
Honeywell Endurance Valve test

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Project Description



Who is our client?

Honeywell - What do they want?

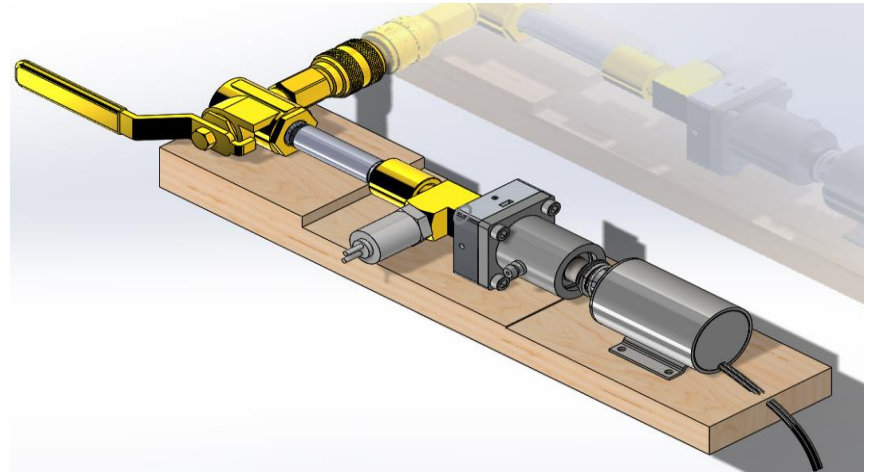
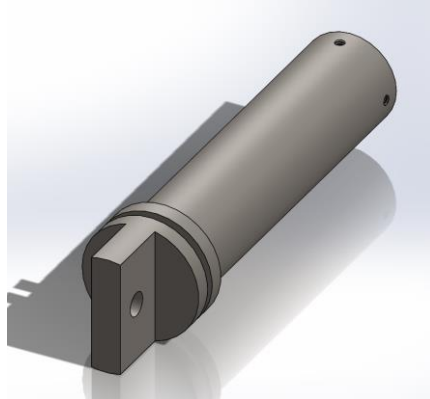
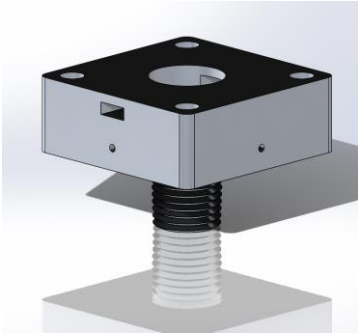
- Test the theory that by replacing the internals of pneumatic control valves with gemlike material it expands the lifetime significantly, thus broadening the application.

Project Goals -

- Create and design a test fixture that can independently test gemlike materials for lifetime and is capable of cycling at 8 Hertz.
- Lifetime goal: 10 Million Cycles +
- Changes
 - U.S Synthetic and Honeywell Meeting in Tempe.
 - 3 way valve changed to be a 2 way valve.
 - Leak Down Test.
 - Redesign.

Updates

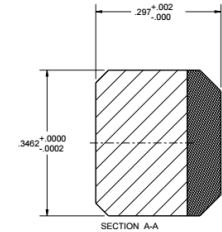
- two way valve instead of three way valve
 - One seat
- Performing a leak down test instead of bubble measurements
 - Accuracy
- Valve and Pushrod redesign



Bianka, Team 30, Endurance Valve Test, 3/8/17 (2)

Design of Experiments

- Temperature Test of Arduino
- Steel vs. Diamond



This sheet is currently set for a 2 ⁴ factorial experiment.					m =	2	experiment levels		
Temperature Data					n =	2	number of factors or design variables		
					Fraction =	1	fraction of full factorial experiment		
					N =	4	number of experimental combinations/trials		
					r =	2	number of replicants		
		Duty Cycle %	Transistor						
	I	x2	x1	d1d2	T1 (°F)	T2 (°F)	Tbar		
	1	1	-1	-1	1	112	109	110.5	
	2	1	-1	1	-1	133	137	135	
	3	1	1	-1	-1	152	148	150	
	4	1	1	1	1	175	174	174.5	
	Effects		39.5	24.5	0				
	β's	142.5	19.75	12.25	0				
Variable Actual values									
		low (-1)	high (+1)						units
	x1	[25	50]				% Duty Cycle
	x2	[TIP120	MOSFET]				Transistor Type



Moving Forward

Valve Housing and Steel Poppets sent to machine shop for machining

Acquire thermocouple and develop labVIEW VI to measure temperature in control volume

Create VI to calibrate and measure pressure leakage during testing

Assemble all parts, connect solenoid to Arduino, and pressure valve to wall.

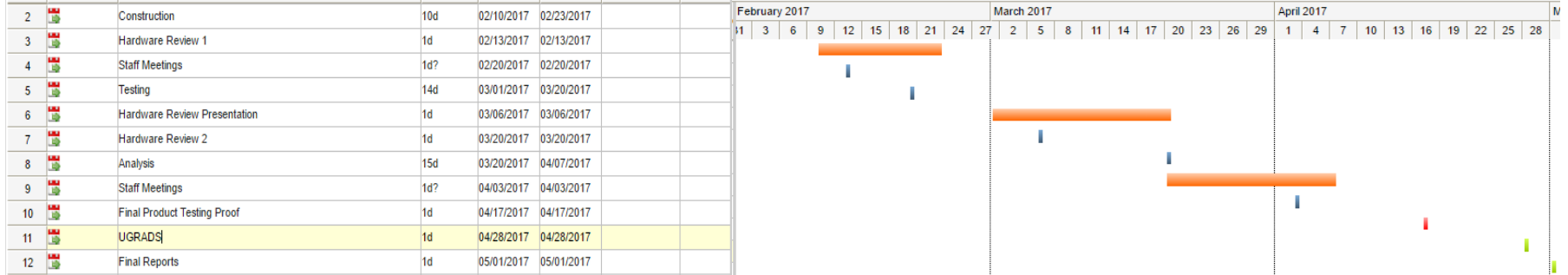
Begin Cycling valve at 10 Hz, measuring pressure leakage twice daily. (24 data points over testing period).

Monitor testing with camera, making sure everything is working correctly and replacing any worn parts (

Unwanted Contingencies and Resolutions

Spring/Solenoid Failure - Garrett
Pressure Measurements - Geordie
Improper Control Volume - Cameron
Power Adapter - Tyler
Incorrect Tolerances - Dastin
Future Purchases>Returns - Bianka
Inadequate Sealing - Team effort
Diamonds Break - Project Finished

Schedule and Budget



Description	Total Cost		
Solenoid	77.24	High Speed Bearing	97.36
Spring	125.77	#10-32 Machine Screw 1/2"	6.36
1k-ohm	1.49	E style locking ring 5/8"	9.03
Arduino Uno Kit	48.99	1/4" brass pipe L=3"	4.58
Pressure Transducer 500psi	128.24	RTV Sealant	6.17
ISO DIN PLUG CONNECTOR	7.13	Threadlocker 220	13.95
Camera Monitoring System	38.99	1/4 Female to Female Connector	6.8
Brass Elbow on/off	21.67	Single Seat Valve	332.47
Tee Pipe	6.67	Poppet Arm	235.49
Brass Connect Socket	7.67	Total=	1184.85
Set screw #0-80 1/16"	8.78	Remainder=	815.15

Questions