Pushing for Large Scale Destruction FX
Lessons learned from Gears of War 3: Raam’s Shadow DLC

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About RAAM’s Shadow

- Gears of War 3 Downloadable Content
- Released December 13, 2011
- 3 Hours of campaign gameplay
- Play as Barrick and General RAAM
- More in-game destruction than any other Gears game to date
We Wanted Destruction

- Realism
- Player immersion
- Raise the stakes
- Water cooler moments
Conflicting Priorities

• It takes a lot of people to do destruction!
• Competition for system resources
• Small FX team with other priorities
A challenge

• Tasked with
  – All the cinematic FX
  – A massive gameplay-destructible building

• More demolition tasks were added
  – LDs and Cinematics guys liked what they saw..
  – ..So they wanted more!
The approach I took

- Particle systems used as filler
  - Dust
  - Debris
- Particle systems for detail work
  - Shattering glass
  - Flying paper and misc atmospherics
• Skel mesh animation for baked sims
  – Playback of baked sims
  – Accurate motion
  – As good as time permits
  – Control over fracture shapes
  – Art-directable motion
So what did I learn?

• 11 lessons.. A retrospective on what helped me:
  – Stay on schedule
  – Keep memory under control
  – Destroy as much as possible
  – Get results which fit the scope and the budget
1. Choose the right tools

- Work in a comfortable DCC environment
- Research a tool that fits the production needs and your time constraint
  - Decently accurate
  - Stable
  - Fast!!!
  - Tolerant of interpenetrations and mesh imperfections
2. Get the facts

• What’s the scope?
• What’s the setting?
  – Cinematic or gameplay
  – Player interaction?
• Communicate with Stakeholders
  – What do they want to see?
  – What’s the story behind the event?
  – Does it serve a particular purpose?
3. Cheat

• Wherever you can
  – No kudos for doing it the hard way
• BG objects as animated meshes
• Hand animate hero debris
• Re-use
• Dust and debris fillers
4. Use fillers (not the pink slime..)

- Look at real destruction footage
  - Debris engulfed in dust
  - Fill the gaps in your sim
  - Hide issues with collisions and settling
- Fillers go in first to gauge the sim workload
5. Mix Techniques

- Physic simulations are time consuming
- Real destructions are a mix of materials
- Use that to your advantage
  - Particle dust
  - Particle debris
  - Material Debris
  - Sound design
6. Be sneaky (blocking early)

- Talk to the LD as early as possible
- Provide a quick initial sim
  - For blocking
  - Don’t optimize!
- Congrats! You just reserved your chunk of level memory
  - Promise it will look better and be more efficient
7. Two pass Approach

• Stub in early and quickly
• Resist re-sims until..
• ..the level is nearly locked down
• Call out for any additional comments
• Then do the second/final pass.
8. Plan

• Early communication with LDs
  – Break off into sublevels

• ..and with Cinematics guys
  – ‘Convenient’ camera work
  – Transitions and cutaways
9. Share the love

• Detail Fracturing
  – Mesh optimizations
  – Material and detail work

• UV work
10. Recycle

• Mirroring
  – Single mesh with multiple simulations
  – Hide symmetrical hole cutouts
  – Huge memory saver

• Modularity
  – Standalone destructions sims you can reuse
11. Optimize

• Mesh Optimizations
  – Simplify meshes before fracturing
  – Aim for larger sized Pieces
  – Consolidate nearby chunks into a larger solid chunk
  – Minimize the use of clustering simulation behavior
Parting sentence..

BANG FOR THE BUCK!