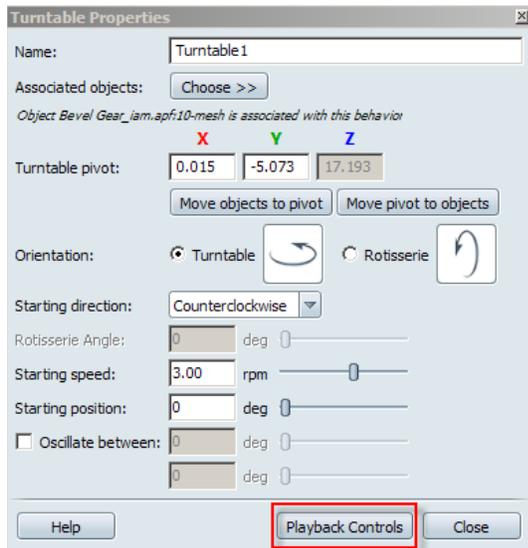
Before Pivot Assignment.



After Pivot Assignment.

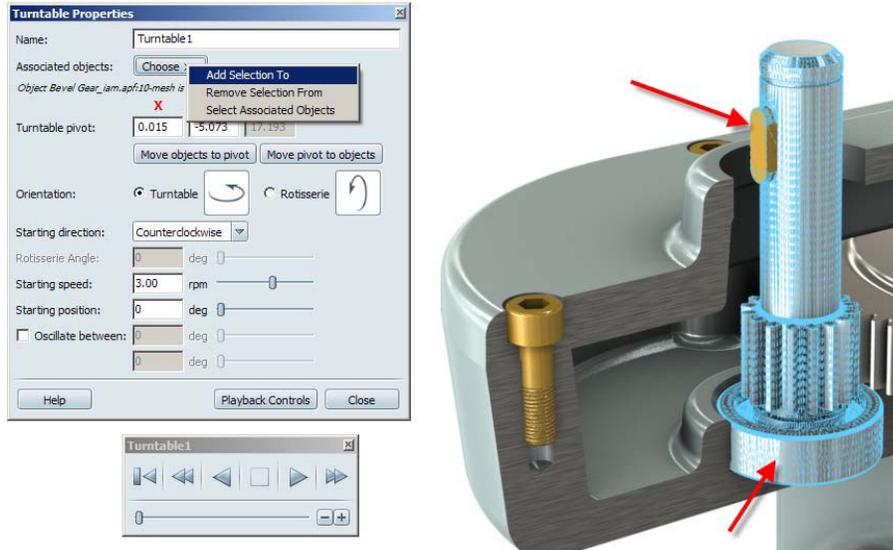


At this point we can test the turntable by pressing the “Playback Controls” button
Then the select Play Button.



You will notice that only the selected shaft is moving, so we need to assign additional objects to the turntable, so all the relative parts move with the shaft.

Select the 2 additional parts as shown, and then select the “Choose >> Add Selection To” button.



Test the turntable again by selecting the Play button. If the turntable looks correct, select the “Close” Button.

At this point you have successfully created a turntable to simulate the shaft rotating.

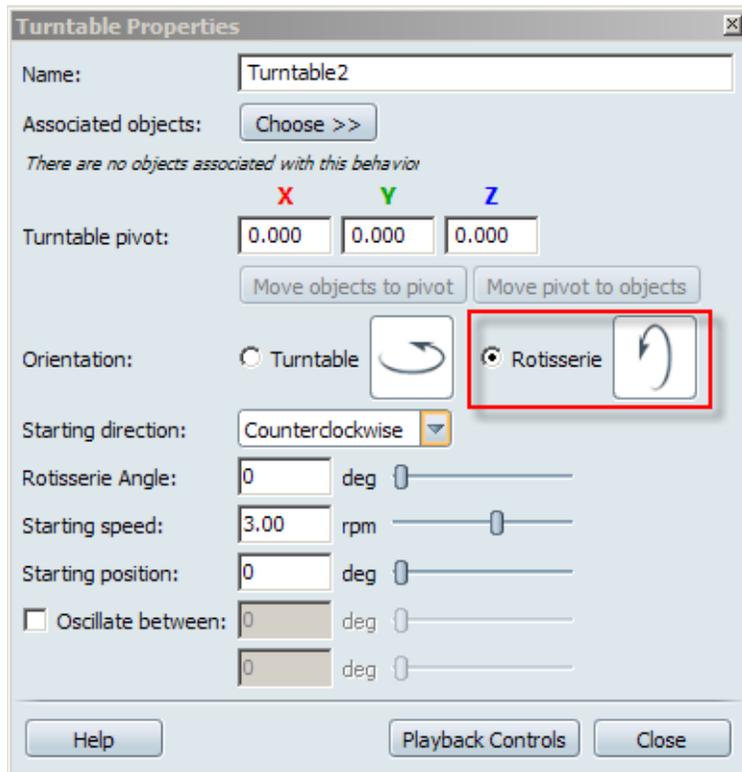
We need to create 2 more turntables.

Unselect all the parts before proceeding to the next step.

From the Behaviors Menu Create a second turn table.

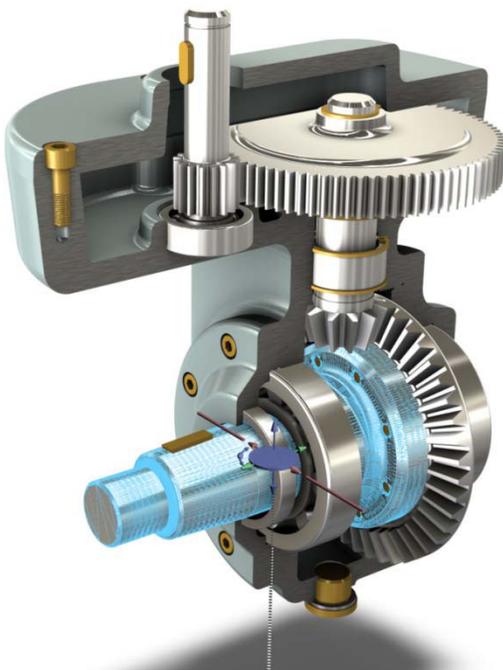


For this example we are going to create a Rotisserie, as shown below.



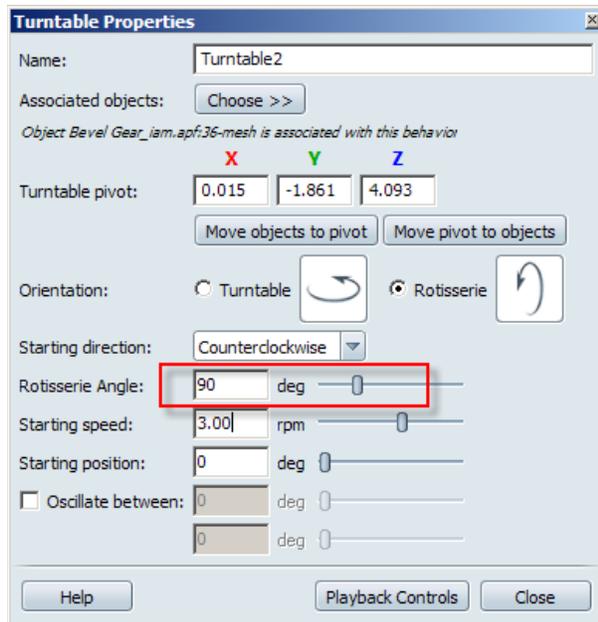
Select the part as shown below, and assign it to the new turntable.

Select the button "Move Pivot to objects"



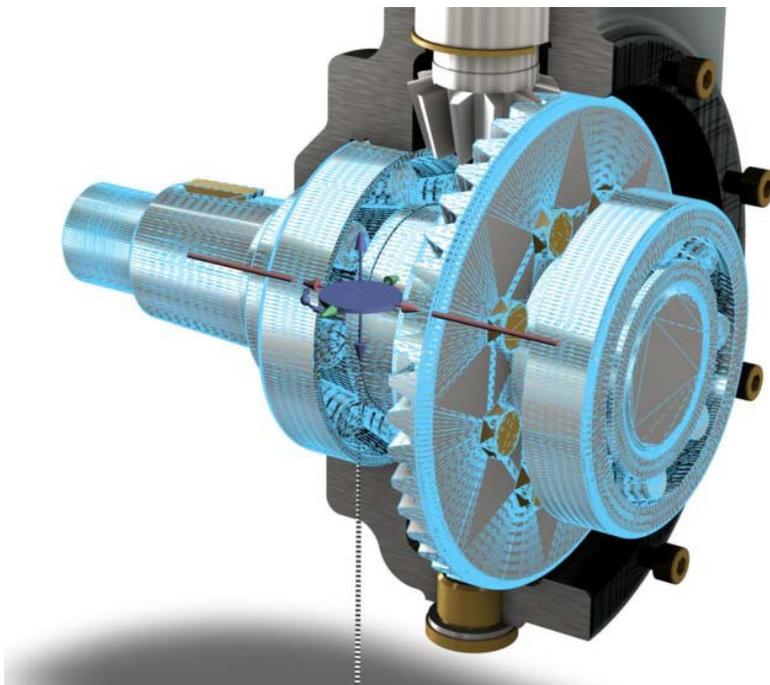
Select the Playback Controls button, and test the new turntable.

You will notice that the pivot is in the wrong direction. We will rote the pivot by typing in 90 for the Rotisserie Angle.



Test the turntable again by Selecting the Play button.

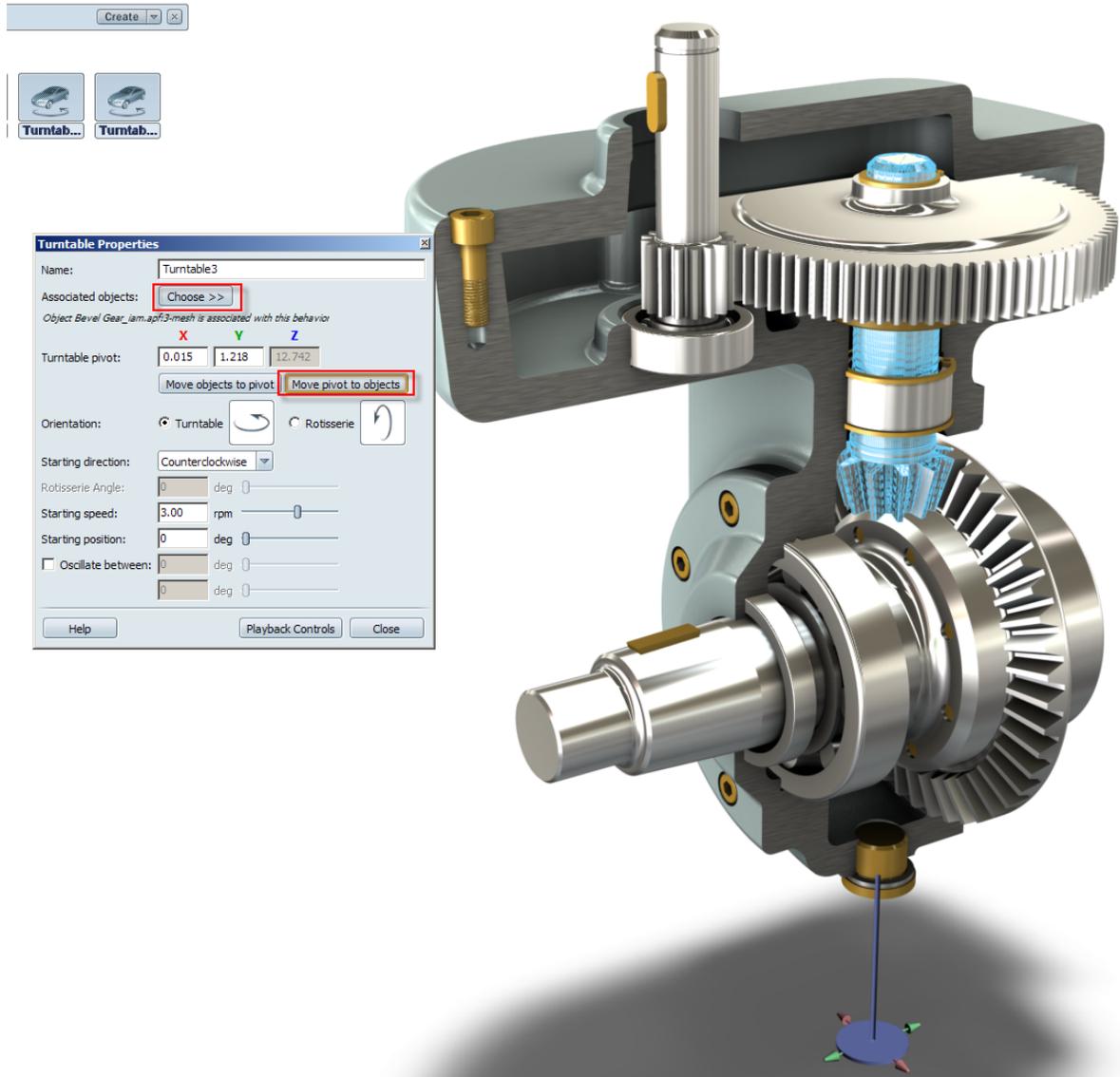
Add the additional objects to the turntable as shown.



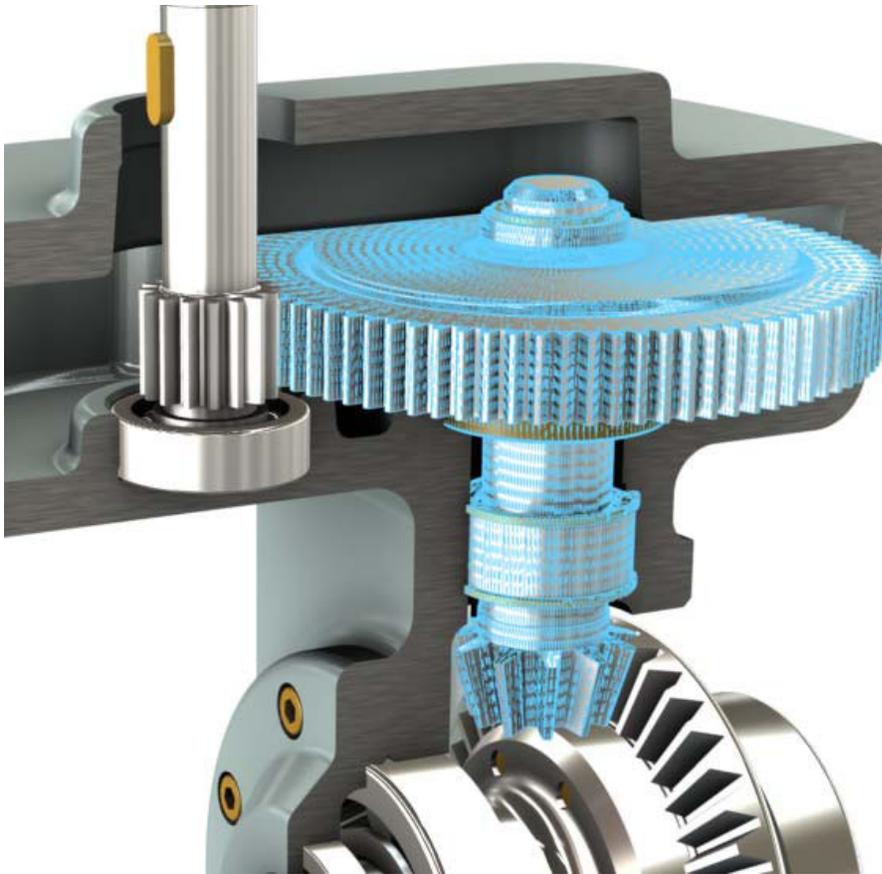
Test the turntable and close the dialog once all the objects are correctly assigned.

Create the 3rd turntable

Select the object as shown below, Select the “Choose>> Add Selection to”, Select the “Move pivot to Objects” button.



Add the additional object to the turntable.



Test the turn table by pressing the “playback Controls” button

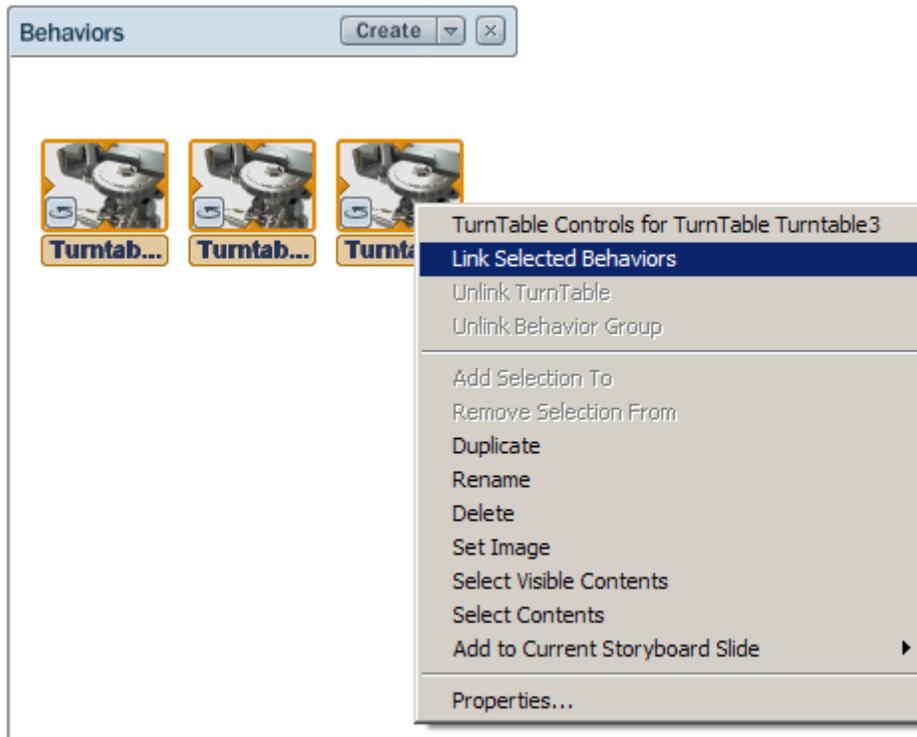
Then select the “Play” button.

For the final step, we want to play all the turn tables at the same time. To do this we can “Link” all the turntables together.

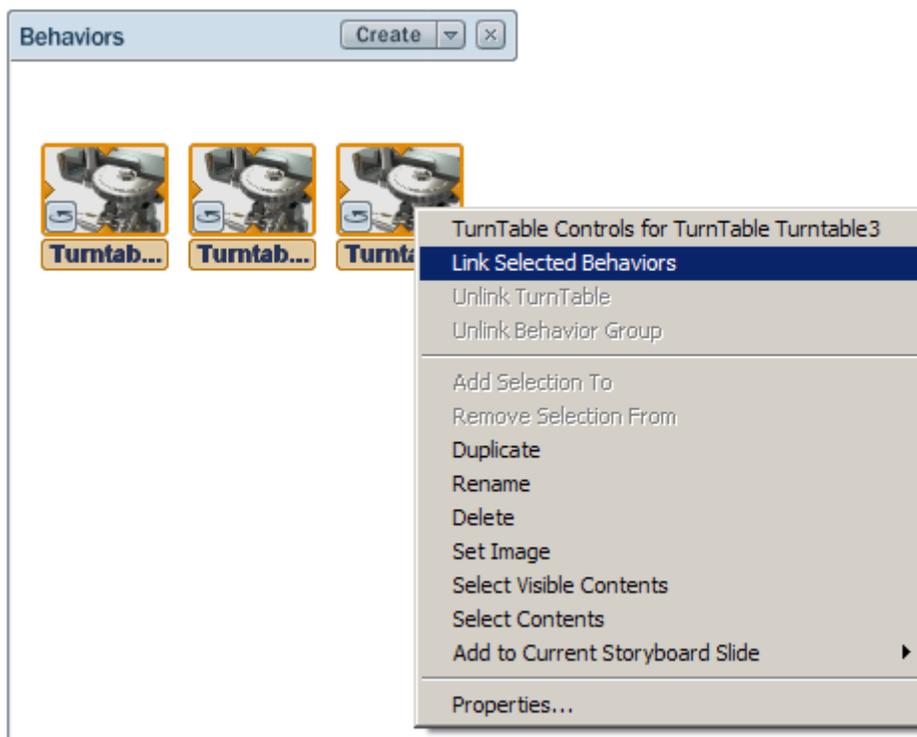
Select all the Turntables as shown below.



Perform a Right Mouse click and choose the “Link Selected Behaviors” option.



Test the Turntable by turning on the Multiple turntable play dialog



Creating an ID Plate with Normal Maps

Showcase has the capability to simulate a texture by using a normal map. Normal maps are a special image which can be created by applications like Photoshop and crazy bump.

Here is an example of what a normal map image looks like.



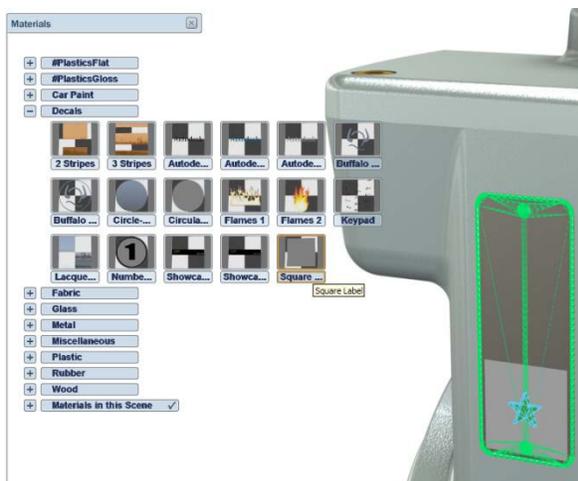
We are going to create what will look like an embossed ID plate.

Open the materials pallet by Pressing the “M” key

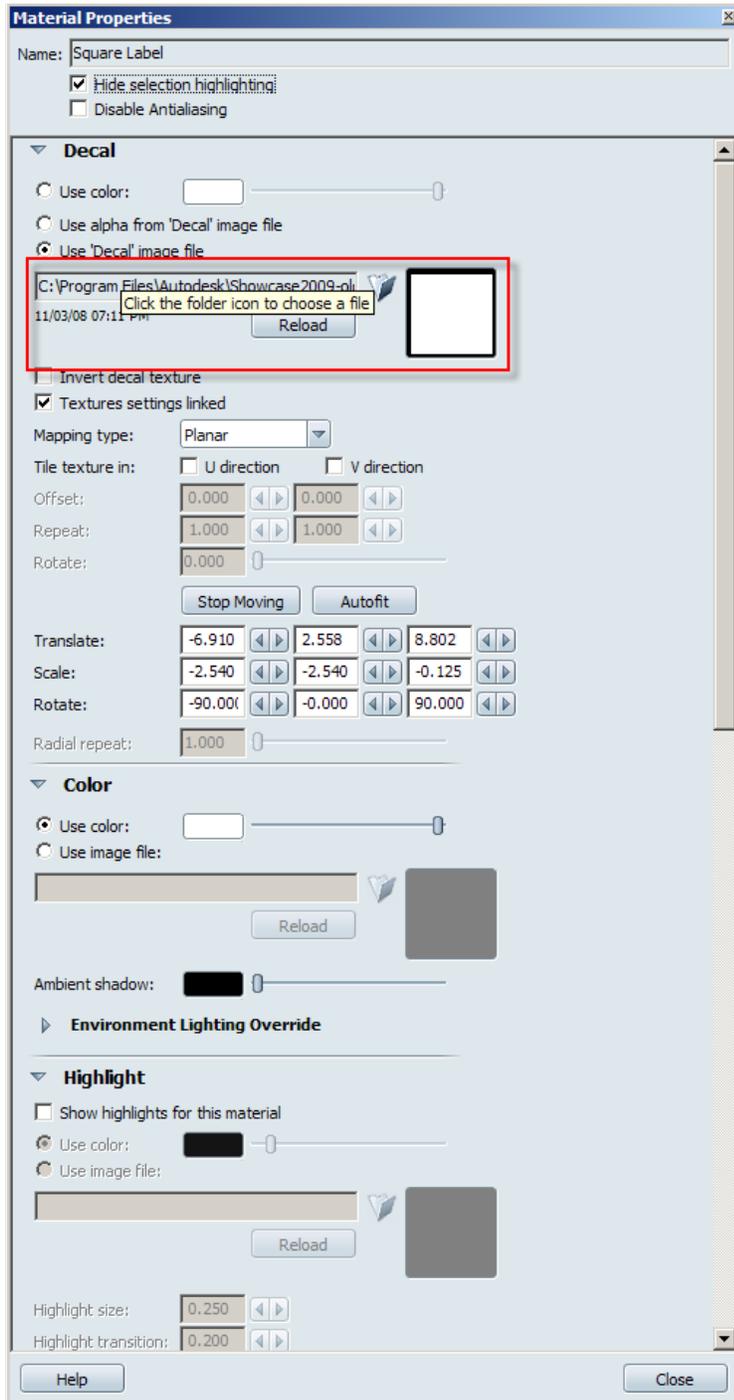
Select the ID plate as shown.



From the Materials pallet, expand the decals tab and apply a square decal. It should appear on the ID tag as shown below.

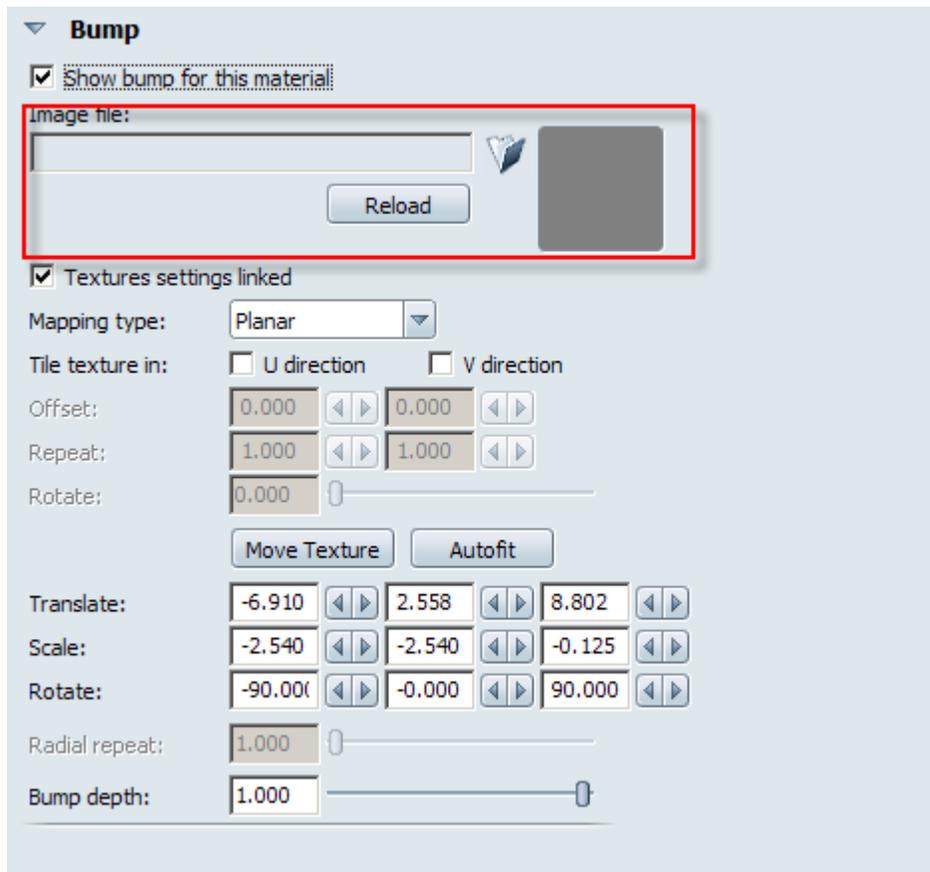


Press “Shift M” on the key board to bring up the Decal editor.



Replace the decal file with text.jpg

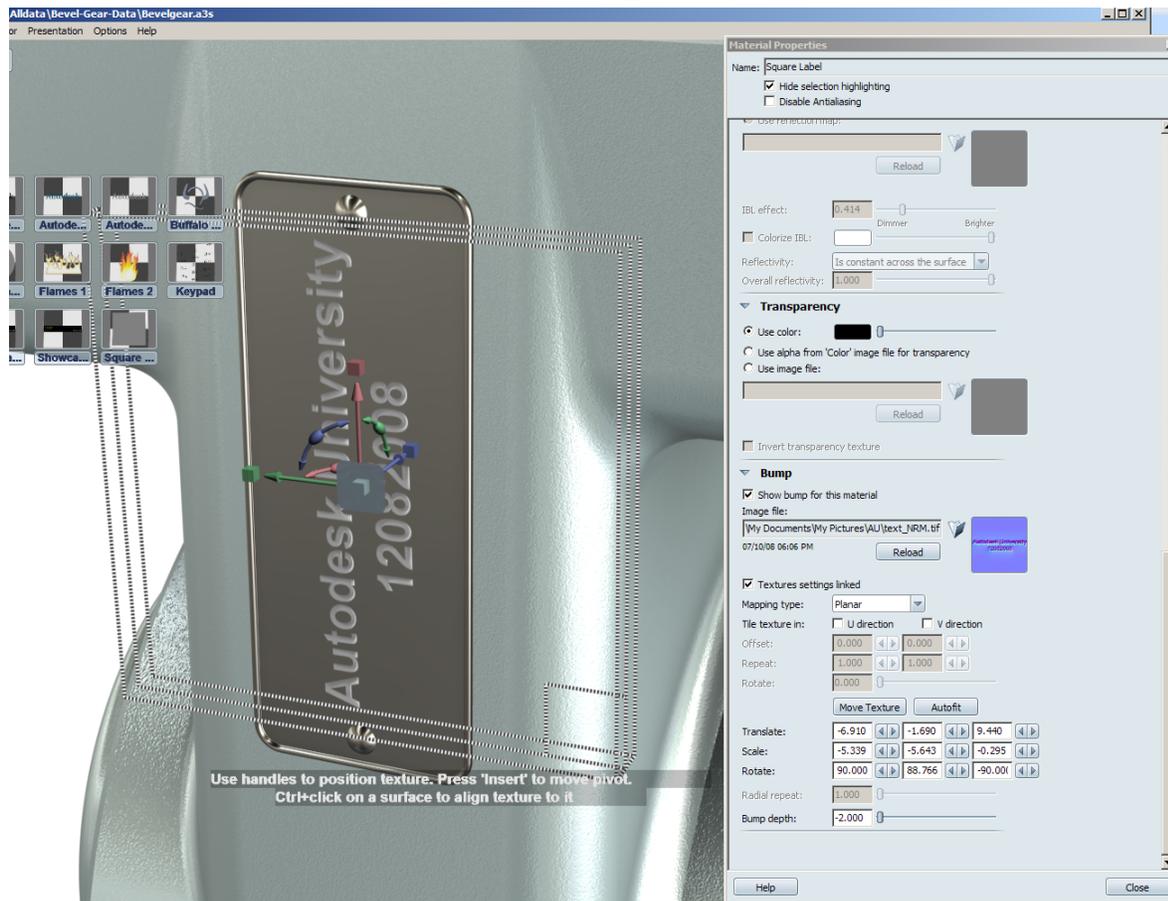
Scroll to the bottom and select the bump option, then add the image text_NRM.tif



The image may need to be rotated and scaled using the handles on the image.

The bump depth can be controlled by typing in different values. Even negative values can be used.

Your results should be similar to the following.



Appendix

Selecting Geometry

There are different ways to select the geometry. The first is to simply click on a surface and the entire selection set will be selected. When assigning materials, it is useful to select the geometry with the Right mouse button. Selecting geometry this way brings up a selection drop down menu that allows the user to select geometry based on assigned materials, material types, selection sets and geometry behind the closest geometry, which is especially handy when selecting geometry behind a transparent surface like a display cover or windshield.

Environments

Showcase uses the color and light information from the environments to light the scene. This helps to give the image a realistic lighting effect based on the highlights and reflections on the model which are based on the environment. To achieve the realistic lighting effects Showcase takes advantage of High Dynamic Range Images (HDR). HDR images are essentially images that hold the lighting and color information of a number of images taken at different exposure settings which are all then used in the scenes lighting and reflections. There is of course much more to HDR images and the lighting techniques used, but we won't get into that in this paper.

Showcase includes several pre-created environments which can be selected and dropped into the scene, to which adjustments can be made to control the lighting and sizing of the environment.

It may be necessary to set the floor position of the environment once it's been brought in.

Materials

Color

Click the **Use color** radio button to apply a specific color rather than an image.

Highlight

Use Color - Adjusts the color of the highlights.

Highlight Size - Controls the size of shiny highlights or hotspots on the surface.

Highlight Transition - Modulates or scales the intensity of the specular highlight.

Reflectivity – controls how reflective the material is.

