

# *Phil Campbell's* World of Trainz

## **3D Studio Max Animation Tutorial**

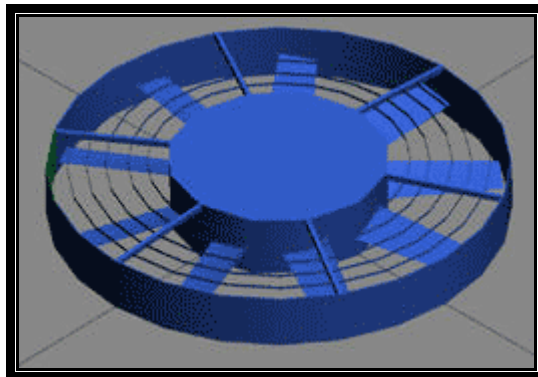
**In this tutorial you will learn how to animate the fan blades for a locomotive. The methods used to create the fan animation can be adapted to any Trainz object.**

**Note.** To complete this tutorial you will need to have available a model that has already been textured and has an unwrap UVW modifier applied to it. You can get the demonstration file [here](#).

3DStudio Max will be referred to as 3ds.

### **1. Sample files**

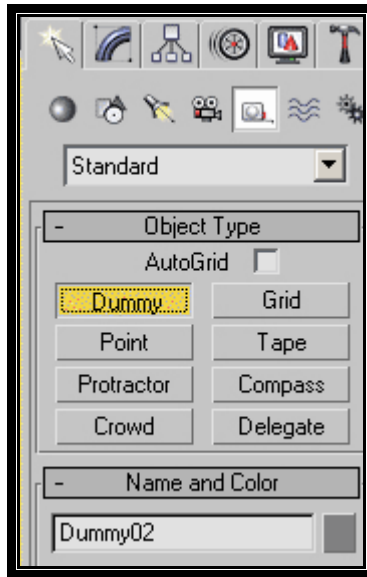
The following screen shot shows the model I am working with. There are two items in this model the fan guard and the fan blades.



**Figure 1 Fan**

### **2. Dummy objects**

The first item we need to add is a bone or dummy item. To add a dummy item in both 3DStudio Max and Gmax you need to go to the “Create” tab and then to the “Helpers” tab



**Figure 2 Dummy menu item**

In this case you will need to create two dummy items. It is recommended to create the dummies in the top view. Once you have created the dummy items you will need to rename them. For animation to work in Trainz the dummies must begin with b.r. If you do not name them correctly then Trainz will not recognize them. For this example I will name them b.r.main and b.r.fans1

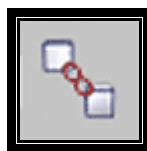
### **3. Dummy placement**

Once you have renamed the dummies you will then need to move the dummies to the correct location. The b.r.main should be moved as close as possible to 0x and 0y. The Z axis I usually keep the dummy about 200mm or 8" above 0. The location is not that important.

The location of the b.r.fans1 is however critical as it is what controls the animation. For the fan blades the dummy needs to be at 0,0,0. If it is not at this location then the fan will appear to oscillate when the animation is running.

### **4. Linking**

Once the dummies are in location we can then start linking the items together. To link them together first select the link button and then select the item



**Figure 3 Link tool**

To make it easier to see if a link has been made I usually change the view setting to "wireframe" which can be done by right clicking on the text in the top left corner of

the workspace. You need to create the following directory structure which can be shown by pressing H

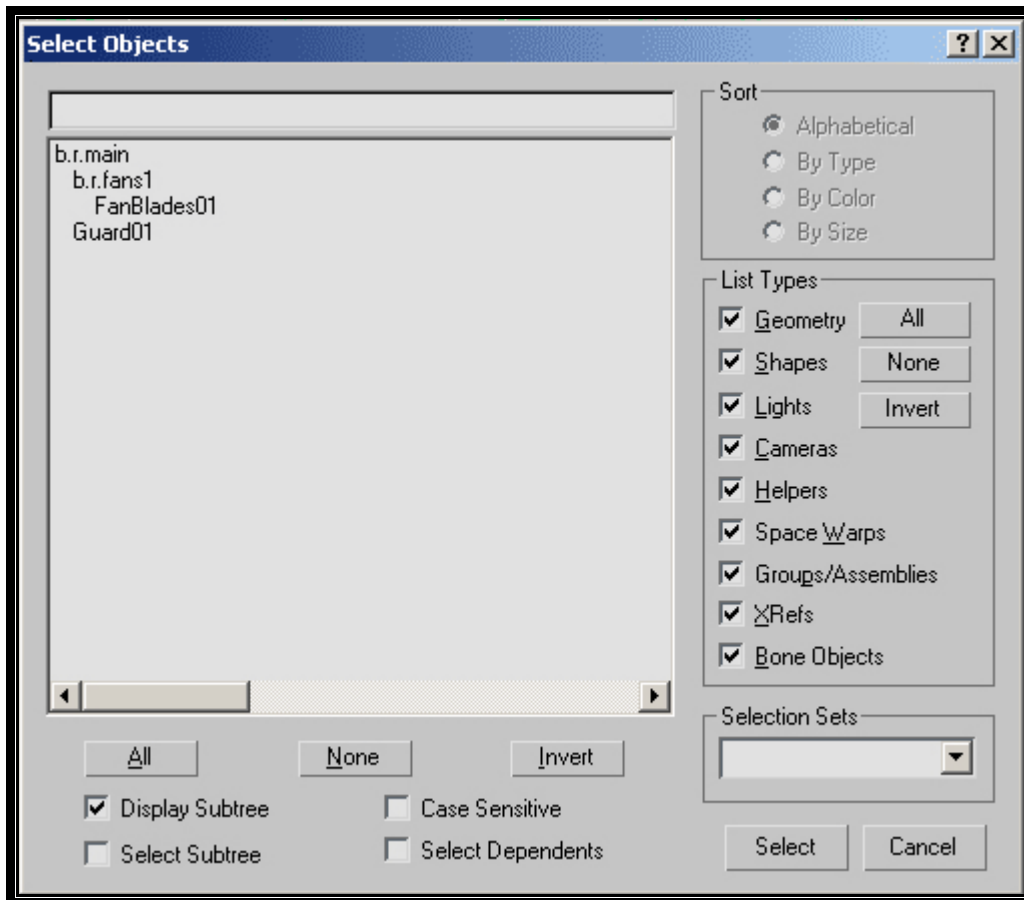


Figure 4 Directory structure

You may need to check the box “Display Subtree” to show the structure.

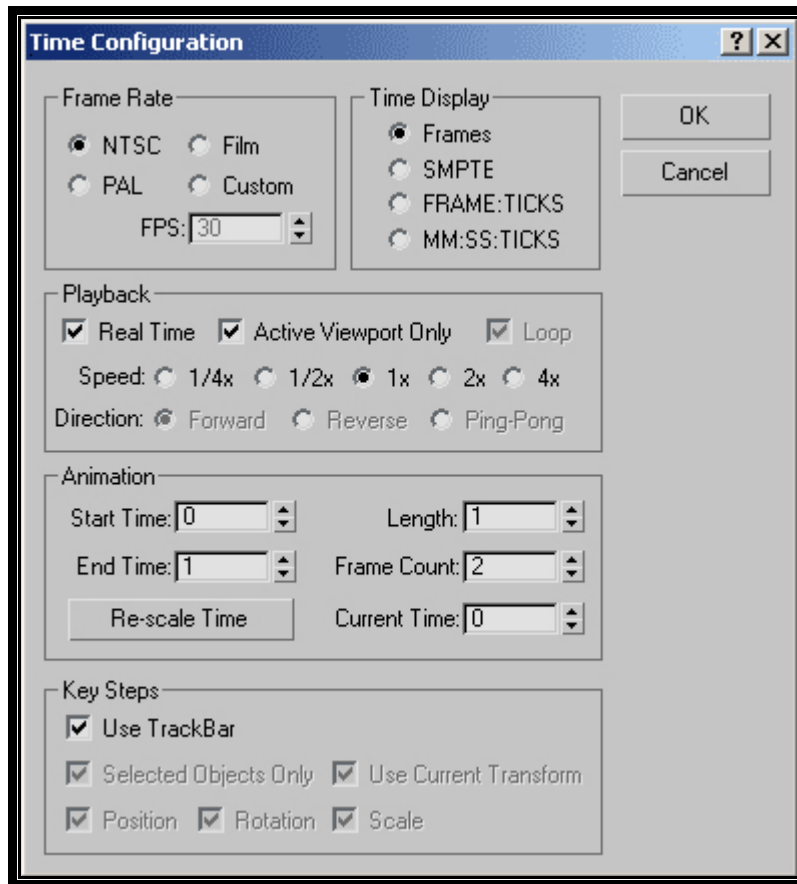
## 5. Time rate

Once you have this directory structure we then need to set up the time rate for the animation. To do this we need to click on the following icon located in the bottom right hand corner.



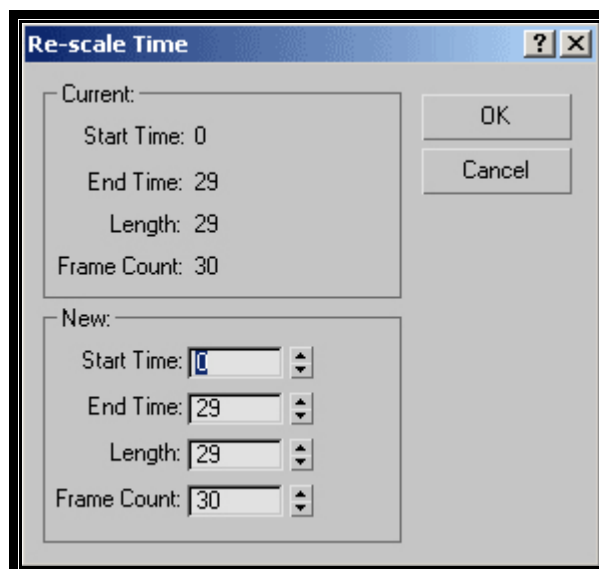
Figure 5 Time setup button

Once you have the following window open we need to change the Animation start and end time.



**Figure 6 Time configuration window**

The easiest way to do this is to select the “Re-scale Time” button which will open the window shown in figure 7



**Figure 7 Re-scale time window**

Where it says frame count, change the value here to 30 frames. Some people use a different number here but I find 30 gives a good smooth animation. Once you have changed the frame count click OK and the animation start time should be the same at 0 but the end time should now be 29. Also make sure the "Use TrackBar" checkbox is selected.

## 6. Animation

Now we are ready to start the actual animation of the fans. Firstly select the b.r.fans1 dummy. Then select the rotate tool.



Figure 8 Rotate tool



Figure 9 Animation keys

In 3ds you will then need to select the set key button (See figure 9). Before you move anything you need to use the button with the key on it with the tool tip "Set Keys" (Figure 9).



Figure 10 Zero key

This will set a base key or zero key as shown in Figure 10 which is the starting point of the animation. We now need to move the animation to the next key. Select the arrow key pointing to the right as shown in figure 10 and the bar will move and frame 1 will be selected. Make sure you have the rotate tool selected as shown in figure 8.

Once you have moved to frame 1 select the text in the z: co-ordinate box and type in 12 then press enter. If you have every thing linked correctly and the correct dummy selected then both the dummy and the fan should have rotated 12° in a counter clockwise direction (looking from the top).



**Figure 11 Rotate co-ordinates**

Now you need to press the “Key” button again then index to the next frame, rotate the dummy and press the “Key” button. You will need to do this for each of the 30 frames indexing the frame and rotating the dummy 12° for each frame. This can be a slow process and there are quicker ways to do this such as only setting three equally spaced keys and using 3ds to calculate the values in between but this method has worked the best for me and I will continue to use it.



**Figure 12 Animation keys**

## **7. Testing**

When you have created a key for each frame you can test out your animation by clicking on the “Play Animation” button. If the fan oscillates then you did not have the dummy located at the center of the fan. If it seems to skip or pause then you may have missed a step when setting keys. Check each key manually and make sure that each frame number has a rotation value as set out in the table below. If you have missed a key then you will need to redo any of the keys that are incorrect. You can also have problems when using 3ds to create the values in between if you did not specify the correct value for the correct key then 3ds will calculate the rest of the values incorrectly and you will have to start again. .

Degrees	Frame	Shortcut
0	0	0
12	1	
24	2	
36	3	
48	4	
60	5	60
72	6	
84	7	
96	8	
108	9	
120	10	120
132	11	
144	12	
156	13	
168	14	
180	15	180
-168	16	
-156	17	
-144	18	
-132	19	
-120	20	-120
-108	21	
-96	22	
-84	23	
-72	24	
-60	25	-60
-48	26	
-36	27	
-24	28	
-12	29	-12

## 8. Exporting

Once you have the animation complete then we need to export the fan to the Trainz format. Deselect everything and select “Export” from the file menu. Type in a name with the .im extension. Then select the “Trainz format [\* .IM, \* .KIN, \* .PM]” entry from the file type drop box and click "Save". Then select “Export” again and this time type in a name and use the .kin extension. When the “Export Animation” dialog box appears click on the “OK” button.

## **9. Config entries**

Now that you have exported the file into the Trainz formats you will need to set up a directory structure and create a config file with the line “animdist X” for bogeys with the X being the circumference of the wheel in metres. For scenery, locomotives, interiors and rolling stock the animation needs to be set up in the config file. Animations can be controlled with a script or they can be set to auto run.