Water Spray System



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Overview

- Project Background
- Project Description
- Product Specifications
- Concept Variables
 - Piping Structure Design
 - Automation Design
- Design Concepts
- Design Selection
- Future Work



A 215 hp Cummins diesel engine

Project Background

- Cummins tests the effect of water on engines, specifically their electrical components
- Cummins simulates the effect of driving over water puddles by spraying engine while running an endurance test



Project Description

Problem

- The water spray system currently used by Cummins is very inefficient and lacks robustness
- Our task
 - Design a new water spray system that is...
 - More efficient
 - Automated
 - More sturdy



Product Specifications

- Must be capable of spraying 3 ft x 6 ft area
- Must be height adjustable from 3 ft-6 ft
- Structure must be reliably stable
- Automated/Variable Spray Settings
 - Spray Duration
 - Spray Intervals
- Flow rate of 1 gpm

Product Specifications



Must be able to spray AB plane and both sides on BC plane

Concept Considerations

- Piping Structure and chosen method of automation are interdependent
- Automating motion will minimize human-system interaction greatly
- Automating motion will increase test repeatability and work efficiency

Concept #1- Flex Hose



Concept #2-2D Automation



Concept #3- 2D Automation (Nook)



Decision Matrix

Quantify Characteristics of Concepts

	Cost	Automation	Robustness
0	2000+	No automation	Unstable
2	1600-1800	0 axis automation	Fairly Unstable
4	1200-1400	1 axis automation	Fairly Stable
6	800-1000	2 axis automation	Stable
8	400-600	3 axis automation	Very Stable
10	0-200	4 axis automation	Extremely Stable

Decision Matrix

Design Selection

Conclusion

 Automating the motion of the spray system will greatly meet the client's need for minimal human-system interaction

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Questions?

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