Dynamica Toolset
Dynamica History

- Developed by Nicola Candussi for Disney Animation Studios
- Used in production of the animated feature *Bolt*
- Bullet Physics powered rigid body array simulation
- Donated to Bullet Physics project - thanks Disney!
- Rigid body creation, activation, and baking tools
- Voronoi pre-shatter
- Rigid body primitives, hulls, & meshes.
- Force breakable constraints & keyframed kinematic colliders
Axis, Radial, & Daisy Chain activation controls

Baking & pipeline integration

Options: timestep, substep, collision margin, & constrained body collisions

.bullet export
Authoring Destruction: Typical Workflow
Authoring Destruction: 3 Steps

1. Mesh prep, pre-shatter & rigid body creation
2. Constrain & choreograph
3. Simulation baking & pipeline integration
Step 1: Mesh Preparation & Pre-shatter

- Create simple proxy shapes with conformed surface normals
- Run Voronoi shatter
- Convert to active rigid bodies
- Simulate to verify collisions
Step 2: Constrain & Choreograph

- Initial choreography & activation timing
- Add constraints & configure breaking thresholds
- Iterate: continue to simulate & adjust as needed
Step 3: Bake & Integrate

- Bake simulation as keyframe data
- Verify results
- Push down pipeline or re-integrate
Content Created With Dynamica
Siggraph Logo Crumble

- Voronoi pre-shattered polygon box
- Daisy Chain activation
- No constraints
- Passive rigid body box acts as “pusher”
Rigid bodies are activated in stages along the Y axis.
Constraints hold the top together.
Particles were added after baking.
Meshes repurposed as Nucleus passive colliders.

Castle Tower Collapse
Exploding Barrel of Apples

- Barrel held together with constraints
- Explosions controlled with intersecting passives
- Constraint breaking thresholds control disintegration
Anti-gravity Axles

- Simple proxy shapes built to match render meshes
- Breakable hinge constraints on each wheel
- Multiple Maya fields creative anti-gravity effect
Weapon Test

- Each block was Voronoi pre-shattered
- Explosions controlled with intersecting passives
- Particles were added after baking
- Fractured shapes were re-proxied for fluid collisions
Get Dynamica

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