The Complete Guide to Blender Graphics

Supplement-06

A Train on a Track.

In this demonstration, an animation will be created of a train moving around a circular track.

To produce the animation you require a model of a train and carriages and the track on which it runs. The track will comprise rails and sleepers. This exercise will demonstrate the technique rather than the detail, therefore, the modeling will be very basic.

The train and the track will be generated using a curve path which defines the shape of the track and the position of the train on the track.

Begin by placing the **3D window** in **Top Orthographic view**, scale the default Cube object down (S Key, Type 0.3, Press Enter - Figure 6.1).
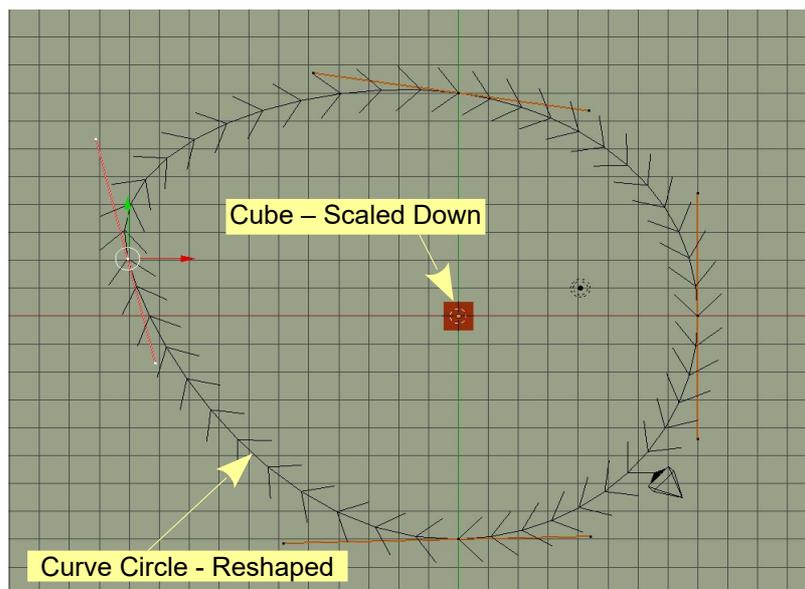

Cube – Scaled Down

Curve Circle - Reshaped

Figure 6.1

The Curve Path

Add a **Curve - Circle** in **Top Orthographic** view (Curve Path – Bezier Circle – Figure 6.1). Don't forget to deselect the default Cube object. You may leave the Cube in the Scene since it will be used for creating the train.

With the **Bezier Circle** in place scale (S Key, Type 8, Press Enter) and shape it to represent the shape for your track. The shape may be as complex as you like but remember that trains do not run around tight curves. Keep in mind the scale of objects in the Scene and how they will relate to each other. If you intend to produce something with considerable detail select a scale and stick to it. For example, one Blender grid unit equals one meter.

The Track

A railway track consists of two steel rails secured to a series of wooden or concrete sleepers. To create the track, model a track section consisting a single sleeper with two short sections of rail as shown in Figure 6.2.
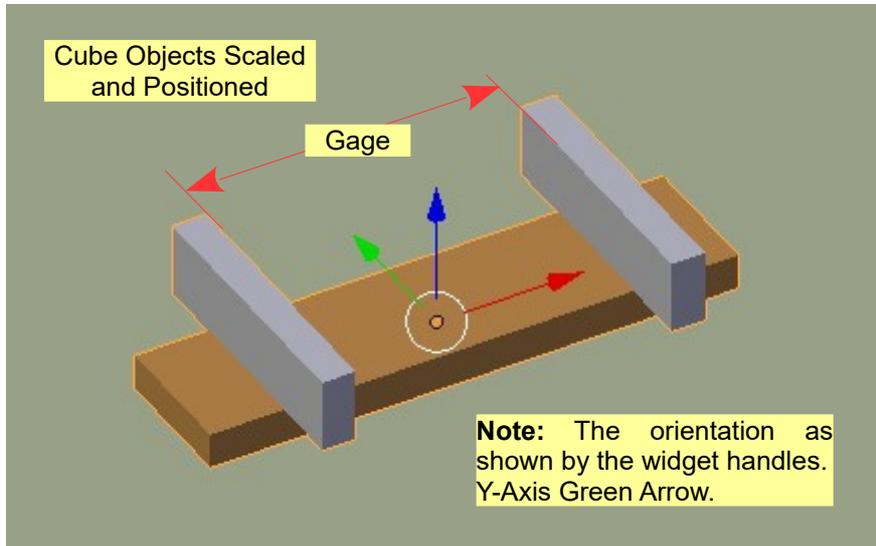

Cube Objects Scaled and Positioned

Gage

Note: The orientation as shown by the widget handles. Y-Axis Green Arrow.
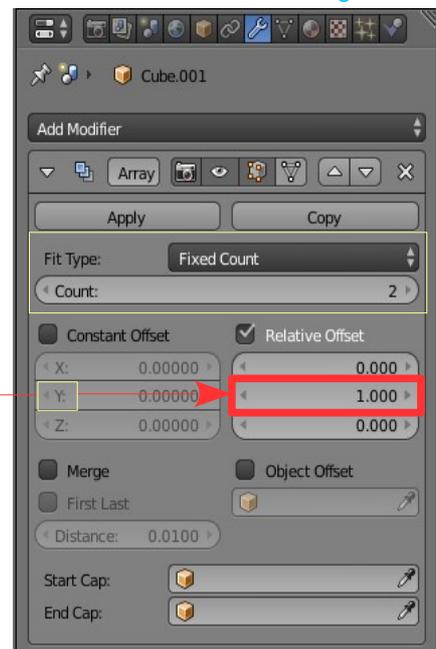
Figure 6.2

Rail gages (the distance between the inner edges of the rails) vary considerably depending on the type of transport device and depending on the country in which they operate. A standard gage in the UK, USA, Canada and Australia is measured at 1.435 Meters (4 Ft. 8.5 inches). In modeling the track you can approximate a scale for simplicity. Join the sleeper and track sections into a single object.

Note: Add different material (color) to the rails and the sleeper before joining.

Tip: If you want gray rails make sure you add a material in the Properties window. Don't accept the gray color displayed on the Screen. When an object is entered it doesn't have a Material applied. If you join an object without assigning a material to one which has a material it will display with the color of the assigned material.

Figure 6.3

With the track section selected add an **Array Modifier** (Figure 6.4). By default the **Fit Type** is **Fixed Count, Count 2.000**, **Relative Offset** is checked with the **X value 1.000**. This duplicates the track section on the X axis. Change the axis to match the orientation of your model.

Y Axis - Green
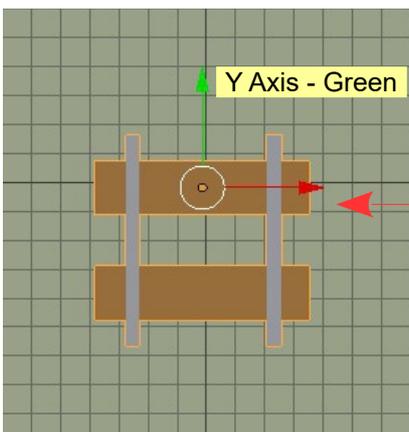
Relative Offset axis changed to the Y axis to match the Track Model.

Count: 2 Duplicates the Model on the Y axis

Figure 6.4

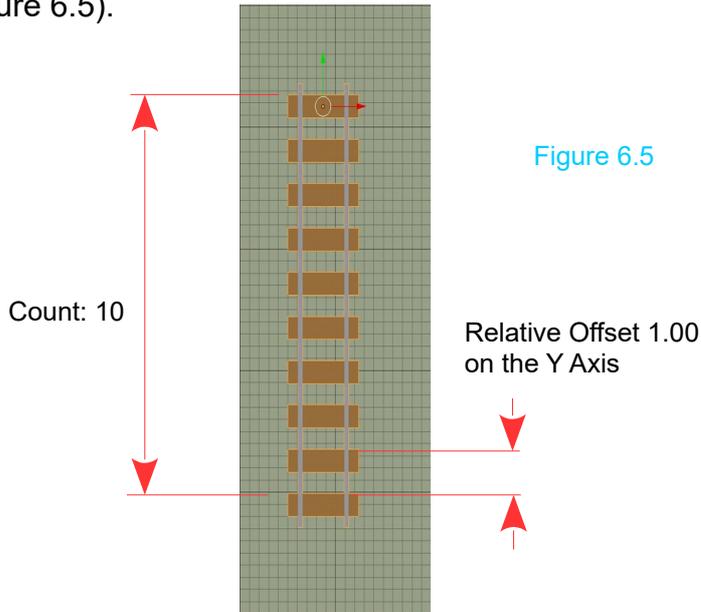Increase the **Count** value to create more duplications (Figure 6.5).

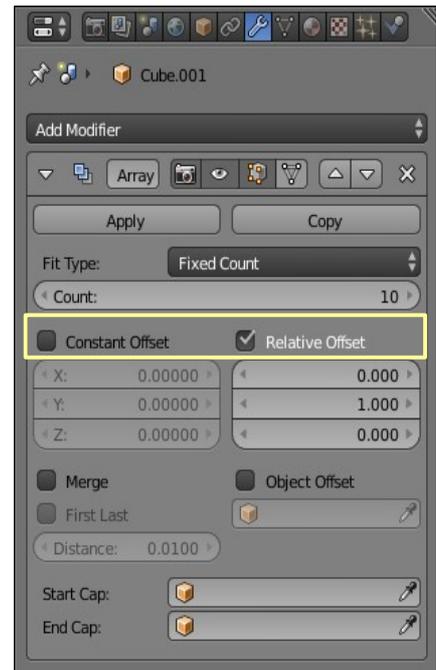Figure 6.5

Count: 10

Relative Offset 1.00 on the Y Axis

Figure 6.6

Add a second modifier, this time a **Curve Modifier**. Set the Object to **Bezier Circle** (Figure 6.6).

The duplications of the track section will be arranged on the curve. You may be required select the track section and reposition it in the 3D window. Increase the **Count** value in the Array Modifier until the track sections are duplicated around the entire curve (Figure 6.7).
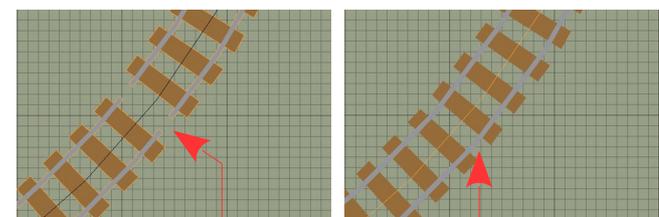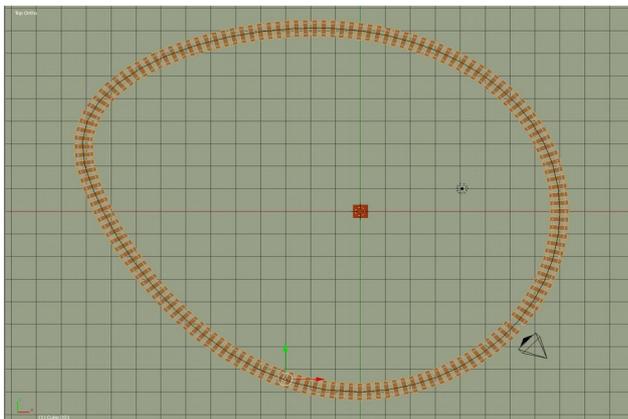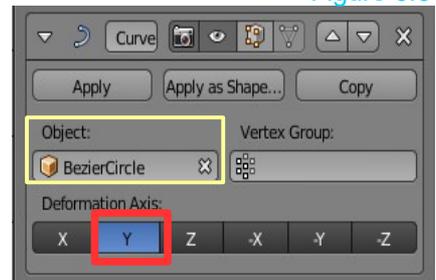
Figure 6.8

Gap between Track Ends

Gap closed after scaling the Curve

Figure 6.7

You may be lucky and have the last section meet up with the first but if not select the Bezier Curve Circle and scale down until the end of the tracks meet (Figure 6.8).

Remember the distance between the rail ends doesn't have to be exact unless you plan on a close up of this particular join.

The Train

For the train model, start with the default **Cube** object and scale it to resemble a single train carriage or car. Make the proportions appropriate for the scale of the track. Since only technique is being demonstrated detail such as wheels or windows will be ignored (Figure 6.9).
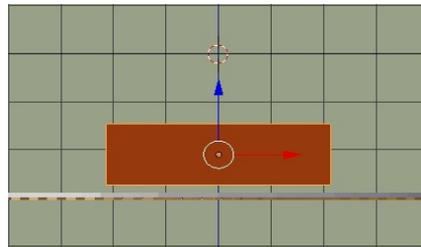

Figure 6.9

Leave the carriage located at the center of the Scene and have it selected. Add a **Follow Path Constraint** (Figure 6.10). Check (Tick) **Follow Curve** and set the **Target** to **Bezier Circle**. The carriage will relocate to the track but you will have to set the **Forward value** to **X** to align the elongated cube with the track and probably drag the carriage back to the track (Figure 6.11).
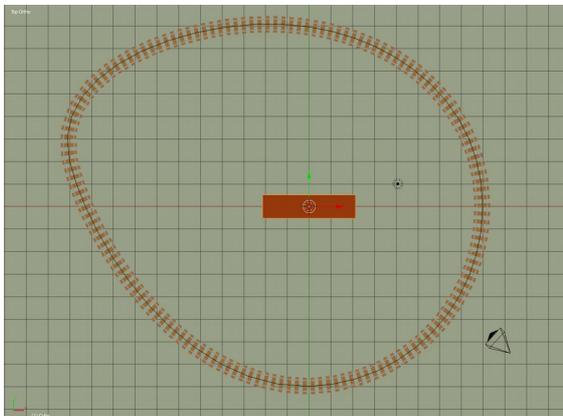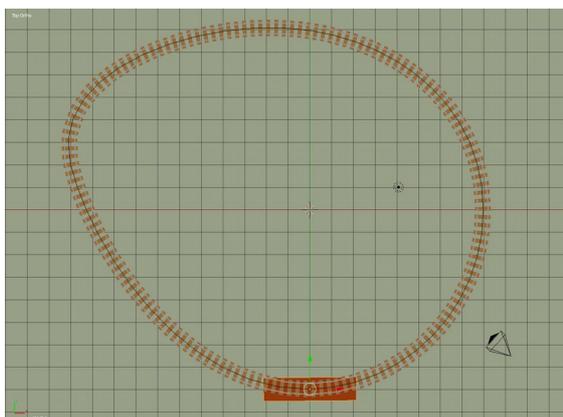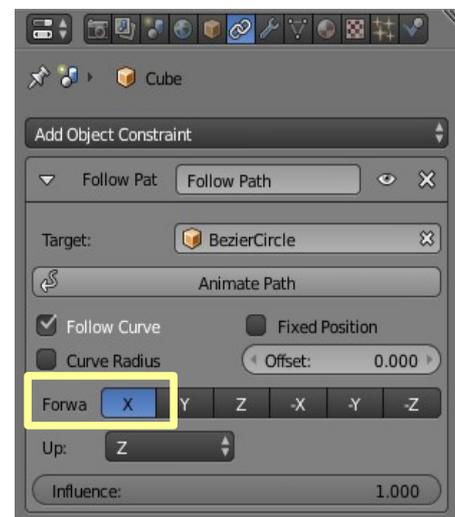
Figure 6.10

For the time being, leave the train as a single carriage.

Figure 6.11

Animation

The single carriage is animated to follow the curve as described in the **Follow Path: Follow Path Constraint Method** in **The Complete Guide to Blender Graphics**. In the **Bezier Circle, Path Animation tab,** leave the default **Frames: 100**, set the **Evaluation Time** value at 0.000 for Frame 1 in the animation and 100.000 for Frame 250.

Play the animation in the **Timeline window** to see the single carriage traverse the track in 250 frames.

Adding Carriages

Stop the animation at Frame 1 and select the single carriage. Press **Shift + D + Enter** to duplicate the carriage. This duplication will have an identical **Follow Path Constraint** applied (Figure 6.12).

With the new carriage selected adjust the **Offset** value in the constraint panel to reposition the new carriage along the track. Repeat the procedure to duplicate as many carriages as you wish.
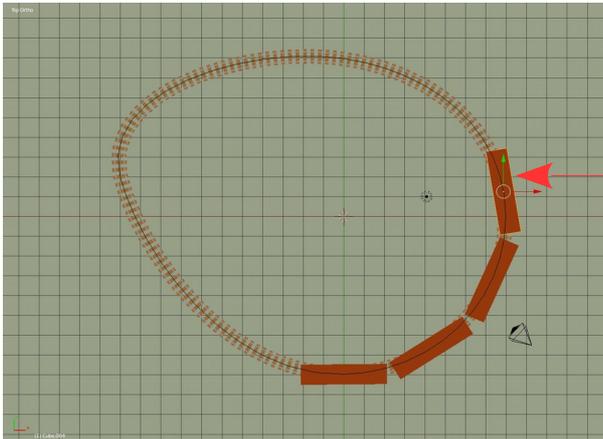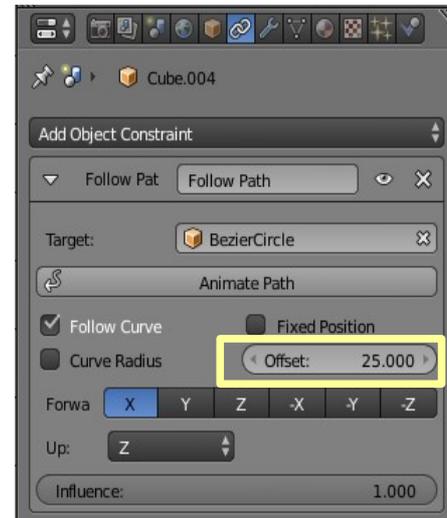

Figure 6.12

Carriage No. 4
Offset: 25.000

Playing the animation in the **Timeline** will show the whole train moving around the track.

You may select each carriage individually and remodel in Edit mode.

Tip: If carriages are to have identical features such as wheel sets, windows, doors etc. model them before duplicating carriages.

Remember: You can always select the Curve Path and reshape it to fit your Scene.