



The Weight of the World

**creating massive destruction audio for
Red Faction: Armageddon**

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GAME DEVELOPERS CONFERENCE
SAN FRANCISCO, CA
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EXPO DATES: MARCH 7-9
2012

THEORY
SYSTEM DESIGN
IMPLEMENTATION
OPTIMIZATION
PERFORMANCE
FINAL THOUGHTS

CLEAR THE AREA

GAMEPLAY

+6 409



THEORY

**SYSTEM DESIGN
IMPLEMENTATION
OPTIMIZATION
PERFORMANCE
FINAL THOUGHTS**

THEORY / SYSTEM DESIGN / IMPLEMENTATION / OPTIMIZATION / PERFORMANCE

EMOTION, SENSATION

DESTROY THE INFECTED BUILDINGS

3/5

DESTROY

WEIGHT

0400

084

THEORY

SYSTEM DESIGN

IMPLEMENTATION
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FINAL THOUGHTS

SUPPORT GAMEPLAY DESIGN





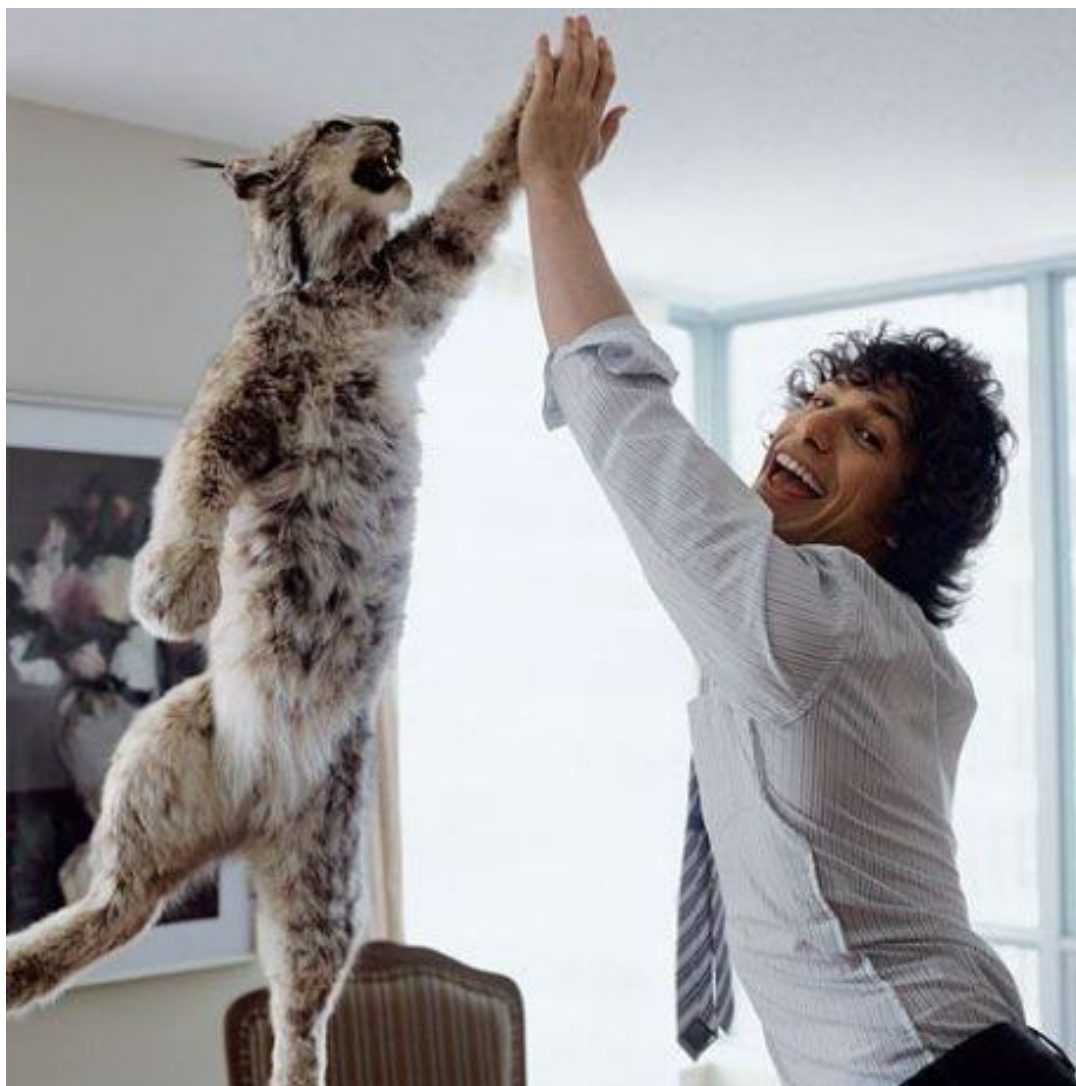


THEORY / SYSTEM DESIGN / IMPLEMENTATION / OPTIMIZATION / PERFORMANCE

SUCCESS











THEORY / SYSTEM DESIGN / IMPLEMENTATION / OPTIMIZATION / PERFORMANCE

EMOTION, SENSATION

THEORY / SYSTEM DESIGN / IMPLEMENTATION / OPTIMIZATION / PERFORMANCE

CHALLENGE

\propto

REWARD

CONTINUOUS REWARD SPECTRUM

THEORY / SYSTEM DESIGN / IMPLEMENTATION / OPTIMIZATION / PERFORMANCE

ARTICULATION

THEORY
SYSTEM DESIGN

IMPLEMENTATION

OPTIMIZATION
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FINAL THOUGHTS

“ART OF IMPLEMENTATION”

GGEOMMOD

2.0

[without math]

SCENE / an arbitrary unit of gameplay



SHARDS / pieces of a structure



ACTION / shard collision behavior



MATERIAL / shard composition



SIZE / our perceptual measurement

SCENE / an arbitrary unit of gameplay



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SIZE / our perceptual measurement

ACTIONS

IMPACT

SLIDE

ROLL

SHIFT

DETACH

STRESS

GROAN

COLLAPSE

SCENE / an arbitrary unit of gameplay



SHARDS / pieces of a structure



ACTION / shard collision behavior



MATERIAL / shard composition



SIZE / our perceptual measurement

MATERIALS & SHAPES

CONCRETE
STEEL
MONOLITH
CARDBOARD
GIBS

SOLID
SHEET
POLE
FLESH
BONE

SCENE / an arbitrary unit of gameplay



SHARDS / pieces of a structure



ACTION / shard collision behavior



MATERIAL / shard composition



SIZE / our perceptual measurement

SIZE PARAMETERS

Velocity

Mass

Energy (mass, velocity)

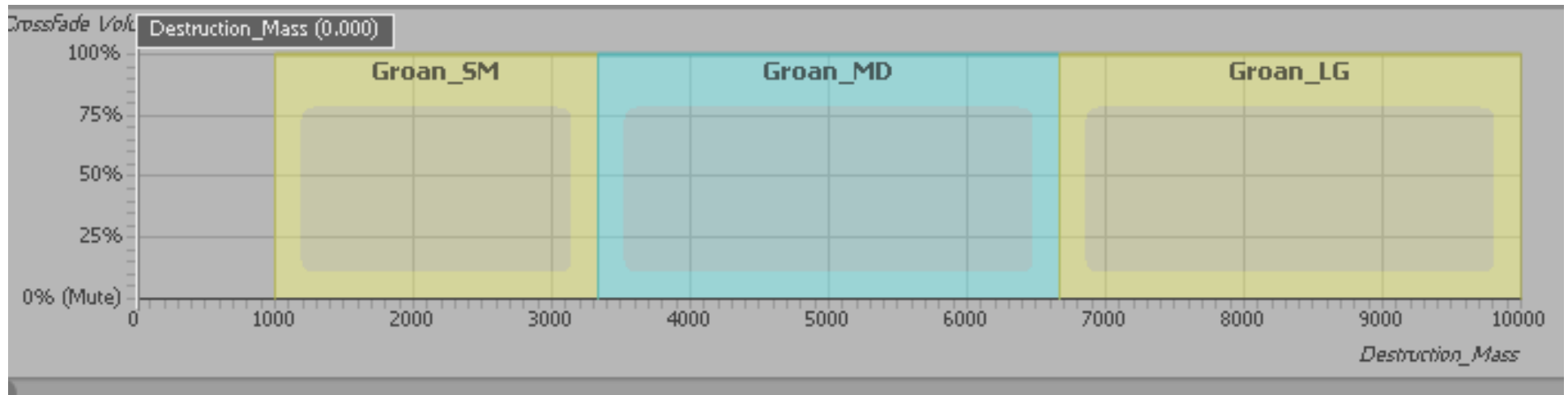
Shard Dimension (surface)

Load to Yield Ratio (stress)

Area of Effect (collapse)

STEEL / POLE / GROAN

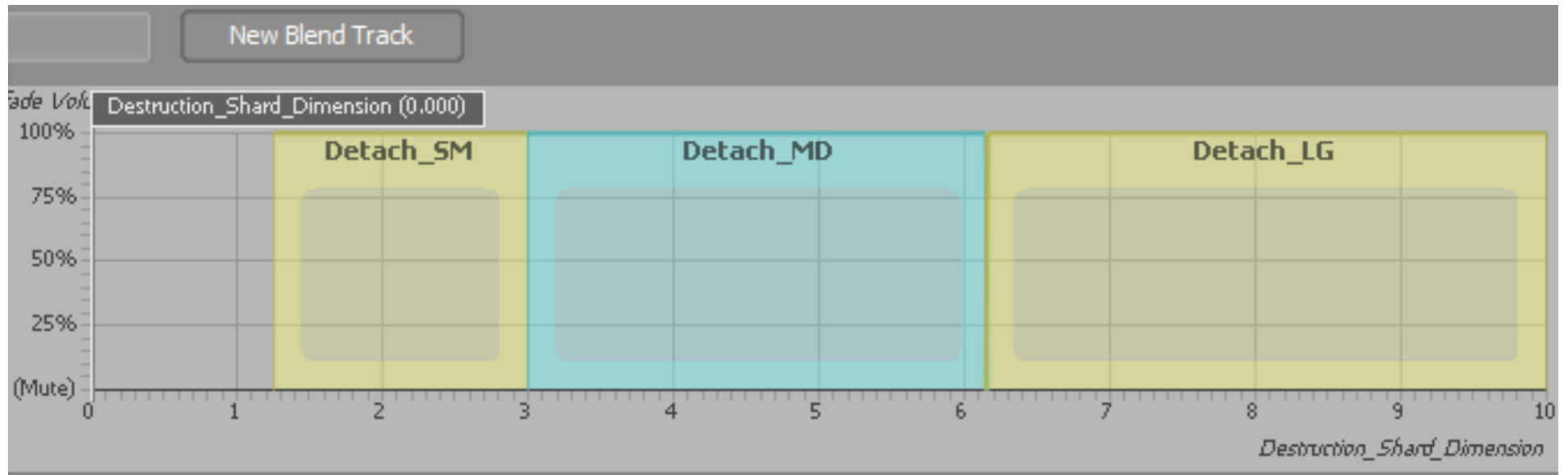
MATERIAL / SHAPE / ACTION



SIZE

STEEL / POLE / DETACH

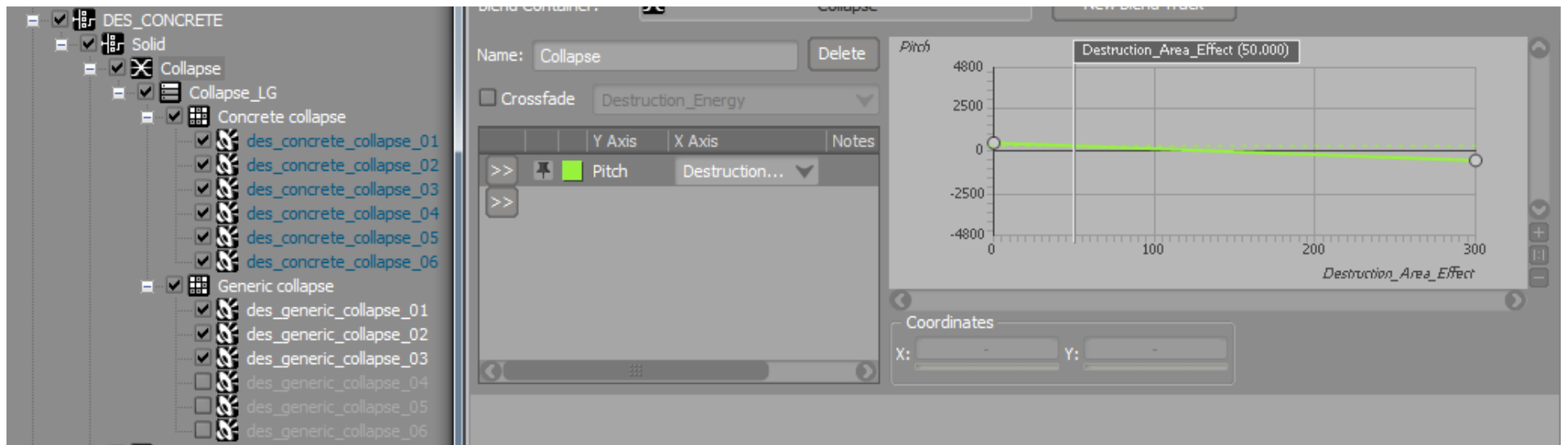
MATERIAL / SHAPE / ACTION



SIZE

CONCRETE / SOLID / COLLAPSE

MATERIAL / SHAPE / ACTION



SIZE

DEBUG

Frametime (avg): 0
Max: 0

default:	0/1	0/1	0/1
collision:	0/30	0/10	0/10
stress:	0/10	0/10	0/10
load balance:	0/10	0/15	0/20



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SYNCHRESIS

Synchronization + Synthesis

Coined by Michel Chion, “Audio Vision”

[aka “wobble room”]

Perfect sound sync is not necessary for the mind to perceive the sound as causally related to the event on screen.

“Somehow, it seems that our minds can keep track of [...] the footsteps of two people, but with three or more people our minds just give up [...] the mind says ‘Yes, I see a group of people walking down a corridor and what I hear sounds like a group of people walking down a corridor.’”

-Walter Murch, on editing footsteps for THX 1138

From the article “Dense Clarity, Clear Density”

http://transom.org/?page_id=7006

SYNCHRESIS



ILLUSIONS, MICHAEL










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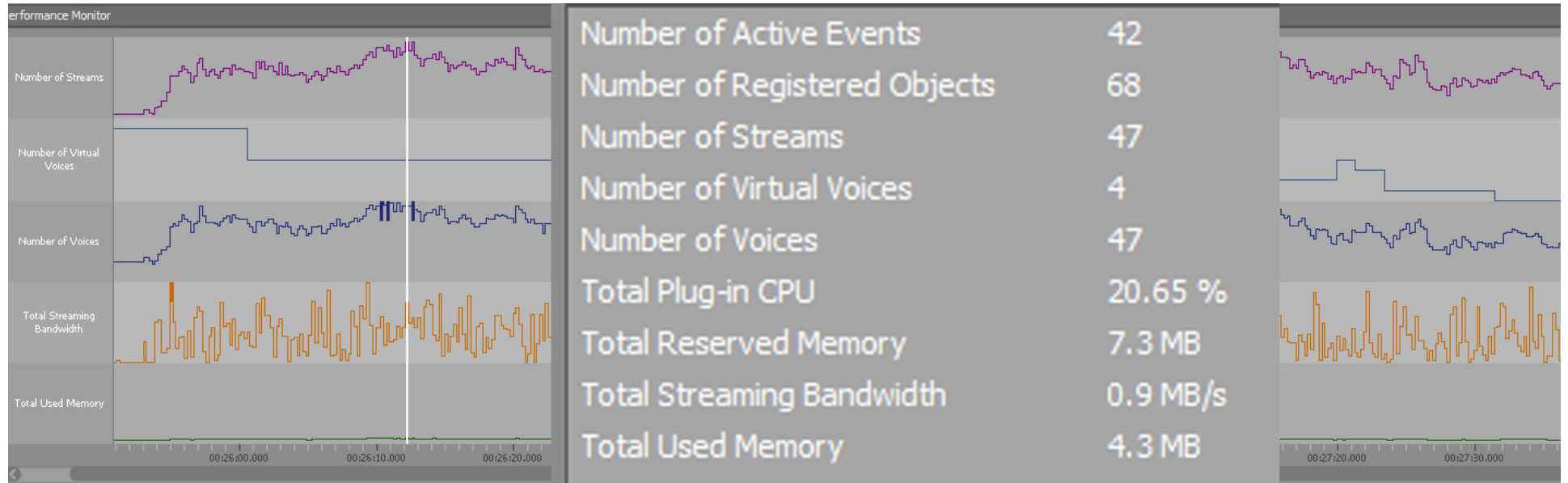
PERFORMANCE

Voices GraphVoicesMemoryStreamsPlug-insEnvironmentsObs/OccSoundBanksLoaded MediaPrepared E									
Pool Name	Reserved	Used	Ratio Used	Max Free Block	Allocs	Frees	Cur. Allocs	Peak Used	
Communication	96.9 KB	25.6 KB		61.1 KB	1144	924	220	29.6 KB	
Default	2.8 MB	2.0 MB		0.8 MB	188...	168...	19692	2.0 MB	
Lower Engine Default	2.0 MB	0.7 MB		1.0 MB	853...	853...	348	1.0 MB	
Monitor	28.9 KB	1.7 KB		27.3 KB	21447	21379	68	2.3 KB	
Monitor Queue	64.0 KB	64.0 KB		-	1	-	1	64.0 KB	
Stream I/O	2.2 MB	1.5 MB		26.0 KB	12005	11946	59	1.9 MB	
Stream Manager	60.9 KB	15.7 KB		45.0 KB	16146	16036	110	18.2 KB	

PERFORMANCE



PERFORMANCE



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Cache Hit Rate ~80%

PREFETCH TO CACHE!

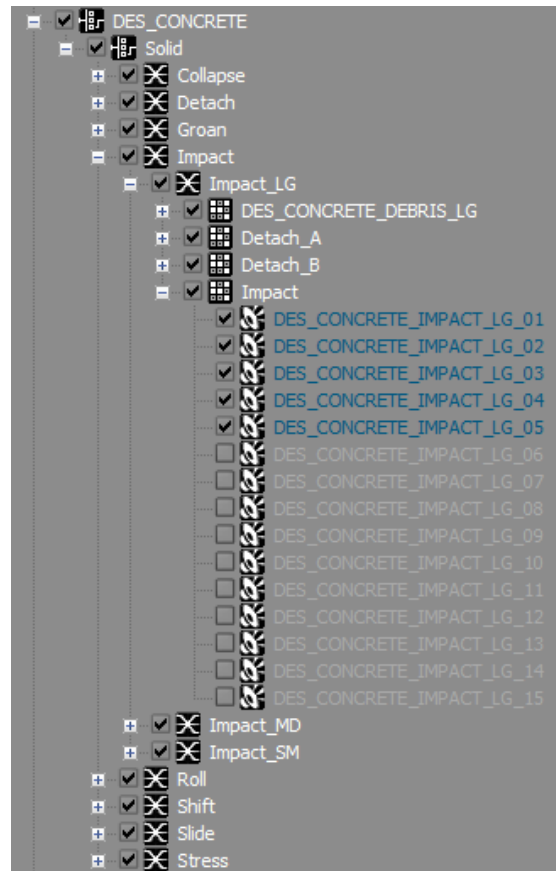
[ftw]

ASSET

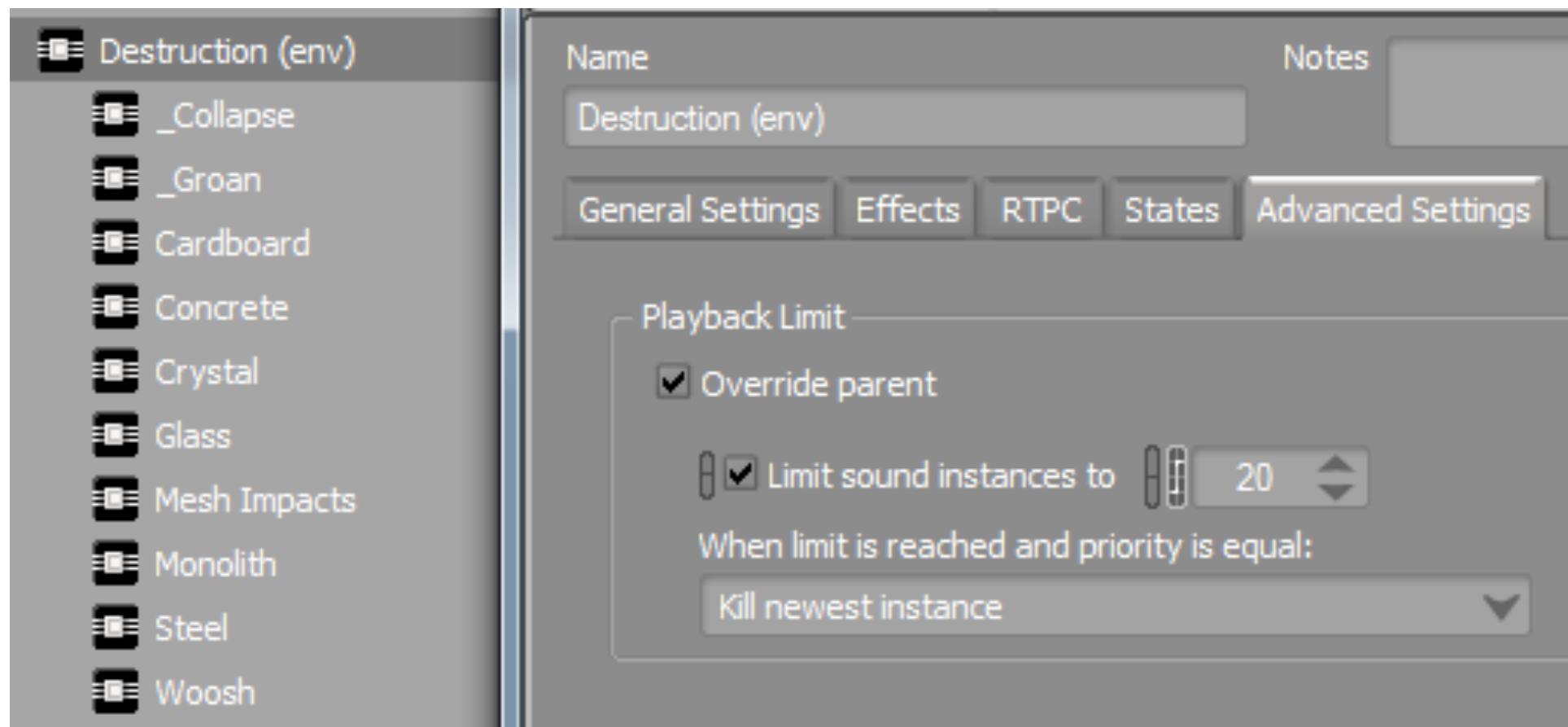


REDUCTION

THEORY / SYSTEM DESIGN / IMPLEMENTATION / OPTIMIZATION / PERFORMANCE



**GET YOUR
PRIORITIES
STRAIGHT**



THEORY
SYSTEM DESIGN
IMPLEMENTATION
OPTIMIZATION
PERFORMANCE

FINAL THOUGHTS



COMPLICATIONS



**PIGGYBACKING
SYSTEMS
NECESSITATES
HYPERVIGILANCE**

THANK YOU

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