



QUESTION OF THE MONTH
Submitted by Mike D. via email

BLENDER

"How do I create a large-scale explosion?"



This issue's solution is provided by freelance animator and director Bassam Kurdali (www.freefactory.org). Bassam is best known for directing *Elephants Dream*, the world's first open-source movie

My first approach to answering this question was to build the explosion using particle systems. But then I changed my mind, for a couple of reasons. The first is that *Blender's* particle system is about to change radically. The new system will offer much better options for hair, explosions, grass, fur – in short, everything – but will be very different from today's system.

The other reason is even more important: diving in with particles is solving the problem backwards. The first step is not to decide 'how', but 'what': you should look at reference material, see what an explosion looks like, then figure out how to recreate it.

Luckily, we live in the age of YouTube. Just typing 'explosion' in the search box yields some awesome examples, from which you can make some vital discoveries – for example, there are many types of explosions. In a large explosion, like a factory or

fuel plant, the most striking feature is not the blast, but the large plume of thick, rolling smoke. This plume looks very dense, not like wispy gas, so maybe particles aren't really a good choice after all.

I've decided to focus on the most important aspect of the explosion – the smoke – using an animated mesh. I've derived the blast from the smoke by varying the pacing, texture and colour; the shockwave that spreads across the ground like an expanding ring; and the shake in the camera as the shockwave reaches it.

Because the explosion is animated, many objects change shape and scale throughout the sequence. Treat the figures provided here as a rough guide, and play with settings to get the effect you prefer. The frame numbers used give a good sense of the timing you need to establish.

All the material for the tutorial can be found online in the Stop Press section of the *3D World* website (the direct URL is <http://tinyurl.com/yvt3g7>). Although the walkthrough deals primarily with animating and texturing the smoke plume, the finished animation also shows a warehouse being destroyed. There isn't space here to get into destroying the warehouse, but the final scene file (*explosion_final.blend*) is available in the download material for reference. ●

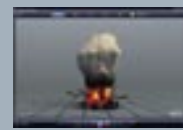
FACTFILE

FOR
Blender 2.45

DIFFICULTY
Expert

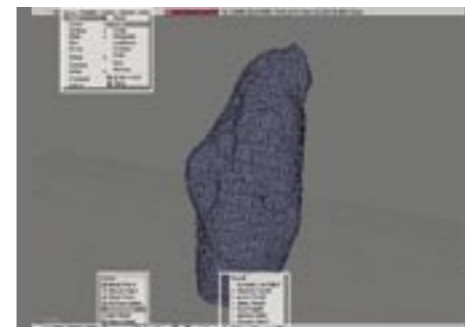
TIME TAKEN
2-3 hours

ON THE WEB
• Scene files
• Full-size screenshots
• Final video

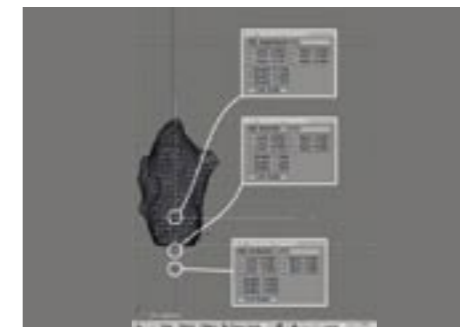


ALSO REQUIRED
N/A

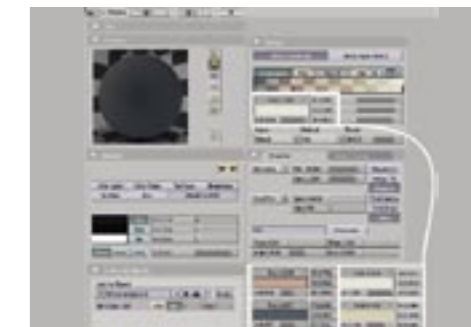
STAGE ONE | Initial set-up



01 Open *explosion_initial.blend*. Select View > Top. Click to place the 3D Cursor on the warehouse. Select Add > Mesh > Cube. Press [W], select Subdivide Multi and set Number of Cuts to 18. Select View > Side. With the vertices selected, press [W] and select Smooth several times to round the corners. Shape the object to roughly match the screenshot, using the Sculpt Mode tools. Move the mesh to just above the ground. This will become the smoke plume for the explosion.



02 Next you'll add some Empty objects for texture mapping. Switch to Top View. Add three Empty objects in Top View via Add > Empty. In the Transform Properties window (Press [N] in 3D View), set the name, location and scale of each Empty according to the screenshot: *heightblend* should be scaled close to the size of the smoke plume mesh, while the other two Empty objects are scaled smaller, as shown. Return to View > Side.



03 Select the smoke plume mesh. In Buttons Window > Shading > Material buttons, click Add New to add a new material. In the Ramps tab, click Colorband. [Ctrl]-click the ramp to add two extra points. Refer to the screenshot for all four points' values and other material settings. The cloud looks dark just now: you'll fix that soon.



04 In Texture buttons > Texture tab, click Add New; name the texture 'heightfade'. Change Texture Type to Blend. In Material buttons > Map Input tab, select Object and type 'heightblend' (the name of the Empty you created) into the text field. Map to Z, Z, Z. (You want the texture to blend vertically.) In the Map To tab, set the colour to RGB 1, 1, 1 and activate Col, Nor and Ref. Set Nor to 5.07.

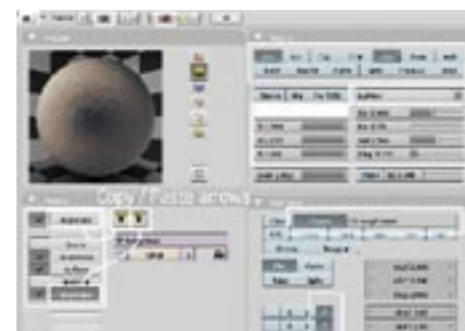


05 In Texture buttons, add a new texture called 'boom' under heightfade. Set Texture Type to Clouds; Noise Basis to Voronoi F1; NoiseSize to 2; and NoiseDepth to 3. In Material buttons > Map Input tab, select Object and enter 'boomtex'. In the Map To tab, refer to the screenshot for settings. In the Texture tab, click the up arrow button to copy. In turn, go to the next three texture slots and press the down arrow (paste).

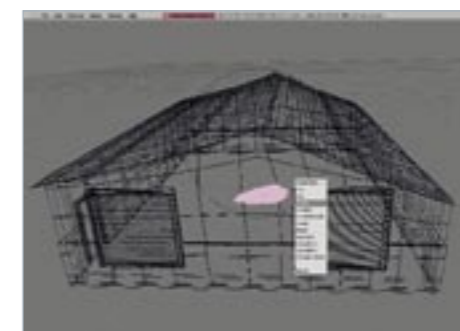


06 In Texture buttons, select the first boom copy. Click the number next to the name and select Single User to copy it; call it 'boomdeep'. See the screenshot for its Map To settings. In Texture buttons, set NoiseDepth to 6. Name the second copy 'surface'. See the screenshot for Map To settings. Set NoiseSize to 0.3 and NoiseDepth to 6. Name the third copy 'boomflat'; set NoiseDepth to 0.

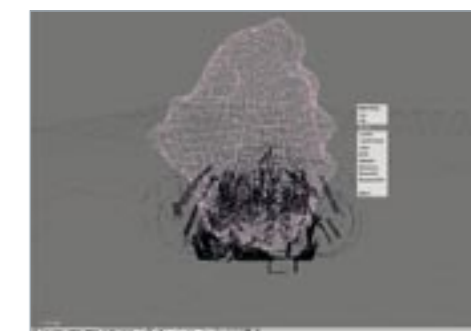
STAGE TWO | Setting up smoke modifiers and animation



07 In Material buttons > Texture tab, untick both 'boom' and 'boomflat'. Click surface, and change its Map Input Ob: to 'surfacetex'. Copy heightfade from the first slot and paste it below the others. In the Map To tab, change Texture blending mode to Lighten and set the colour to RGB 1, 1, 1. Activate Col and Ref. Set Col to 0.466, Nor to 0.50, Var to 0.564 and Disp to 0.200.



08 Next, you'll start to animate the smoke plume, making it grow bigger by scaling it. In Edit Mode > Face Select Mode, select the bottom faces, press [Shift]+[S] and choose Cursor->Selection. In Object Mode > Editing > Mesh, click Center Cursor to move the pivot. At frame 41, scale the mesh almost flat, then scale its diameter, so it's smaller than the warehouse. In 3D View, press [I] and select Scale to set a key.



09 At frame 43, scale the mesh up. Make the depth and width a little smaller than the warehouse dimensions, but set the height comfortably above the warehouse. Set a Scale key. At frame 45, scale up the height even more, and set a Scale key.