From Design to Fabrication: Using 3ds Max to Build a Real Rube Goldberg Machine

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In this class we will examine how 3ds Max was used during the previsualization, design and fabrication phases of the Panasonic Toughpad “The Ultimate Torture Test” video.

Class summary

At the end of this class, you will be able to:

 Discover how to apply tools traditionally used for VFX to Mechanical Design
 See how MassFX can be used as a quick solution for working out mechanical designs
 See how various features in 3ds Max can be used to create quicker previsualizations
 Understand how rigging tools in 3ds Max can be used to help design working mechanical assemblies

Key learning objectives

The Project

To create a viral video that highlights the key points of ruggedness of the new Panasonic Toughpad in the context of a whimsical testing grounds inspired by Rube Goldberg machines.

The Creative Challenge

To create a viral video that highlights the key points of ruggedness of the new Panasonic Toughpad in the context of a whimsical testing grounds inspired by Rube Goldberg machines.

The Logistical/Technical Challenge

5 weeks schedule from project award to shooting
No location established at time of award
Concepts for all torture tests not yet approved by client
Not technically a “Rube Goldberg Machine”
….actually harder
Concept

Original Concept Art

Design and Previs: Overview

7 Primary Characteristics to Highlight:

- Impact Resistant
- Dirt Resistant
- Water Resistant
- Submergable
- Cold Resistant
- Heat Resistant
- Speakers Loud Enough For Noisy Environments

Design and Previs: Overview

Top 10 Biggest Challenges:

10. Keeping total running time in mind
9. Mindful of Camera Flow/Operators
8. Moving a single Object, Not Energy, from point A to Z
7. Every component is dependent on component before and after
6. Need to avoid repetitive mechanisms whenever possible
5. Many Triggers and Releases needed to be designed
4. Budget not so big that we can just throw money at it.
3. Murphy’s Law In Full Effect
2. The randomness of the universe
1. - Time

Panasonic Project Montage

Execution
Specific challenges:
Overall creative approach not approved until 3 days before shoot
Trigger balls from track via a blowtorch
Change from single ball impact to 3 Requires a way to trigger boat slide only after 3rd ball impact

Car to activate trigger embedded in track
Releasing weight (washers tied to string)
Setting off mouse or rat trap that pulls pin in blowtorch release

Fabrication: Ball Drop Weight Trigger
Design and Previs: Ball Drop Weight Trigger

Initial design concept based on single ball bearing impact.

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Design and Previs:  Boat Canal

Based on Toughpad measurements.

3D modelled in 3ds Max.

3D CNC milled from foam.

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Design and Previs: Elevator
Design and Previs: Elevator

Fabrication: Elevator

Design and Previs: Hoeken Conveyor

Challenge: How to execute linear motion without always using traditional conveyor belts and look interesting.
Design and Previs: Hoeken Conveyor

Solution: Comb the internet until you find http://www.mekanizmalar.com/
Derive measurements for full scale execution from previs.
Fabricate linkages on CNC machine from splines extracted from previs.

Source drive components from McMaster Carr:
  - Sprockets
  - Chains
  - Bushings
  - Collars

Put it all together and pray.
Design and Previs: Last Minute Tweaks

Custom Step Down Chain Sprocket - Freezer Conveyor
Step Down Gearing - Ferris Wheel
Mechanical Start Button

Thank You and Credits
Worlds Away Productions
Kai Lee – Production Designer
Kim Lee – Art Director/Previs Artist
Alessandro Brodsky – Lead Fabricator
Eric Fisher – Fabricator
Victoria Brousseau – Fabricator
Zack Freedman – Av Cannoons/Electronics
Steve Cohen – Drone Specialist

Damasio Cozza – Props
Kathryn Vega – Props
Rudy Heredia – Art Assistant
Sean Hechter – Art Assistant
Linda Albert – Art Assistant
Calvin Wong – Art Assistant

Thank You and Credits
SIGMA
Diane deCastro – V.P., Sr. Account Director
Kelly Mastropolo – Sr. Account Executive
Genevieve Ogi – Agency Producer
Tim Stapleton – Creative Director
Nik Nikolov – Creative Director
Skye Leith – Video Production Director
Jose Aguierre – Video Editor
Matt Reinheimer – Audio Engineer

PANASONIC
Marca Armstrong – Vice President, Marketing
Jayme Cunningham – Marketing Manager

Final Piece

Thank You and Credits
Shilo
Anthony Furlong – Director
Cary Flaum – Executive Producer/Head of Production
Robert Berman – Head of Production - East
Tom Nifenecker – Line Producer
Kevin Kim – Behind the Scenes Photo/Video

Session Feedback
- Via the Survey Stations, email or mobile device
- AU 2015 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time