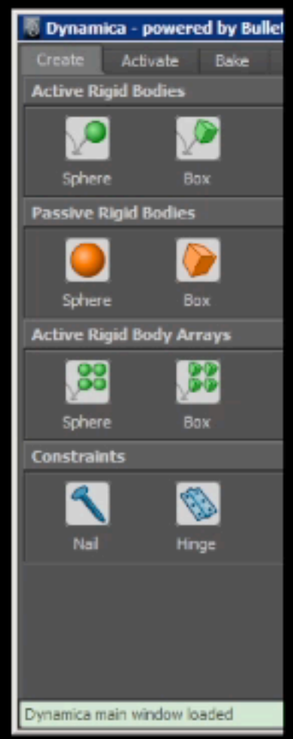
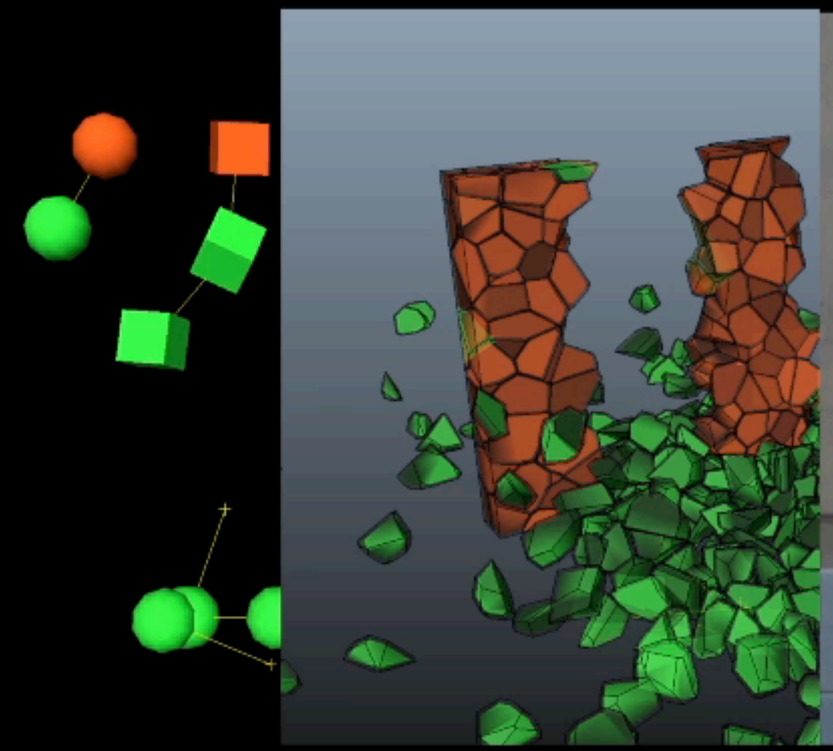
SIGGRAPH2011

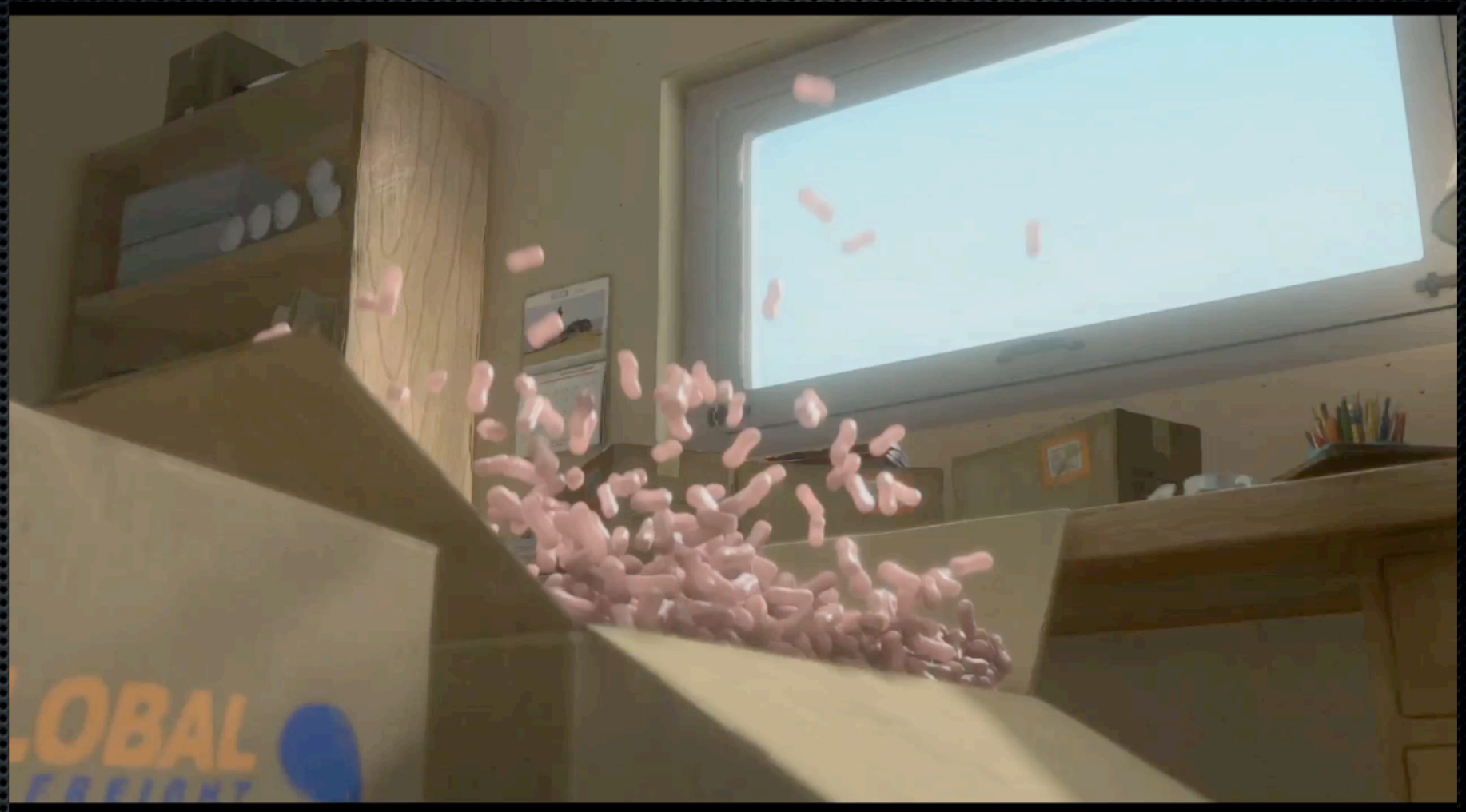
Dynamica Toolset





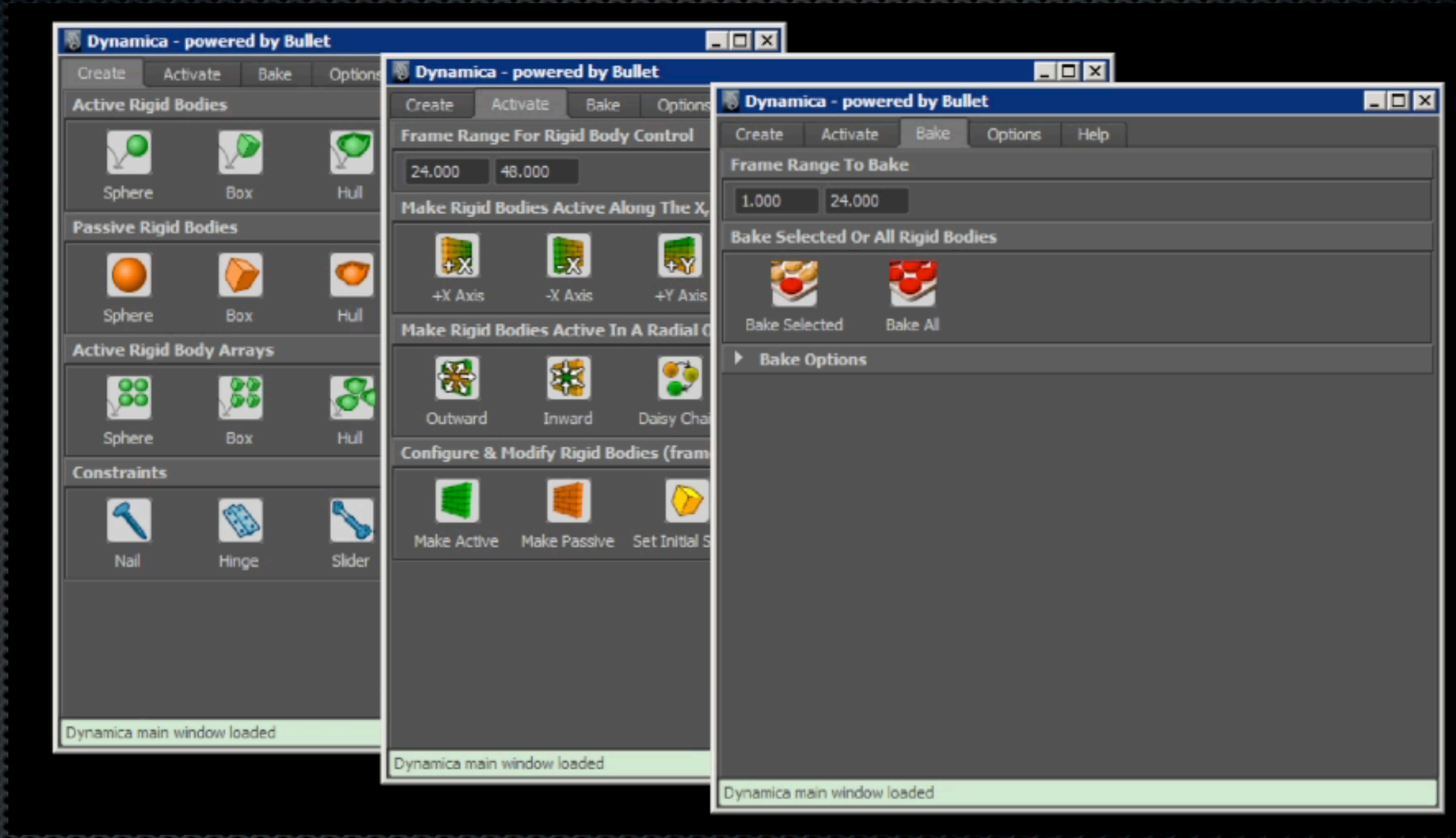
Dynamica History

- 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!



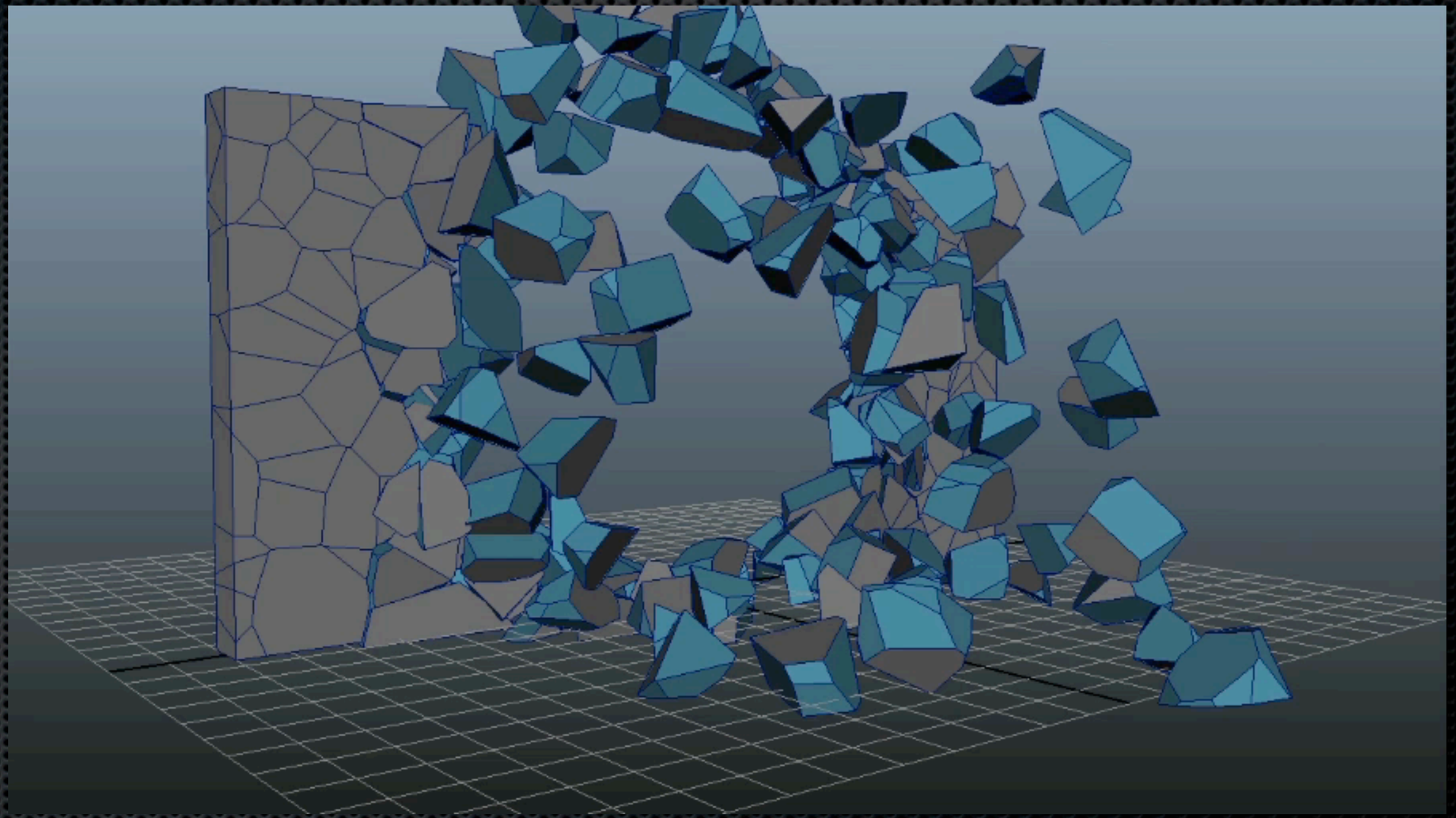
Dynamica Today (1)

- Rigid body creation, activation, and baking tools
- Voronoi pre-shatter
- Rigid body primitives, hulls, & meshes.
- Force breakable constraints & keyframed kinematic colliders

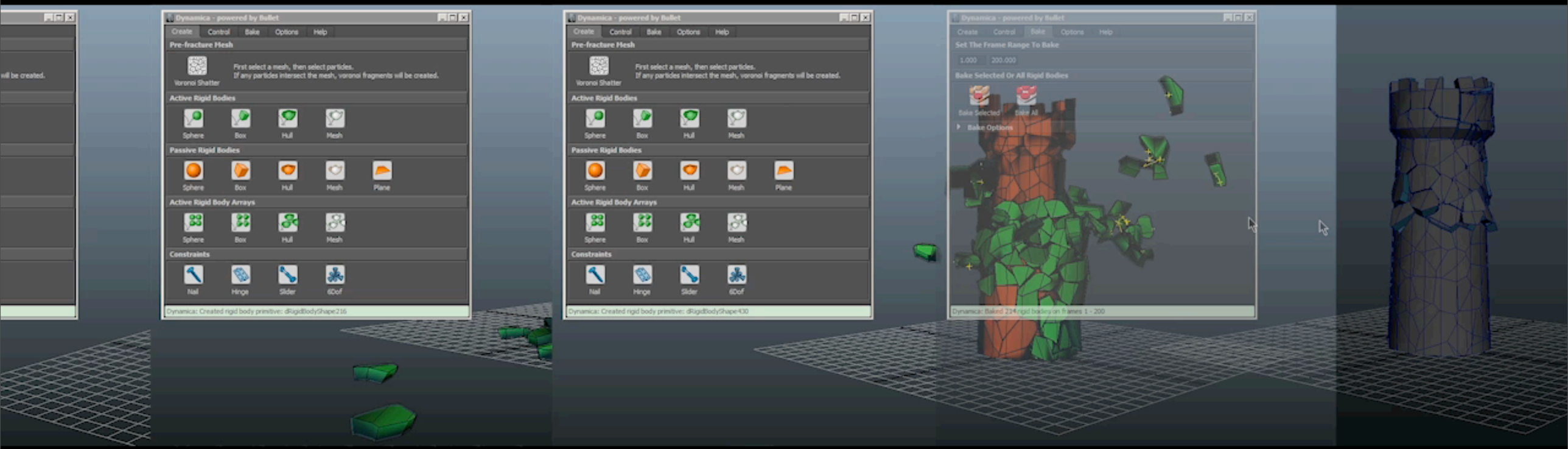


Dynamica Today (2)

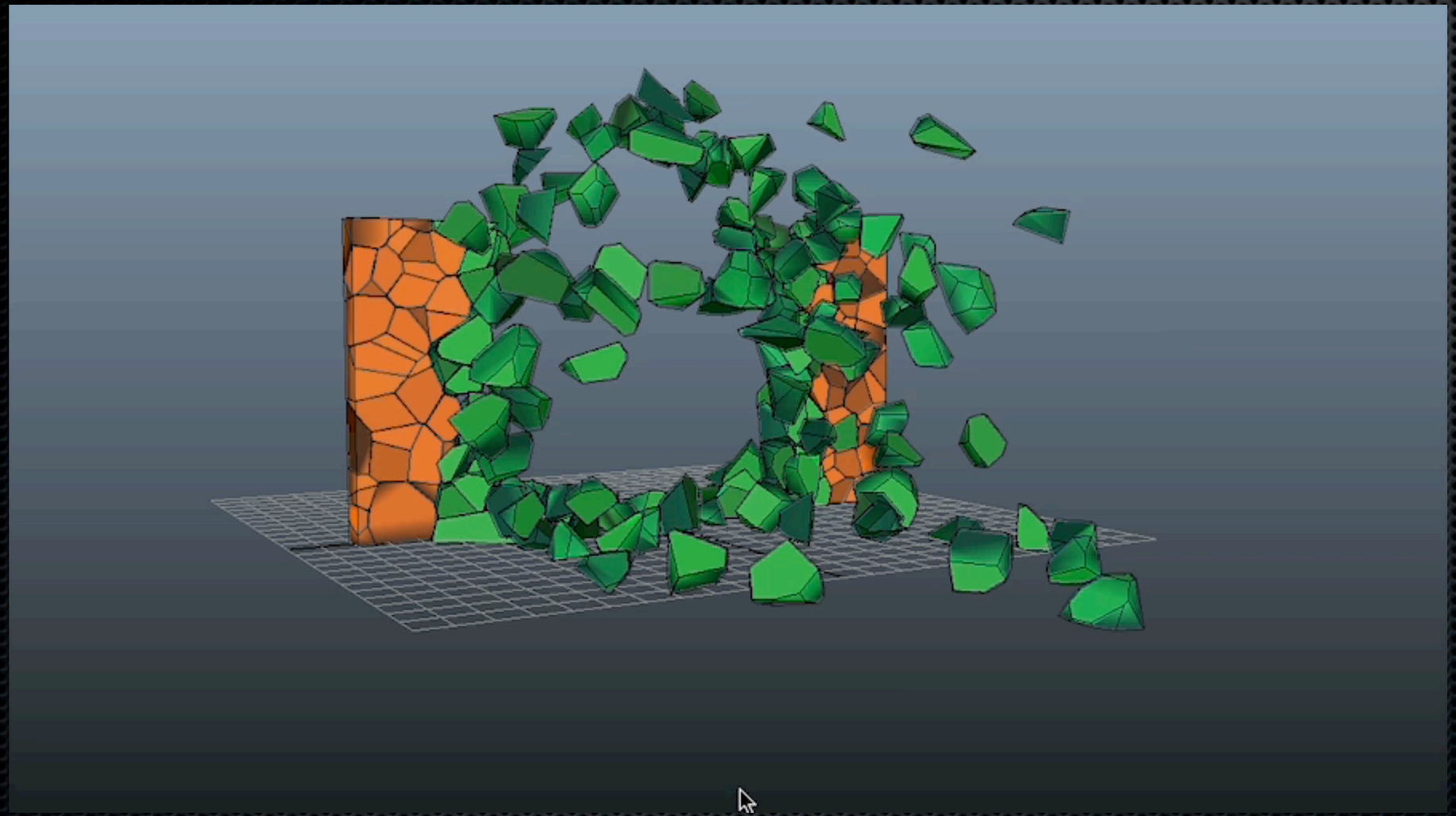
- Axis, Radial, & Daisy Chain activation controls
- Baking & pipeline integration
- Options: timestep, substep, collision margin, & constrained body collisions
- .bullet export



Authoring Destruction : Typical Workflow



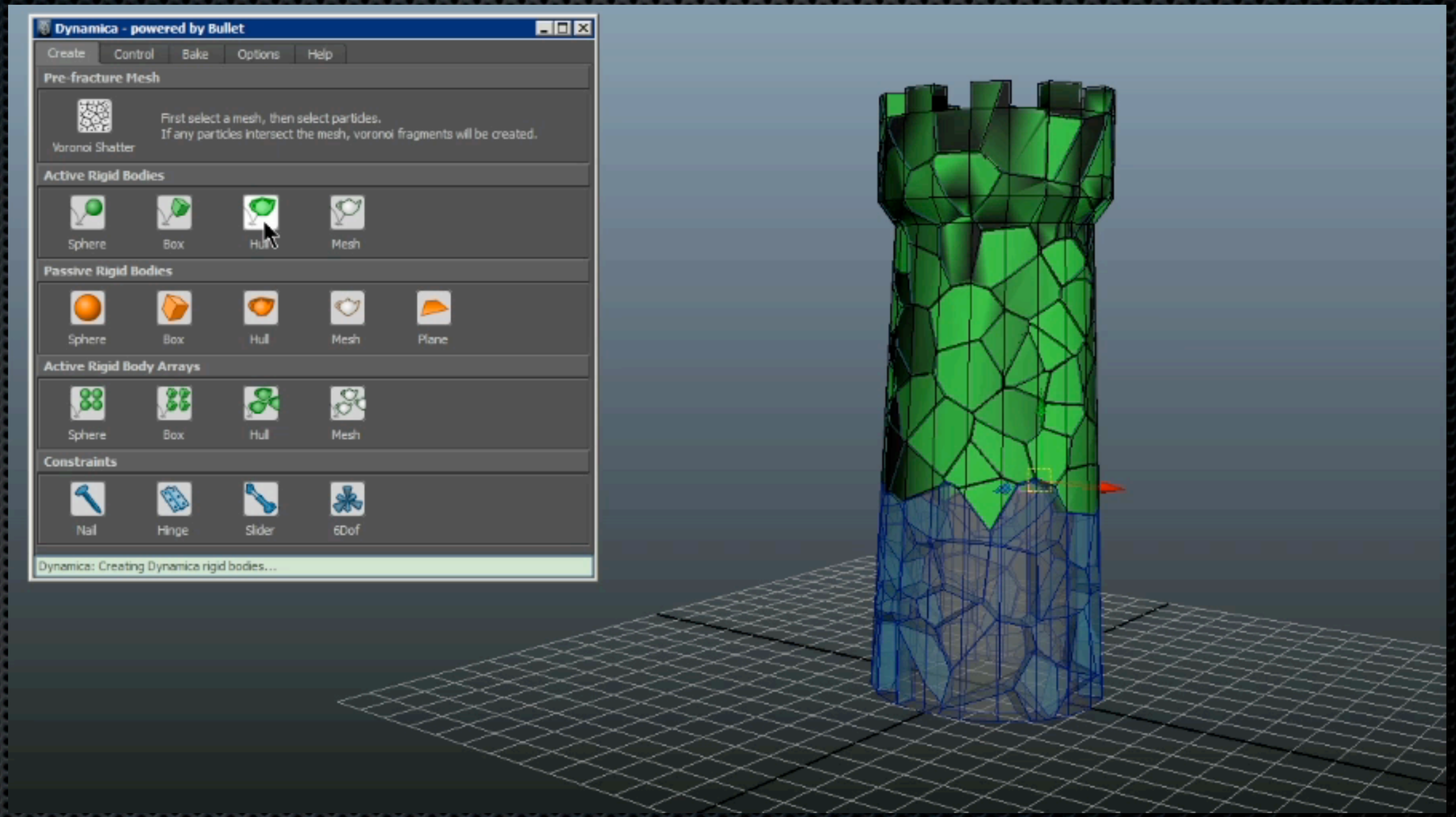
Authoring Destruction : 3 Steps



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

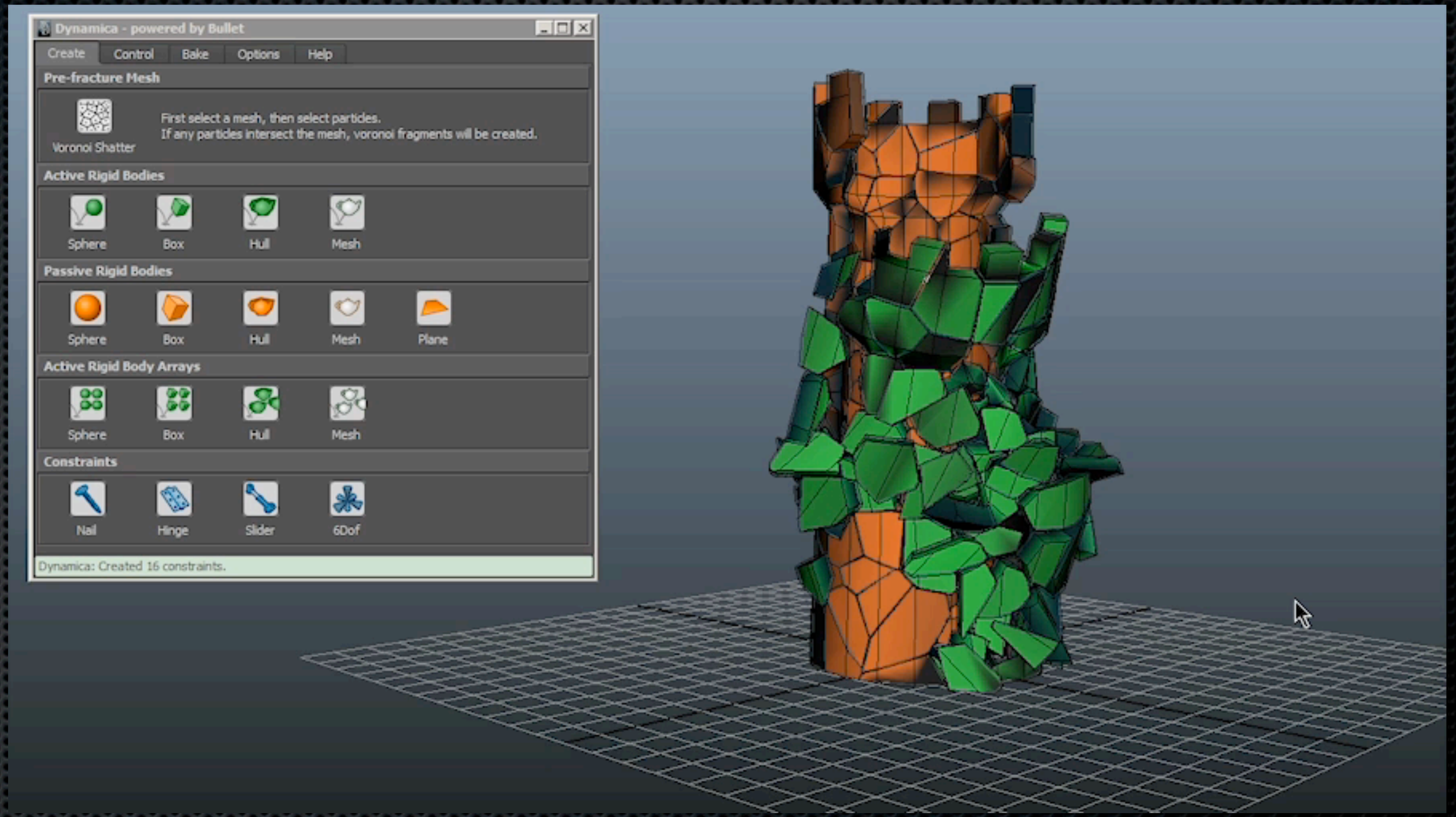
Step 1 : Mesh Preparation & Pre-shatter

- Create simple proxy shapes with conformed surface normals
- Run Voronoi shatter
- Convert to active rigid bodies
- Simulate to verify collisions



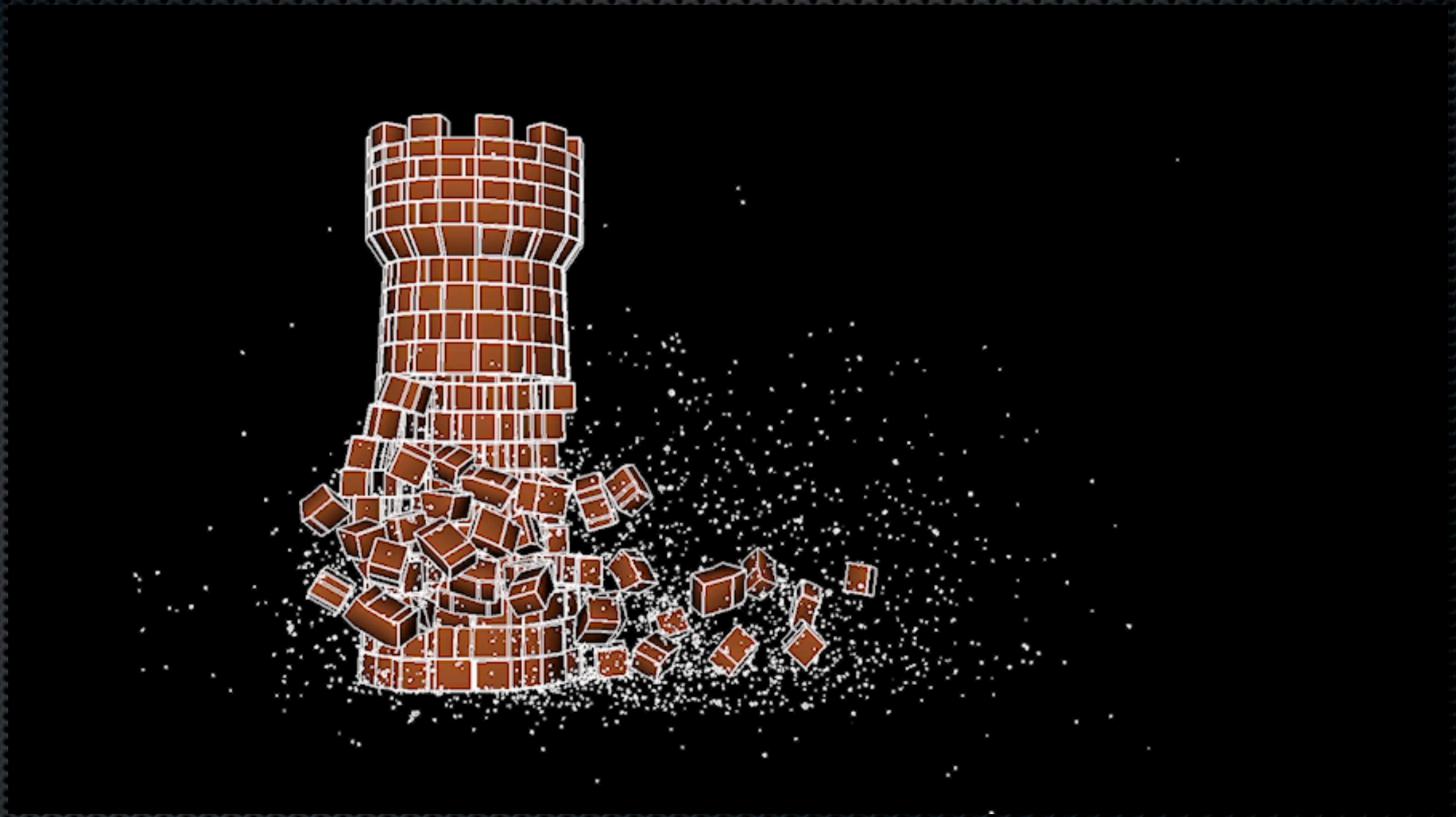
Step 2 : Constrain & Choreograph

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

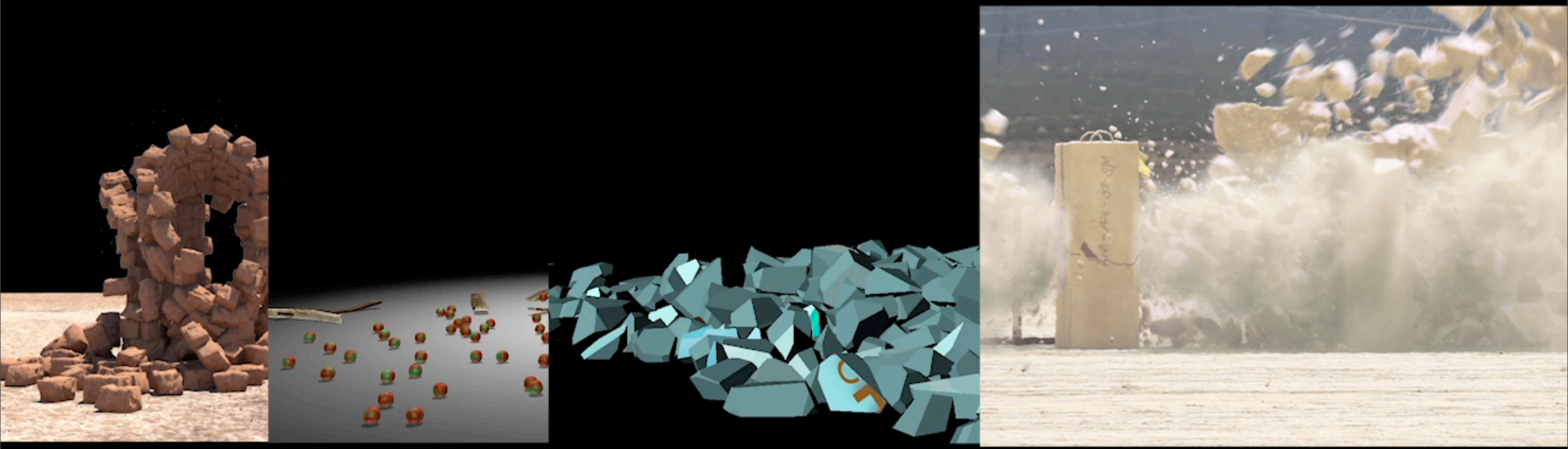


Step 3 : Bake & Integrate

- Bake simulation as keyframe data
- Verify results
- Push down pipeline or re-integrate



Content Created With Dynamica



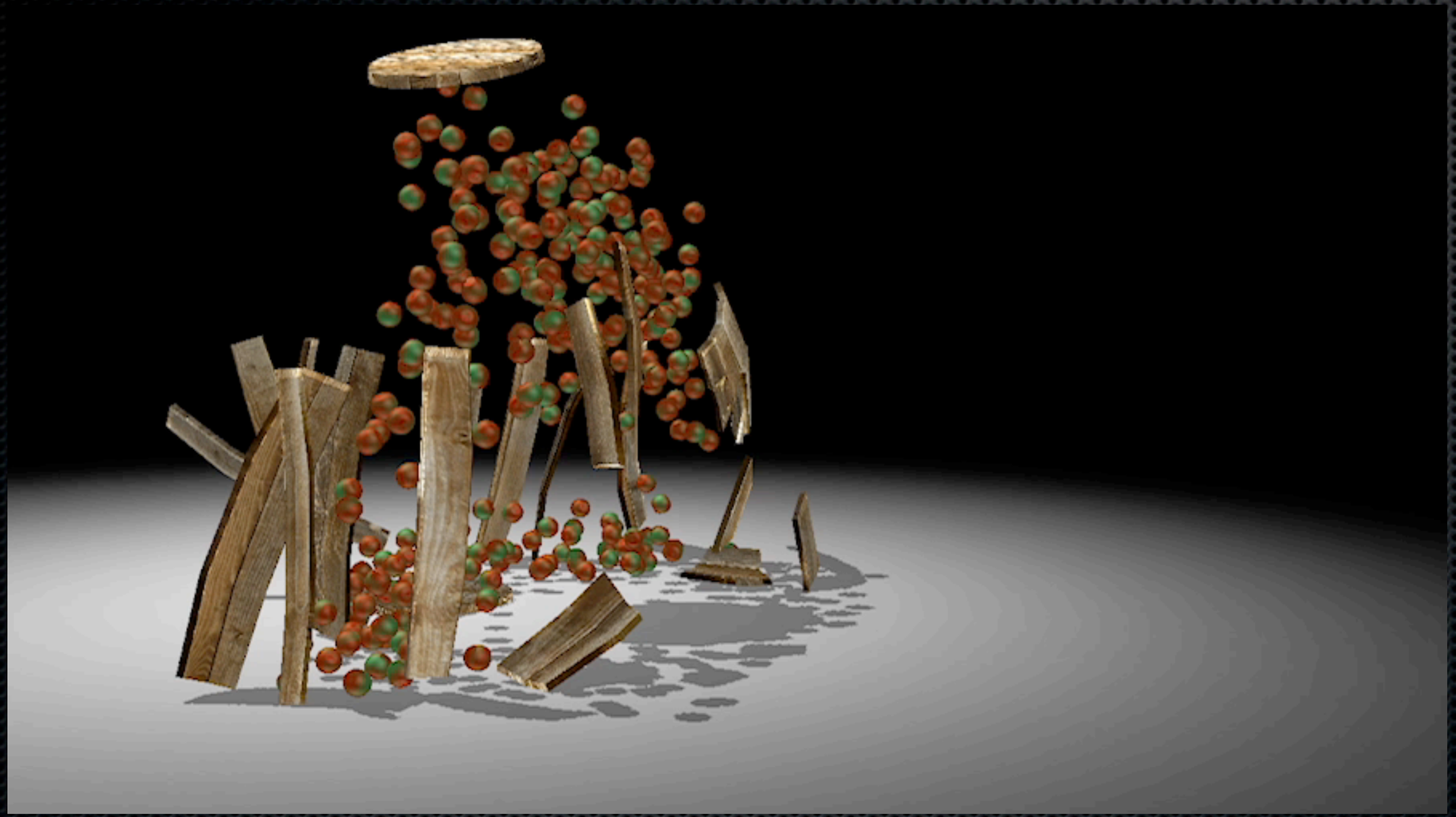
Siggraph Logo Crumble

- Voronoi pre-shattered polygon box
- Daisy Chain activation
- No constraints
- Passive rigid body box acts as “pusher”

Castle Tower Collapse

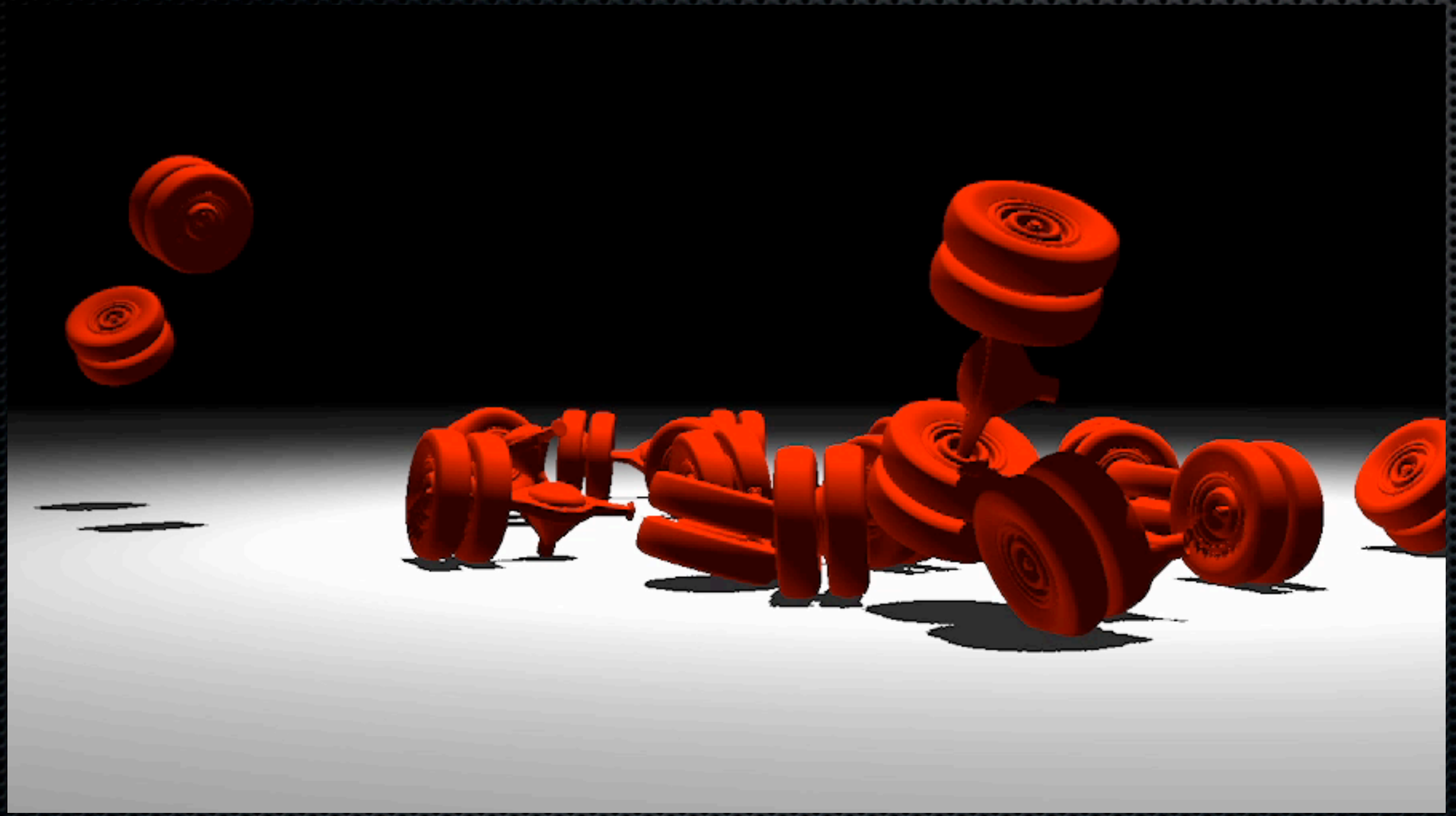
- Rigid bodies are activated in stages along the Y axis
- Constraints hold the top together
- Particles were added after baking
- Meshes repurposed as Nucleus passive colliders

Exploding Barrel of Apples



- Barrel held together with constraints
- Explosions controlled with intersecting passives
- Constraint breaking thresholds control disintigration

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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bulletphysics.org

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