

In CRYENGINE the environment is very interactive - things move, collisions occur and things break. Furthermore, when two materials touch, a sound is often generated.

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## Sounds and Physics

The interaction between two materials is described in a file called *MaterialEffects.xml* (located in <Game folder>\Assets\gamedata.pak, and within this \*.pak file, in Libs\MaterialEffects). Opening this file with spreadsheet software will show a matrix, with surface types in the first column/row.

	1	2	3	4
1		mat metal	mat metal nofric	mat metal thick
2	mat metal	collisions:metal_metal	collisions:metal_metal	collisions:metal_metal
3	mat metal nofric	collisions:metal_metal	collisions:metal_metal	collisions:metal_metal
4	mat metal thick	collisions:metal_metal	collisions:metal_metal	collisions:metal_metal
5	mat metal RayProxy	collisions:metal_rayproxy_metal	collisions:metal_rayproxy_metal	collisions:metal_rayproxy_metal
6	mat metal shell	collisions:metal_shell_metal	collisions:metal_shell_metal	collisions:metal_shell_metal
7	mat metal barbwire	collisions:metal_barwire_on_metal	collisions:metal_barwire_on_metal	collisions:metal_barwire_on_metal
8	mat ladder	collisions:metal_metal	collisions:metal_metal	collisions:metal_metal
9	mat glass	collisions:glass_metal	collisions:glass_metal	collisions:glass_metal
10	mat glass breakable safetyglass large	collisions:glass_metal	collisions:glass_metal	collisions:glass_metal
11	mat glass breakable safetyglass small	collisions:glass_metal	collisions:glass_metal	collisions:glass_metal
12	mat glass breakable thin large	collisions:glass_metal	collisions:glass_metal	collisions:glass_metal
13	mat glass breakable thin small	collisions:glass_metal	collisions:glass_metal	collisions:glass_metal
14	mat glass unbreakable	collisions:glass_metal	collisions:glass_metal	collisions:glass_metal
15	mat wood	collisions:wood_metal	collisions:wood_metal	collisions:wood_metal
16	mat wood RayProxy	collisions:wood_metal	collisions:wood_metal	collisions:wood_metal
17	mat wood breakable	collisions:wood_metal	collisions:wood_metal	collisions:wood_metal
18	mat snow	collisions:snow_default	collisions:snow_default	collisions:snow_default
19	mat ice	collisions:ice_default	collisions:ice_default	collisions:ice_default
20	mat water	collisions:water_default	collisions:water_default	collisions:water_default

From this file the Engine looks up actions to be taken on any given interaction and each entry in the table contains text pointing to a description of the effect to be taken. The effects are described in the *FXLibs* subfolder.

The example below shows how the description is composed for collisions.

Example: When an Entity with an assigned surface type of *mat\_wood* collides with the surface\_type *mat\_metal* the corresponding cell in the spreadsheet contains the text: *collisions:wood\_metal*. This text indicates that the effect is called *wood\_metal* - this is situated in the *FXLibs\collisions.xml* file and the audio system Trigger to be played is described therein.

Pic2: Collisions.xml

```

<Effect name="metal_glass">
  <Audio trigger="Play_p_col_mat_metal_thick_on_glass_thick">
  </Audio>
</Effect>
<Effect name="metal_wood">
  <Audio trigger="Play_p_col_mat_metal_thick_on_wood_solid">
  </Audio>
  <Particle>
    <Name>collisions.small.wood</Name>
  </Particle>
</Effect>

```

## Special Cases

### Special Table Entries

In some cases the material of an object is not enough to describe its sound probabilities. For example, a barrel (made out of sheet metal) dropped to the ground sounds very different from a sheet metal roof being hit by something.

Therefore, the first column of the table described above may contain special names used by archetype classes.

The image below lists various names for the barrel object class and describes the different interaction sounds.

	1	2	3	4
142				
143	Props.storage/local/barrels.barrel_explosive_black	collisions:barrel_full_hit	collisions:bloody_flesh	collisions:fire_spreading
144	Props.storage/local/barrels.full_metal_barrel_a	collisions:barrel_full_hit	collisions:bloody_flesh	collisions:fire_spreading
145	Props.storage/local/barrels.full_metal_barrel_b	collisions:barrel_full_hit	collisions:bloody_flesh	collisions:fire_spreading
146	Props.storage/local/barrels.full_metal_barrel_c	collisions:barrel_full_hit	collisions:bloody_flesh	collisions:fire_spreading
147	Props.storage/local/barrels.full_metal_barrel_d	collisions:barrel_full_hit	collisions:bloody_flesh	collisions:fire_spreading
148	Props.storage/local/barrels.empty_metal_barrel_a	collisions:barrel_empty_hit	collisions:bloody_flesh	collisions:fire_spreading
149	Props.storage/local/barrels.empty_metal_barrel_b	collisions:barrel_empty_hit	collisions:bloody_flesh	collisions:fire_spreading
150	Props.storage/local/barrels.empty_metal_barrel_c	collisions:barrel_empty_hit	collisions:bloody_flesh	collisions:fire_spreading
151	Props.storage/local/barrels.empty_metal_barrel_d	collisions:barrel_empty_hit	collisions:bloody_flesh	collisions:fire_spreading
152	Props.storage/local/container.container_green	collisions:huge_container_hit	collisions:bloody_flesh	collisions:fire_spreading
153	Props.gas_station.can_a	collisions:icy_can_ground		

Destructibles also have a special mapping:

- **Breakage:Breakage:** When an object of said surface type breaks; can be a partial destruction.
- **Breakage:Destroy:** When an object of said surface type is completely destroyed.
- **Breakage:Joint\_Break:** When the joint of an object breaks.
- **Breakage:Freeze\_Vapor:** Points to the sound made when frozen articles vanish upon destruction.
- **Breakage:Freeze\_Shatter:** Points to the sound made when frozen articles shatter.

## Bullet Impacts

A separate file called `FXLibs\projectiles.xml` is used to reference bullet effects.

**NOTE:** A delay can be put into the effect so that the player can hear the sound of the bullet impacting even while still shooting. Also, a bullet hitting a special object, such as a barrel, will create a sound according to the object's assigned material (for example, sheet metal).

Delay in `projectiles.xml`

```

<Effect name="bullet metal" delay="0.05">
  <Audio trigger="Play_p_pro_impact_bullet_hit_mat_metal">
  </Audio>
  <RandEffect>
    <Particle>
      <Name minscale="0.18" maxscale="2" maxscaledist="60">bullet.hit_metal.a</Name>
    </Particle>
  </Particle>
</Effect>

```

## Bypassing the Table for Vegetation Objects

Entries in the `FXLibs\vegetation.xml` file bypass the table in the `MaterialEffects.xml` file and result in audio system Triggers based on the name of the vegetation.

## Console Variables

- **mfX\_Debug:** Turns on MaterialEffects debug messages (1=Collisions, 2=Breakage, 3=Both).
- **mfX\_Enable:** Enables MaterialEffects.
- **mfX\_EnableFGEffets:** Enables Flow Graph based MaterialEffects (Default: On).
- **mfX\_ReloadFGEffets:** Reloads MaterialEffect's Flow Graphs.
- **mfX\_Reload:** Reloads the MFX Spreadsheet.