

MSD Team P17453

Weekly Update

Week 5

2/23/17 - 3/2/17

Weekly Accomplishments:

- Carvey completed making the brackets used to hold the solenoid and pressure relief valves
- Estimated the time required for the intake and exhaust parts of the pressure cycle to go from 0 to 40 PSI and 40 to 0 PSI respectively
 - The data was overlaid on top of the theoretical model
- Decided to wait for the studs and use bolts in the meantime
- Retapped the NPT thread on the pressure collector in the correct direction
- Compiled a small final parts list and ordered them from MSC Direct
- Full pressure test in the reused pressure vessel from team P16452
 - Did leak test and found small insignificant leaks in some fittings, fixed with Teflon tape
- Took videos of tests for our YouTube channel
- Updated Problem Tracking to include NPT reversed thread direction and the wobbly 8020 frame
- Epoxied rubber onto the bottom of the 8020 frame and attached the valves with the L brackets
- Calibrated pressure relief valve
- Performed preliminary poppet valve seat block back pressure leak tests
 - Pressure was not blocked off completely by poppets
 - Will be looked into in the coming week(s)

To do by next week:

- Look into potential solutions for the apparent poppet valve seat block leak
- Perform preliminary pressure cycle testing to fill and release air into the main pressure vessel
- Begin working on poster and technical paper
- Continue to update Edge website and YouTube channel

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Meeting Notes

2/28/17

Meeting Accomplishments:

- Carvey continued work on L-brackets to hold the solenoid valves
- Alex consulted with Rob in the machine shop to see if he had an alternative fix to the collector having the NPT hole drilled in backwards.
 - Our fix was to redrill hole bigger in the correct dimension using a ½" NPT - ⅜" barb hose fitting
 - Rob suggested to just tap it in the correct direction without redrilling anything and see if that works before redrilling
 - Tapped and seems like it should work
- A final list of necessary parts was compiled to order
 - ¼"-20 T-nuts - quantity: 2, checking to see if Professor Wellen will have a few
 - ¼" NPT - ⅜" barb hose fitting - quantity: 3
 - BNC to wire adapters - quantity: 1, ask Dr. Kolodziej if he has extra that we can cut
 - Crimp connectors - quantity: 2
- Performed Pressure Test in main pressure vessel to calibrate safety relief valve to about 80 PSI
- Decided to wait for studs to come in by mid-March
 - Using extra bolts for testing in the meantime

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Meeting Notes

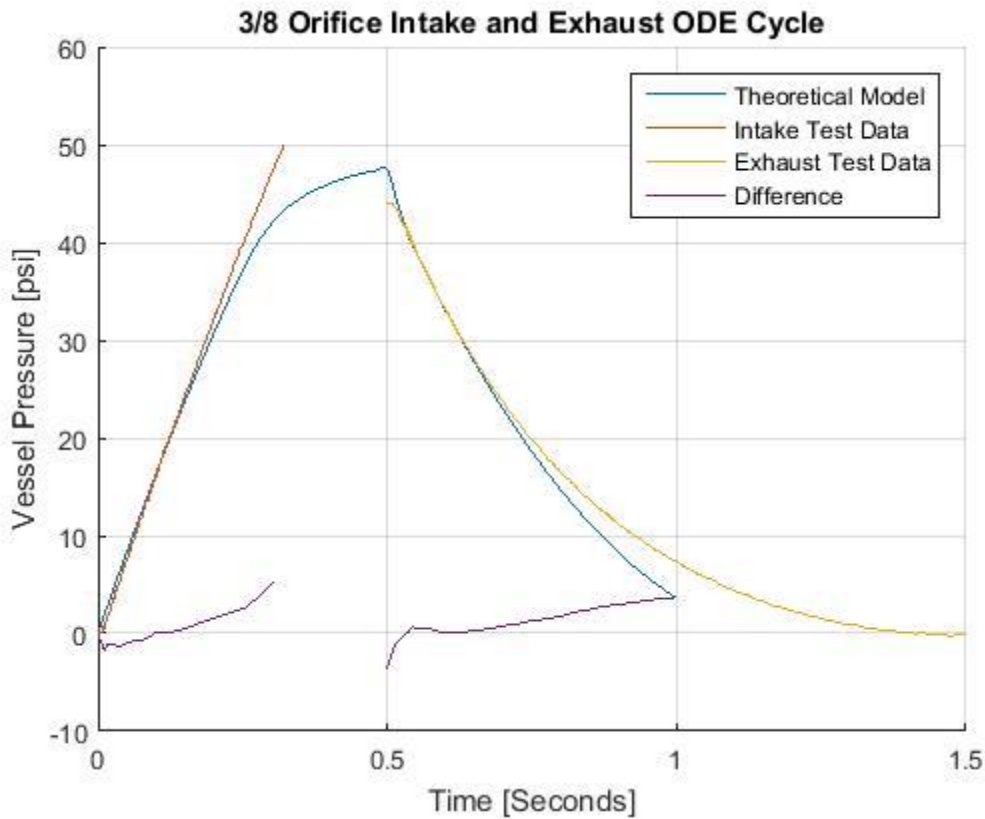
3/2/17

Meeting Accomplishments:

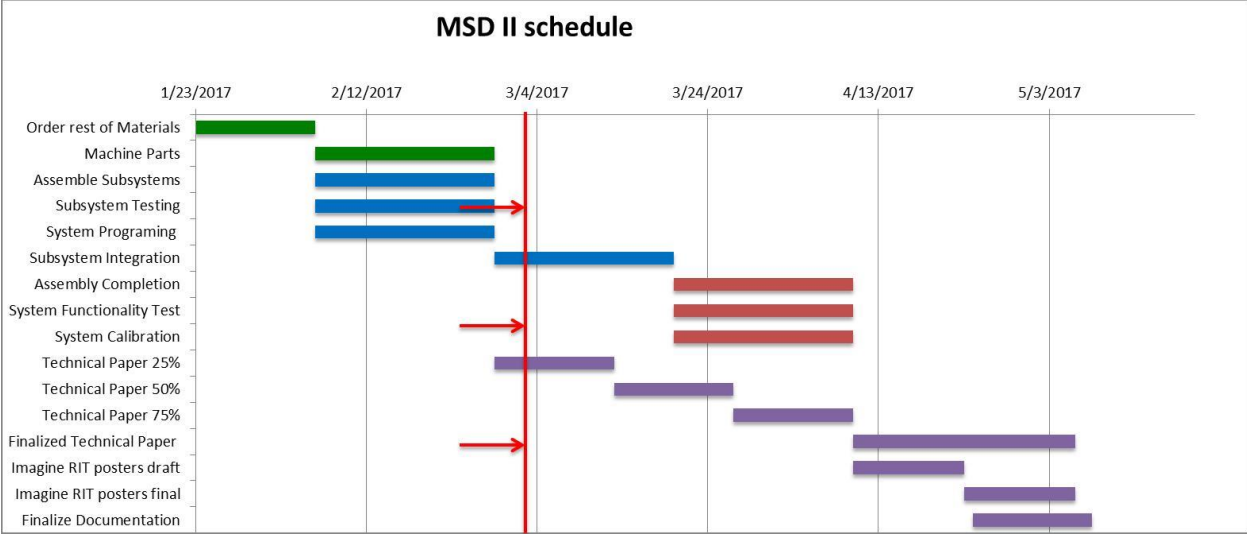
- Carvey continued work on L-brackets to hold the pressure relief valve
- Finished epoxying rubber onto the bottom of the 8020 frame
- Acquired some T-nuts for the valve brackets on the 8020 frame
- Mounted solenoid valves on the 8020 frame
- Showed Dr. Kolodziej some pressure testing data
- Worked on documentation for the project
- Performed preliminary poppet valve seat block back pressure leak tests
 - Pressure was not blocked off completely by poppets
 - Will be looked into in the coming week(s)
 - Potentially due to back pressure entrance flowing directly into the side area of the poppet valves where contact is made with the valve seat block

| | Identifying & Selecting Problem PSP 1 | Analyzing Problem PSP 2 | Generating Potential Solutions PSP 3 | Selecting & Planning Solution PSP 4 | Implementing Solution PSP 5 | Evaluating Solution PSP 6 |
|----------|--|--|---|--|---|--|
| Rating | R1 | R2 | R3 | Y4 | Y5 | G6 |
| CRITICAL | Solenoid valve coils don't fit on new solenoid valves | The previous team's solenoid coils don't fit onto our valves | Drill out hole to make them fit, buy new solenoid coils | Dr. Kolodziej suggested buying new solenoid coils | Added correct coils to BOM and placed order | New coils received and successfully tested on valves. |
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| MAJOR | Valve control loop not producing even signals | DAQ Signal Express has processing delay between loops | Find alternative control system or compensate for the delay | Consume the delay in one of the necessary hold delays during valve actuation | Recorded LED indicators and measured time delay, subtracted that from a valve actuation delay | Signal express now gives even signal to valve drivers. |
| | 3/8 Hose Barb fitting does not thread into hole in collector | Tapered NPT thread on collector was tapped in wrong direction | Increase hole size, retap and purchase larger fitting. Retap in correct direction if possible | Rob advised that retapping the hole in the correct direction would work just fine. | Hole was retapped and the fitting threaded in successfully | No leaks were observed at the joint in question. |
| | | | | | | |
| ORDINARY | How to mount solenoid valves on 8020 frame | There are no mounting threads or surfaces on the valves | Zip-ties, Velcro ties, hose-clamps, L-bracket between valve and hose | L-bracket would look and work the best, relatively easy to implement | L-bracket design completed with parts on order | L-Brackets machined and assembled with success |
| | Relief valve not rated for our pressures | The previous existing team's relief valve is not rated high enough | Order new pressure relief valve | We will get part ____ from ____ | Part has been added to BOM and will be ordered | Correct part received, installed, tested, and confirmed as correct |
| | Frame wobbles on the table top | 8020 cannot be assembled completely square and level | Create feet for the frame with some adjustability to level. | Rubber strips can be bonded to the bottom of the 8020 frame as feet | Rubber strips cut to size were attached using epoxy to the bottom of the frame | The frame no longer wobbles |

Updated Problem Tracking: Revision F



Model-Experimental Data Overlay



Gantt Chart: Team progress through week 6.