





→ CINEMA 4D

BUILD AND ANIMATE 3D IMAGES

Ian Naylor makes full use of *Cinema 4D*'s powerful time-saving functions to create a realistic render of a pinball machine before transforming its basic shapes, shaders and lights into a brilliant animation



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TIME LENGTH

3-3.5 hours



INFO



Ian Naylor has been a commercial illustrator

for nearly 20 years and is represented by London-based agency Illustration Ltd. He also delivers tutorials on computer-generated and traditional illustration at the Blackpool & Fylde College. Visit www.illustrationweb.com/ianNaylor or www.aircrew.co.uk to find out more.

→ Organisation has always been the key to successful 3D work. It's essential that you keep track of the changes you make at each stage and clearly label files for import to avoid confusion, especially when it comes to animation.

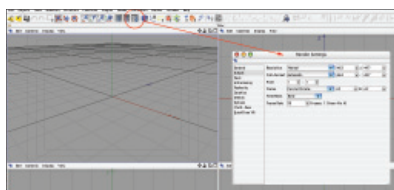
This tutorial uses the powerful tools within *Cinema 4D* to work through the image-making process step by step – transforming a simple 2D image into the amazing 3D pinball machine you see here, using shaders created in *Photoshop* to enhance the geometry you have created.

Using an image provided on the cover CD, you'll be shown how to model a pinball table and its moving parts using basic extrusion, pipe extrusion and creative lighting to create an output for print, before producing a simple, short animation.

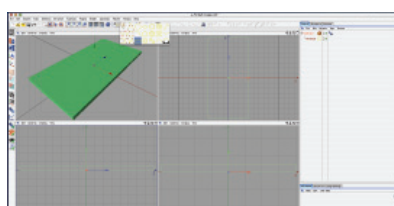
Although you'll need a basic knowledge of *Cinema 4D* to get to grips with this project, you'll soon take on board tips and tricks that will develop your 3D skills and improve your planning and accuracy – saving you time and effort as you move through this increasingly complex task.

The geometry may appear fussy and technical. Indeed three decimal place positioning is more at home in nuclear physics than illustration. But a careful, accurate approach will save you any trouble.

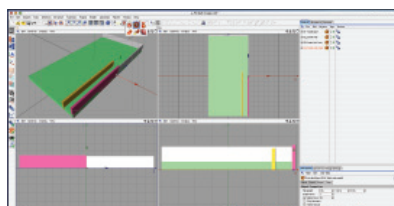
We'll look at file naming conventions and shader application as well as simple lighting and lens effect combinations, motion blur and target expressions, some of *Cinema 4D*'s most impressive functions.



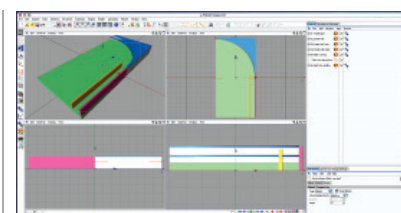
1 First set your render settings to a Resolution of 463 pixels wide by 497 deep. This is not the finished size, but a proportional version. Set Anti-aliasing to Geometry, which will also help with the render speed in the early stages of this project.



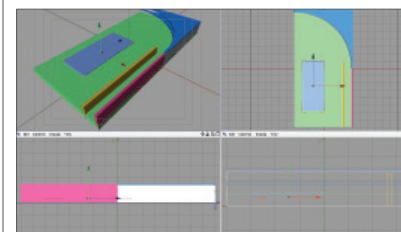
2 Call up a rectangular spline for the 01-Table base extrusion with dimensions of 8m wide by 16m high. This is a 2:1 proportion, which will make shader application easier later on. Set the Position of the spline in X Y Z to zero, add to an extrusion object and set the Y axis to 0.5 m. Save the file.



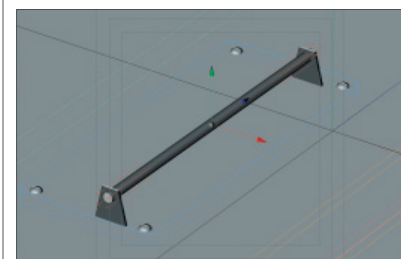
3 Add the 02-Table side, the 03-Inner ball run and the 04-Table side mask. This will stop the background showing through. Here, this is "L" shaped but could be made from two rectangles. All the elements are constructed with vertical extrusions, like the table base.



4 Make the 05-Ball Run top spline (or use the one supplied) and extrude Y to 0.1m and move it to the top of the table edge. Copy and bring it down halfway between the table base and the top. Label it 06-Ball Run Middle.



5 Using the 07-Thumper plate, choose a rectangular spline 2.9m wide by 6.7m deep, a Rounding of 0.2 and set in the XZ plane. Extrude to 0.2 on the Y Axis and add a Fillet Cap on the top edge of 3 Steps at 0.02 Radius. Position at X:4.8, Y:0.7 and Z:2.4.

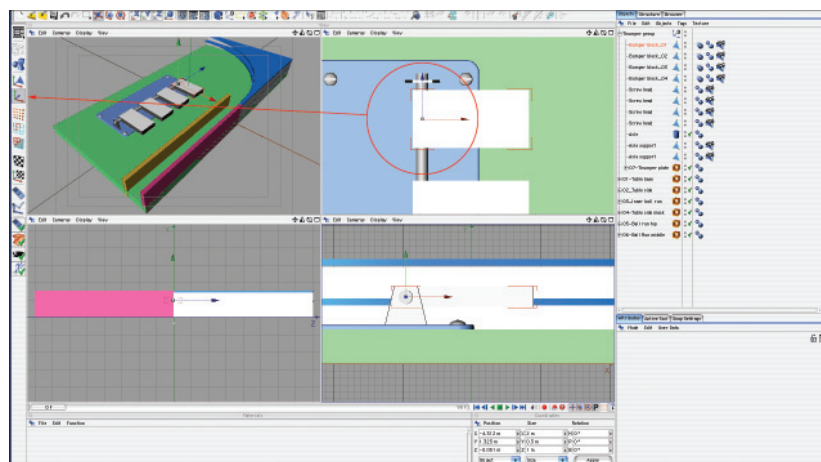


6 Create two Axle supports, the Axle and four screw heads for the thumper plate's corners. You can adjust the position later. Group all of the Thumper elements.

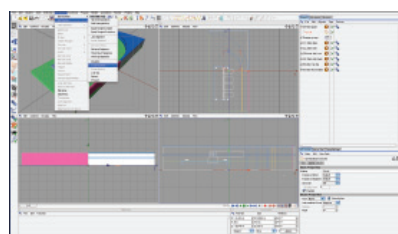
Illustration and tutorial by Ian Naylor
www.aircrew.co.uk



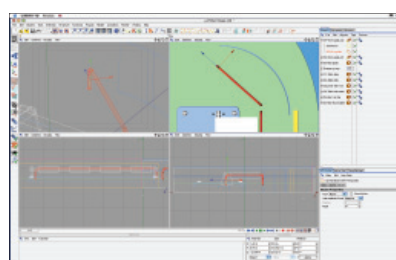
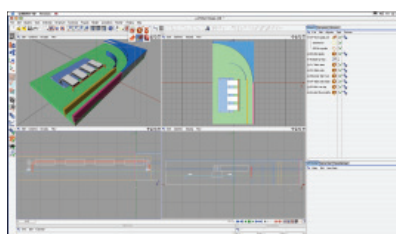
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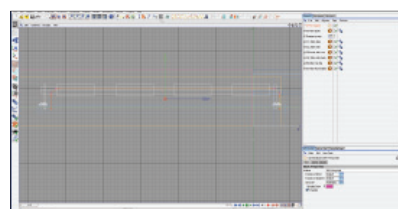
7 Construct a bumper block from a cube – a size of X:2, Y:0.3, Z:1 (2:1 pro) works well – and move it into position on the Axle. The bumpers will flip over in the final image so make sure you position their datum points to the centre of the axle. Duplicate the bumper block to make four and give each a different name. This will help with shader organisation later on.



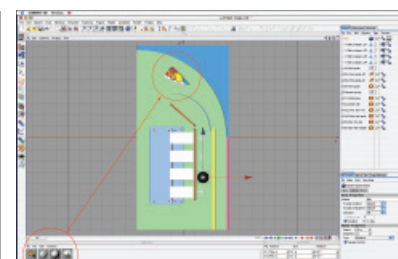
8 The curved 08-Ball guide is made from another vertical extrusion. A spline is supplied on the cover CD, but you could make your own by choosing a 90-degree arc. Go to Structure→EditSpline→CreateOutline and select your desired width. Extrude Y to 1.3.



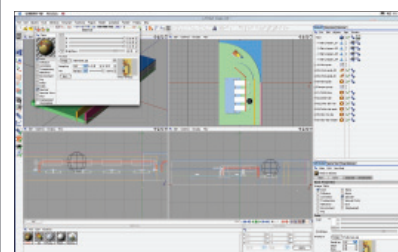
10 Choose a pipe object (09-Wire guide_01) and drop the spline (09 Wire guide) into it. Create a circle spline (09 section) of 0.045 Radius and drop it into the pipe object. This must be above the 09 Wire guide spline in the hierarchy. You'll need two of these, so duplicate the object and move it into position. Shorten the spline along its Z axis if required.



9 There are two wire ball guides to make. 09-Wire guide is made from a rectangular spline with edge rounding. Once you're happy with the radius, convert to polygons (Objects→PolygonObject in the top menu) and un-check Close Spline in the Properties dialog. This will allow you to delete the excess points and leave you with the correct shape to use in the pipe object.



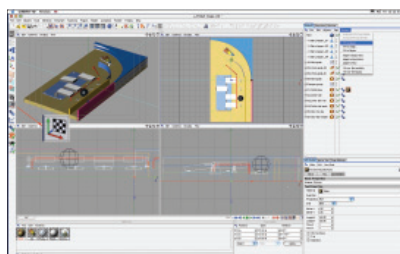
11 You can now use some of the finished geometry from the CD. The 10-Ball guide comes complete with its shaders added etc. Place this as desired at the top of the table at X:0.5, Y:0.5, Z:5.3. You will notice that its shaders appear in the Materials box, too. Position the other free geometry, 11-Star plunger_01, level with each of the Bumper blocks. Add the ball – a sphere with a Radius of 0.5 – in a position near the Bumper block you want to activate.



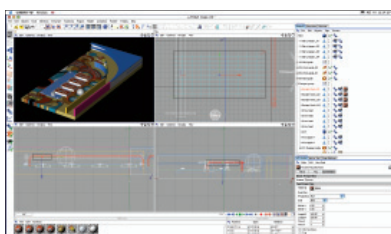
12 Now add the shaders, the pinball table base first. Set up a new material and call it Table. In the colour channel import the file Table base.jpg, set the Specular channel to default (Width 50, Height 20) and apply to the 01-Table base in the Object menu. Set the Projection to Flat and un-check the Tile box.

GEOMETRY COLOUR

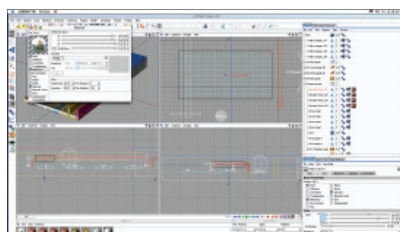
When modelling, geometry can become confusing when in Wireframe mode. To assign display colours to any objects choose Attributes→Basic→UseColour→Automatic and then specify a colour. This will be overridden by the renderer as soon as an actual shader is applied.



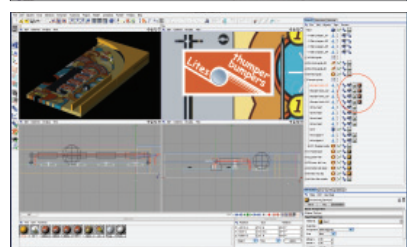
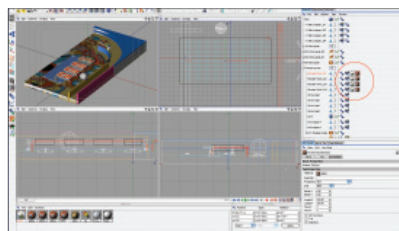
13 Ensure that the shader is highlighted in the Objects dialog and change its orientation to Rotation→P→-90°. Select Objects→Texture→FitToObject. This will place the shader onto the table. Change to Display→QuickShading mode and take a look at the effect.



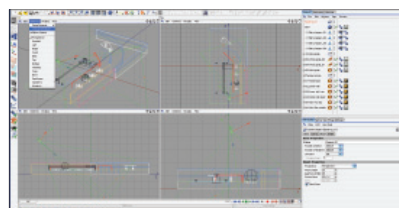
14 You can now add the Bumper plate graphics in the same way. Note that there are four graphics, one for each block. Name the shaders logically, ie, BB01 – Bumper block 01. The rest of the block will need to be chrome but if you leave the shader fitted to object the sides of the block will appear white so you'll need to make a chrome shader.



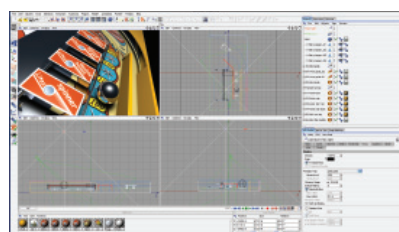
15 Select a new material. I have called this Chr1 (Colour→15 per cent, R:168, G:209, B:255, Reflection→100, Colour→R:238, G:240, B:255, Reflection Dispersion→60 per cent, Accuracy→50 per cent). The Reflection Dispersion and Accuracy will make the render slower, so set them to 0 per cent if you're just checking.



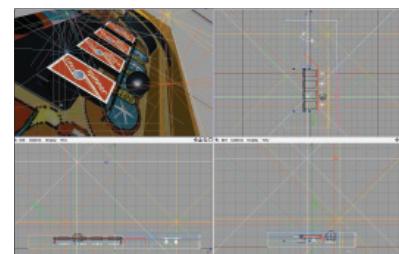
16 Apply a chrome shader to the blocks, in front of the graphic in the hierarchy, and then reduce the size of the graphic to keep it away from the edges. This way (without tiling) the chrome will show through. The Chrome shader can be left in its default projection, UVW mapping. Create a shader for all the yellow parts (Paint) and apply.



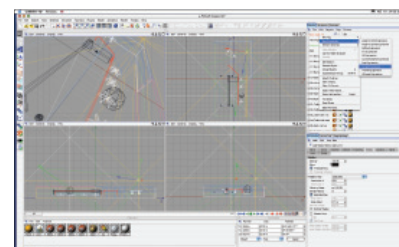
17 Place a camera (Objects→Scene→Camera) into the scene. For a close crop effect use the position X:0.228, Y:4.396, Z:-6.884. Set Projection to Perspective, Focal length and Aperture width to 25 and Field of View to 53.13 degrees. Link the main view to the Camera_01 in the main view window by choosing Cameras→LinkActiveObject. Make sure your new Camera_01 is the active object and complete a test render.



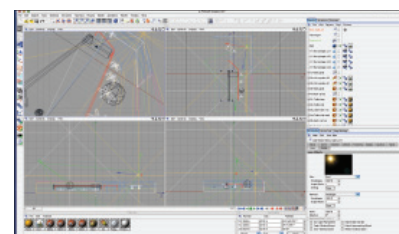
18 It's best to light the scene two ways – with an actual light and some effects lights. The actual light is placed right above the table, this will give smaller shadows and illuminate the front view. Here the light is placed at X:-0.455, Y:8.116, Z:-3.462, but you don't need to be so accurate!



19 You can now set the main light parameters by choosing Attributes→General→Type→Omni and Shadow→Soft. Set Attributes→Shadow and Bias (Abs) 0.1 as default. This will confine the shadow spread and give a tighter soft edge.



20 Add more light (Glow light_01). In order for the lens flare to work you'll need to point it at the Camera_01, so add a Target Expression (select Light, hold Command down and choose NewExpression→TargetExpression). Highlight the Expression in the Attributes dialog and drop Camera_01 into the Target Object box. In the Lights Attributes set Type→Omni and check No Light Radiation. In the Lens dialog choose a Lens Flare (Sun 1) and add more light to taste.



21 For some of the lights try un-checking Use Light Parameters in the Lens section. This will intensify the Lens Flare effect and burn more of the image away. Try different colour and flare combinations, but don't go mad!

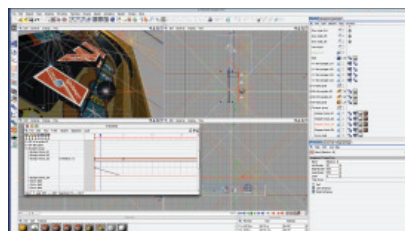


WINDOW RE-SIZE

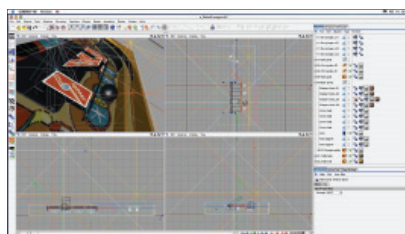
When you have zoomed in and left your image borders way behind, hitting the "H" key in any view will bring everything back to fit within the modelling windows.



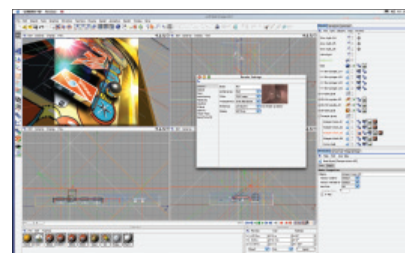
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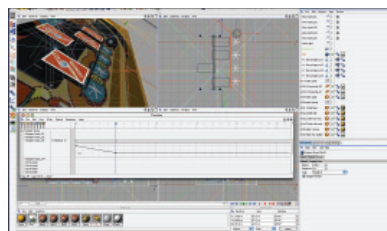
22 Now focus on the Thumper blocks and call up the Animation Timeline. Highlight Bumper block_03, and while holding the Command key down choose New Track→Parameter→Rotation→B. At zero frames, Command+Click on the B timeline and add a new key. Go to frame 5, add another key, and give it a value of 180 degrees, which will bounce the block over.



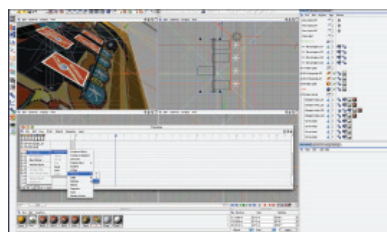
23 Add Motion Blur to the block. This will only work as part of an animation output, so now the block is moving pick a frame, in this case Frame 01, and use this for your still output. In the Objects dialog, select Bumper Block_03, hold down the Command key, choose NewTag→MotionBlurTag and give it a value of 60 per cent.



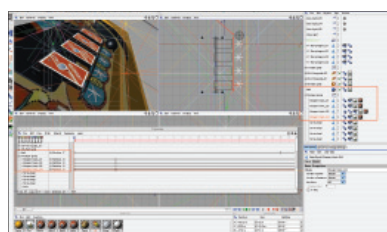
24 Set Render Settings to General, Anti-aliasing to Best, and Filter to Still Image. Next, set Transparency to With Refraction, Reflection to All Objects and Shadow to Soft Only. Go to Output→ChooseASizeInPro and set the size to 300ppi. Keep it small and enlarge the final image in *Photoshop*. Effects required are Object Glow, Lens Effects and Object Motion Blur, which should be set at 60 per cent. Render the file.



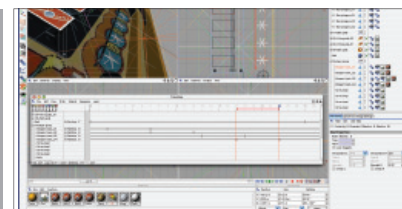
25 Open the timeline. You'll already have a track for the Bumper Block in the Rotation→B track from the still image. Duplicate this and apply it to the other blocks in the timeline. Make the movement act over 25 frames, ie, one second. Experiment with this length of time if you wish.



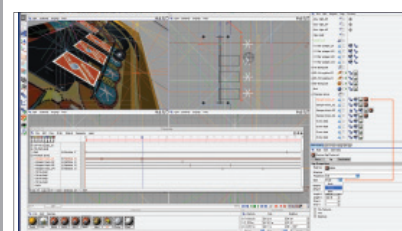
26 You'll also need a movement track for the Ball on the Z axis. Add a new track for this by choosing Timeline→Ball→New Track→Parameter→Position→Z. In the Object Browser, move the ball to just above the Thumper Group in the hierarchy, this way the animation tracks will be viewed closer together in the Timeline window and save scrolling. Duplicate the start key, move to 25 frames and enter a value of -7. This will move the ball to the base of the table.



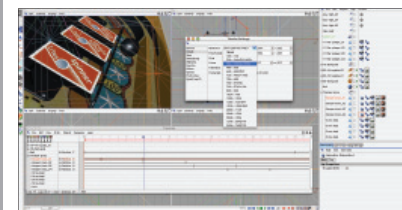
27 Your timeline should now look like this; with tracks assigned to the components you wish to move – the four Bumper Blocks and the Ball.



28 As you preview the ball moving down its Z axis you will notice that as it runs over each Star plunger the Bumper Block will flip over. Adjust the key-frames for each block (1 to 4) to correspond with the forward movement of the ball.



29 When the Bumper Blocks flip over you'll be able to see the back of the block shader projected through – back to front. This can be remedied. Select the block shader in the Objects browser and in Attributes→Basic→Side select the Front option. This will now only map to the front face of the geometry.



30 Once you are happy with the movement, render it out to an animation format. Choose RenderSettings→Output→Resolution→384x288PAL. Set the Frame Length to the length of your animation in frames, the Frame Rate to 25 (*QuickTime* fps) and save it as a *QuickTime* movie. **arts**

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FASTER
RENDERS

To speed up your rendering, try setting the Chrome Shader's Reflection Channel Blur Dispersion to 0. Although this will remain pretty much unnoticeable on your animation, the output will be considerably faster.