

Human Powered Vehicle Competition

Department of Mechanical and Aerospace Engineering at the University of California, Irvine



Mission:

The national American Society of Mechanical Engineers organization hosts the e-Human Powered Vehicle Competition where we are tasked to make an electrically assisted bike. ASME at UCI wanted to provide undergrads the opportunity to gain hands-on engineering experience on a more intimate level and gain confidence in their engineering abilities.

HPVC Team:

Advisor

Professor David Copp

Financial Director

Alexander De Santiago

Project Managers

Adrian Ornelas & Crew Parker

Dynamic Leads

Anisha Jayasekara
Daniel Jang
David Lozano

MAE 93 Team

Phillip Choi, Edmund Feng, Kazi Hasan, Angelo Ilagan, Aldo Khiev, Travis Lee, Jonathan Leung, Sunny Lin, Christian Mason, Christian Ortiz, Alejandro Plascencia, Aviraj Singh, Harkirat Singh, Peter Tran, Samuel Zepeda

Electrical Lead

Amanda Lieng

Statics Leads

Darren Aguilar
Gabriel Sackinger
Sophia Shannon



Key Features

- Material: 6061-T6 Aluminum Tubing | RPB 1.25"-0.25" | Center Frame, 1.75"-0.25" | Factor of Safety: 2.1
- The rollover-over protection system can withstand a side load of 1330 N and a top load of 2670 N [see "Finite Element Analysis"].
- The top speed of our bike is 22.6 MPH @ 80 RPM, and the breaking force from this top speed is 150.1 lbf and the breaking distance 34.14 ft
- 48V Lithium battery, emergency stop, electric motor to assist pedaling.

LATE AUGUST

eHPVC Rules
2023 Rules

FALL QT.

Design
Definition

WINTER QT.

Manufacturing &
Testing

LATE APRIL

HPVC Demo Day
at SJSU

DYNAMIC SUBTEAM

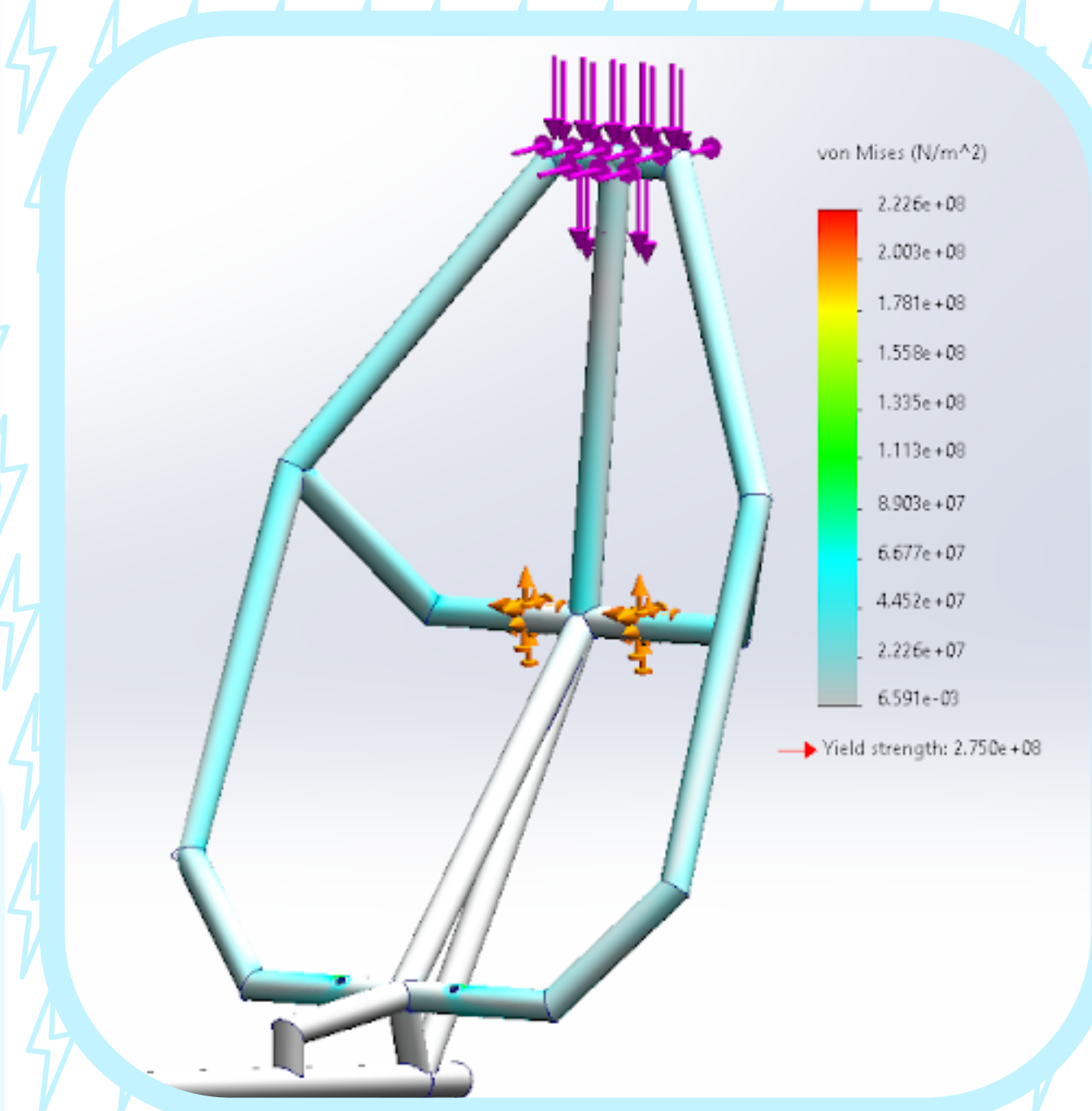
Objective: Implement efficient drivetrain with robust braking and steering systems.

Drive Train Features: 3-speed crankset and 8-speed cassette with intermediate gears mounted to electric motor

Braking System: Two front mechanical brake calipers with slotted disc brakes

Steering Features: Rollover threshold of 0.4, Track rod direct steering system, wheelbase length of 39.4", track length of 28"

Finite Element Analysis



ELECTRICAL SUBTEAM

Objective: Safely provide power and data

Electrical Box Features: ABS weather-proof enclosure with polyurethane gasket

Emergency Stop button to isolate the battery and motor in case of an emergency

Arduino microcontroller used to process IMU positioning data and display onto LCD screen

STATIC SUBTEAM

Objective: Keep the rider safe and comfortable.

Frame Features:

- Rollover Protection Bar
- Carbon Fiber seat set at 40 degrees from the horizontal for the most optimal comfort
- Center frame places the crankshaft 15 degrees above the back of the seat and accommodates our 5' 8" rider for easy pedaling

BUDGET

Dynamics

Drive Train | \$750
Steering | \$500
Braking | \$115

Electrical

Battery | \$180
Arduino | \$20
Wiring | \$50
E-Stop | \$15
E-Box | \$80

Statics

Tubing | \$180
Welding | \$1000
Seat | \$120

TOTAL COST: \$3,010

SPECIAL THANKS

Professor David Copp, we couldn't have done this without your guidance and support.
President Anthony Chin of ASME at UCI for supporting the team every step of the way.



Department of
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