



# Waterfalls New Media Design

## P11301

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# [ Project Review Objectives ]

- Project summary
- Project status
  - Level of completion
  - Current readiness
  - Finances
- Comparison of final project to original design
- Phase II suggestions

# Relevant Technical Risk Assessment

- Risk: Unable to achieve laminar fluid fall
  - Accepted that turbulent flow will exist in the water fall due to imperfections and falling distance
  - Had smooth bent lip to slow down water as much as possible
  - Performed tests with prototype to calculate the ideal flow rate, which was used in the pump selection
- Risk: Servo dam doesn't completely prevent water flow
  - Put doors in the back of the main structure to allow for overflow to pour out the back
  - Due to time constraints, we were unable to apply gaskets to the dams that would have greatly reduced "leaking" of the dams

# [ Current State of Design ]

- Main Structure
  - Completely built and assembled according to drawings from MSDI
  - Due to time constraints, proper testing and tweaking could not be done
  - Added rear doors for adjustable overflow levels as an added measure of control
- Catch Trough
  - Completely redesigned from MSD1
  - New design reduces the amount of water needed to run the machine
  - Increased structural capacity of lower trough
  - Decreased the size of the catch trough to make it more portable and user friendly
  - Employs the use of independent scissor jacks for leveling

# [ Current State of Design ]

- Electronics/Controls
  - 8 independent dams controlled by 16 solenoids
  - Used L-Brackets to mount the solenoids to the main structure
  - USB interface to control the servos from a computer
- Prototype
  - Small-scale prototype was used for fluid flow modeling and pump selection.

# [ MSD II Schedule Milestones ]

- Dec 22<sup>nd</sup>: Completed Prototype construction
- Jan 3<sup>rd</sup>: Began final design construction
- Jan 19<sup>th</sup>: Catch trough construction completed
- Feb 9<sup>th</sup>: Upper trough completed
- Feb 11<sup>th</sup>: Solenoids attached w/ connectors
- Feb 14<sup>th</sup>: Upper and Lower trough attached and electrical wiring completed
- Feb 16<sup>th</sup>: Pump and hose installed; first test completed

# Future Development Recommendations

- Upper trough:
  - Refine lip shape to optimize flow
  - Rebuild dams or add gaskets to current dams
  - Improve hose configuration
  - Redesign leg configuration
- Lower Trough:
  - Add plexi-glass splash guards
  - Reconfigure wheel/brake/leveling jack arrangement
  - Reconfigure waterproofing and noise reduction (liner material and application)

# Future Development Recommendations

- Electrical
  - Streamlining microcontroller code
  - Printed circuit board construction
  - Miscellaneous additions
- Fluid Sampling
  - Perform increased fluid sampling for optimal viscosity and surface tension
  - Conduct projection tests to determine optimum transparency of fluid

# [ Final Notes ]

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- Budget: ~\$100 remaining
- Scheduling:
  - Met basic requirements of the project but were unable to perform all the testing and fine tuning.
- Phase I:
  - Provided the proof of concept for a mobile waterfall projection system and defined future project improvements
- Phase II:
  - Refine fabrication and construction techniques
  - Research fluid selection and lip design
  - Automated leveling system

# [ First Test Run ]

