

N F P A

Fluid Power

VEHICLE

Challenge



NFPA
Education and
Technology
Foundation

FINAL PRESENTATION
WVU Tech Fluid Power Vehicle
Dr. Yogendra Panta
April 2021



Agenda



- Team Introductions
- Objectives
- Midway Review
- Hydraulics
- Pneumatics
- Fabrication
- Final Progress
- Lessons Learned
- Acknowledgments



Meet the Team



Advisor: Yogen Panta



Michael
Ecker-
Randolph



Joseph
De La Cruz



Ashton
McNicholas



Travis
Salmons



Objectives



- Meet Competition Requirements
- Create a lightweight, efficient vehicle that can complete all competition events.
- Innovate and improve on previous vehicle designs by including new systems and components
- Showcase the engineering ability of the team and university.



Midway Review Summary



- The team scored a 3.51/5 on the midway presentation which is one of the highest from our university.
- The team appreciated all advice from those in attendance and here are the changes we made:
 - include a gusset to improve stability when welding our arms
 - simplify our pneumatic circuit



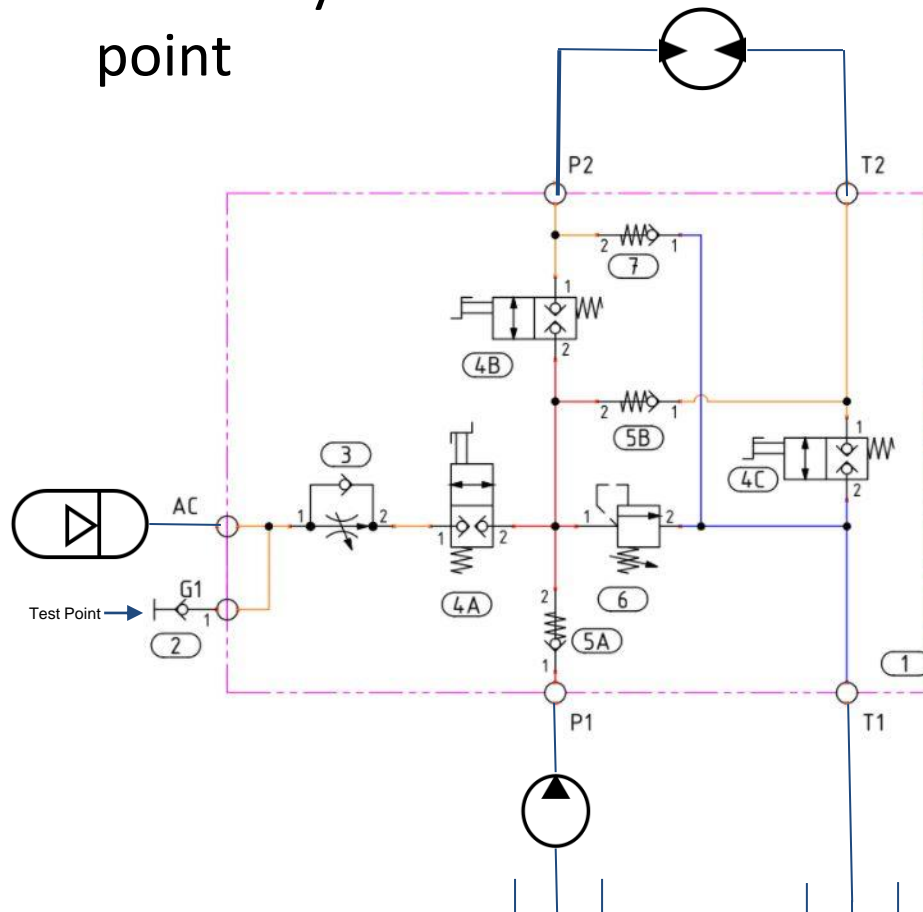
Vehicle Design

Frame and A-arm
Steering
Tank
Mounts
Hydraulics
Pneumatics
Drive System
Manual Brakes

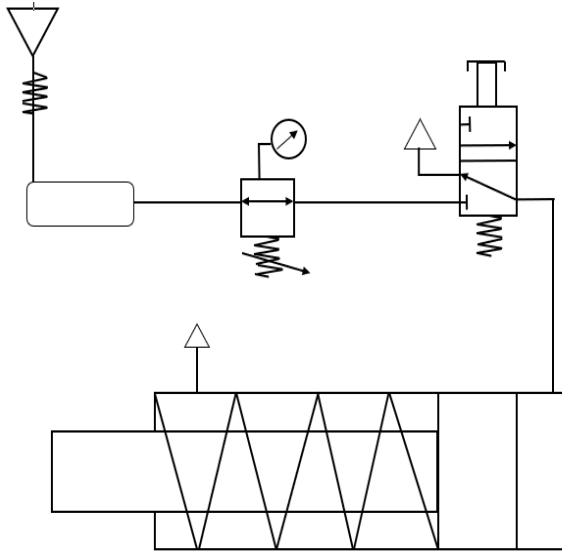


Hydraulic Circuit and Hydraulic Components

- The vehicle made use of a manifold assembly that doubled as our control point



Pneumatic Circuit and Use



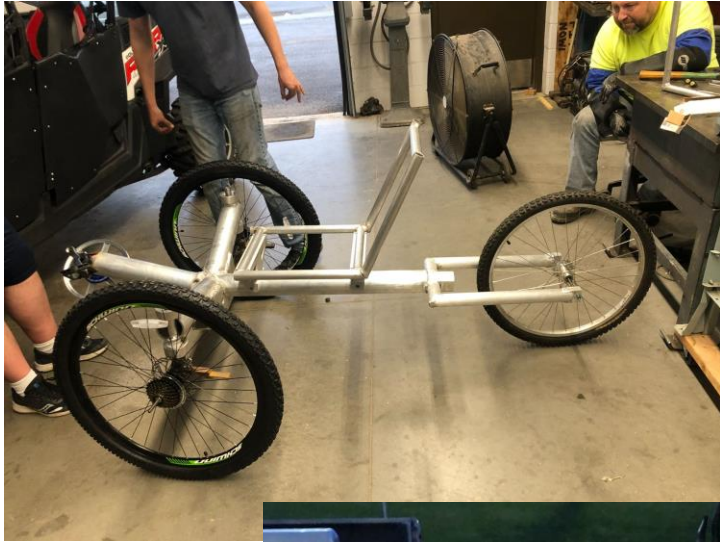
Vehicle Fabrication

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Vehicle Fabrication - cont.

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Race Results



The team attempted two of the three race challenges.

Sprint
Challenge:

Trial 1: 1:15

Trial 2: 1:23

Efficiency
Challenge:

Trial 1: 83 feet

Trial 2: 131 feet



Supplier Parts - Cost



Supplier	Cost*
Sunsource	\$2,584.00
Online Metals	\$1,338.25
McMaster-Carr	\$739.91
Iowa Fluid Power	\$333.15
Bimba	\$181.58
Other Sources	\$366.00
Total	\$5,542.89

Progress of Final Vehicle



The vehicle is fully fabricated and operational. All hydraulic and pneumatic components were connected and both circuits work properly.

However, there are things that still can be improved on for future teams such as: the drive chain, ergonomics and component selection.



Lessons Learned



The Good:

Learning experience in fluid power

Opportunity to meet industry professionals

CNCing and manual machining experience

Time management and troubleshooting

The Bad:

Limited lab time with minimal fabrication skill

Impacts of Covid on scheduling



Acknowledgements



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Ernie Parker (NFPA Mentor)

Stephanie Scaccianoce (NFPA Contact)

Jeff McCarthy (SunSource)

Pam Wieczorek (SunSource)

Josh Scarbrough (Iowa Fluid Power)

Kent Sowatzke (Bimba)

WVUIT Student Government Association

Gary Duffield (Fabrication Consultant/Welder)

Morgan Smith (Fabrication Consultant/CNC)

Richard Cantrell (Fabrication Consultant)



The End - Questions?

