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Using Blender 2.7 for Animation - **Advanced 7 - City Scene with Fracture Simulation**

* Open Blender

**Enable the “Fracture Tools” Addon**:

* Click File, New, File, User Preferences, Addons, on left choose Object category, & make sure “**Object: Fracture Tools**” is checked
* “Save User Settings” to prevent having to repeat that next time.

**Enable the City Generator addon**:

* File, User Preferences, Addons, on left choose 3D View category then make sure City Generator is checked; Save User Settings
	+ If says Java missing, update Java—if still says missing, add Java bin folder to PATH (get help from web or an expert).
* On the left panel, scroll down to click “set city options”, set them the way you want, save & close, BUILD CITY
* Save the textures: File, External Data, Pack into Blend File
* File, Save As, your home drive (such as T:\*username* or H:), then in the second box name it 3dv7CityFracture

**Make a breakable object**:

* Make a cube or other solid object with only one set of linked vertices (made with neither join commands nor city generator—boolean is ok) that will be the building that will explode into shards (starting with your own simple mesh will help the simulation work better—buildings made by city generator will not work unless each set of linked vertices are separated).
* The fracture simulation does not work with scaling—to resolve this, select your object, then in the menu bar below the 3D View, click Object, Apply, Scale.
* For physics to work, make sure the object is not inside out nor has corrupted normals for any other reason (normals are the values for which direction the faces are facing)—go to Edit Mode, then click Mesh, Normals, Recalculate Outside

(shortcut is: place mouse over 3D View, then press Ctrl N).

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| *BONUS: Instead of instructions below, use this Cell Fracture tutorial video to make a ground fracture, then add a ground texture:*[*R:\Classes\3DAnimation\Topics\Fracture, Cell - Ground Fracture - Blender 2.65 Cell Fracture Tutorial by Jayden Beveridge on vimeo.mp4*](file:///%5C%5CFCAFILES%5CResources%5CClasses%5C3DAnimation%5CTopics%5CFracture%2C%20Cell%20-%20Ground%20Fracture%20-%20Blender%202.65%20Cell%20Fracture%20Tutorial%20by%20Jayden%20Beveridge%20on%20vimeo.mp4)* *Delete the generated ground.*
* *Make new ground using video tutorial above and fracture it using**Cell Fracture as in video)*
* *Ground must have texture: (material, texture button, change Type to “Image or Movie”, Open, then choose a picture from R:\Pictures or your home drive. Alternatively, you can do texture paint.)*
* *Sky must be changed to an image: (Click texture button, click globe under texture button, change Type to “Image or Movie”, Open any Environment image you saved in your home drive or from any of the environment folders in R:\Pictures , then scroll down & under Influence check Horizon)*
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**Fracture your breakable object**:

* Select your breakable object. Make sure you are in Object Mode.
* First make sure you Click Material button (dark checkered sphere) then Add a material, so that later all shards will have same material & you can edit their material easily (all at the same time).
* Click Object  button then change Name to chunk, press enter (so chunks will be named something like chunk.001 etc).
* SAVE because fracture can cause crashes. Then press the Spacebar, type Frac, click “Fracture Object”, then on the left change Number of shards to 50 or so, check “Execute” (if it crashes, try again but first make sure only a simple solid object is selected, and if still crashes, decrease number)

**Animated fracture**:

* Go to wireframe (‘z’)
* Press ‘b’ then draw a box around all shards & so all are selected & nothing else
* Press the Spacebar, type Frac, click “Setup Fracture Shards”
* Click “Blender Render” & choose “**Blender Game**”, press ‘p’ to test, then if it is OK, you are ready. Otherwise go back to Blender Render & undo until before fracture & try changing fracture options (physics is usually most accurate with Flat shards option). If it is exploding instantly, you may need to use a simpler mesh (for example, UVSphere usually works better than Icosphere).
* Go to the frame when you want physics to start
* In “Blender Game” click Game, make sure “**Record Animation**” is checked
* Press ‘p’, then when chunks are done moving or you want them to stop, press Esc. Click Game, Uncheck “Record Animation”.
* Now the frames are recorded—you may want to click Game, then uncheck “Record Animation” so you don’t overwrite part of it or start it at a different place accidentally.
* Now change back to “Blender Render” & your animation will be there.

**Render a video:**

* + Click World  button, check Ambient Occlusion.
	+ Adjust the camera. Press NUMPAD 0 to turn camera view on/off as you adjust it.

Click View, Properties, then check “Lock Camera to View” then you can move the camera using the middle click (click & drag scroll wheel as button) to rotate (do that while holding shift to pan).

* + In Render , change from PNG to H.264, Browse , choose your home drive (such as T:\*username* or H:), click .

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| TIP: Make a building breakable that was generated by SCG* Select the city mesh (selects all buildings)
* Press Tab key to go to Edit Mode
* Right-click a corner of the building you want to fracture.
* Ctrl L (shortcut for Select, Linked) -- you can only explode one solid at a time.
* Press 'p' (Shortcut for Mesh, Vertices, Separate)
* Click "Selection"
* Press Tab to return to Object Mode
* Right-click so that only the building you want is selected
* Object, Transform, Origin to Geometry (this moves the pivot point to the center of the object)
* Object, Apply, Scale

(continue the directions starting from “Fracture your breakable object”) |

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Using Blender 2.7 for Animation – Advanced 7.2 - Smoke Simulation QUICK EFFECT

(updated for 2.65+)

* Make sure you have your 3dv7 scene open then make a **cylinder or other object** for a log or a shape similar to a building or whatever will smoke. **It must look like something**, so if you mean to make a log, make the cylinder tall.
* With the cylinder selected, at the bottom of the 3D View click “Object”, Quick Effects, Quick Smoke. This will make it into a **Smoke Flow** object.
* Select the cylinder (Smoke Flow object) you created, then click Physics button, then change Flow Type from “Smoke” to “**Fire + Smoke**”
* Select the wireframe cube “Smoke Domain” that was created
	+ Click the Physics Tab if you are not still in it.
	+ **Increase Divisions to a higher number**, to about 64 (avoid going past 120 unless you have more than 2 GB of RAM)
	+ **Resize the smoke domain** to surround the whole area you want the smoke to be able to go.
	+ Click to expand “Smoke Cache” section on right
	+ click “**Bake**” (if gray skip this since may have baked already)
	+ Check “**Smoke Adaptive Domain**” to shrink domain to where the smoke is to save memory and hard drive space on the computer.
* Change to wireframe shading so that other objects don’t cover smoke when previewing the animation in the 3D View (see picture on right).
* Pause at a time when there is smoke then render to test it (Render, Render Image)to see the fire in full quality!

[TIP: make sure that you select the Smoke Domain object when you want to change the options or bake—if you click the Domain button, Blender will change whatever you have selected to a domain and your simulation will not work because there would be two domains!]

* + Then when it finishes rendering and shows an image with smoke, below it click “Image”, “**Save As Image**” and save it as 3dv7 smoke image. **It must show smoke**.

OPTIONAL: If you want the shadows of the smoke to be accurate, select each object in your scene, click material button (then new material if no other options are there), then click to expand the “Shadow” category then check “Receive Transparent” (repeat for each object that is not smoke). (Pax)

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| BONUS: Create a realistic smoke volume using Cycles (requires Blender 2.71 or later). Change renderer from Blender Render to Blender Cycles. Select the Smoke Domain. Click the material  button. Click “Use Nodes.” Change Diffuse to Volume Scatter. Change 3D View to a node editor. Add, Shader, Volume Absorption. Add, Shader, “Add Shader.” Place the “Add Shader” between Scatter and Material Output. Make sure both Scatter and absorption are connected to “Add Shader” and that “Add Shader” output is connected to Material Output’s Volume, but NOT Surface. Add, Input, Attribute. For Name, type density. Connect “fac” to density for both Scatter and Absorption. For fire (optional): Select the addribute. Shift D to duplicate, then move it out of the way and click to drop it. Change from density to Flame. “Add” “Shader” “Add Shader”—place it between the existing Add Shader and Material Output. “Add” “Shader” “Emission”. Connect flame Fac to Emission Strength. Connect Emission to the second Add Shader. Change emission color to orange. To make better smoke, you can input flame Fac into a color ramp, then connect it to Emission color (the color ramp should probably go from red to orange to white. To increase quality, click Render button, then in the Sampling section change “Sampling Presets” to “Final.” (see also https://www.youtube.com/watch?v=xH0O4bMalhg |

Works Cited

Pax, Sardi. "Blender 2.65 Simple Fire & Smoke Tutorial." *YouTube*. N.p., 13 Dec. 2012. Web. 19 Feb. 2013. <http://www.youtube.com/watch?v=ne\_qEeBvHRM>.