



TUFT (EV Formula Car Racing)

2023-2024 Activity Report

2025/2/20

2023-2024 Project Leader

Shoya Sawano

Member

Shuhei Niwano

- Overview (competition, team)
- Objectives and concepts
- Activities
- Conclusion
- Acknowledgement



Purpose of the Competition

To develop human resources that, through the support of government, industry, and academia, will contribute to the development and promotion of both automobile technology and industry

Outline of the Competition

A competition in which students compete with vehicles that they have conceived, designed, and built themselves.

Around 80 teams participate from Japan and abroad with the cooperation of nearly 250 companies, which includes major automobile manufacturers.

Formula SAE Japan 2024

Date: 2024 Sep 9~14

Venue: Aichi Sky Expo



Photo by JSAE



We are developing EV formula racing car

Team concept:
Grow as engineers



Founding	2011
First competition	2013
Best result (EV)	3rd (2017, 2021)
Best result (Overall)	27th (2021)
Members	20

- Required Documents and Vehicle Inspections
 - Competitors must prepare and submit necessary documents, and pass technical inspection.
- Static Events
 - Design
 - Presentation
 - Cost review
- Dynamic Events
 - Acceleration
 - Skidpad
 - Autocross
 - Endurance
 - Efficiency

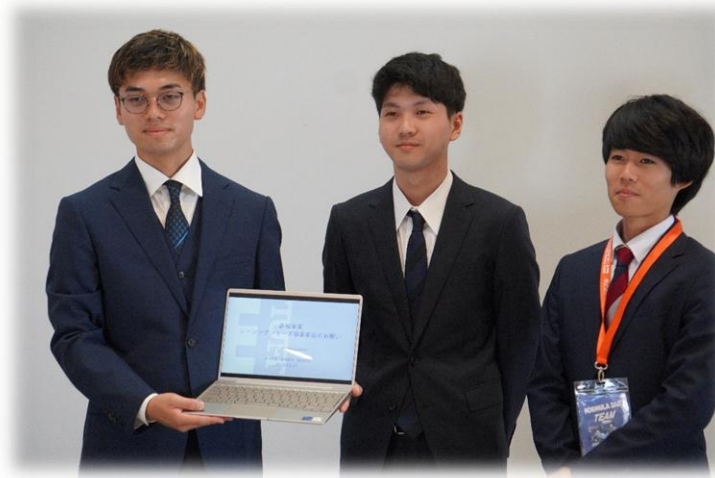


Photo by JSAE



Photo by JSAE

Static Events

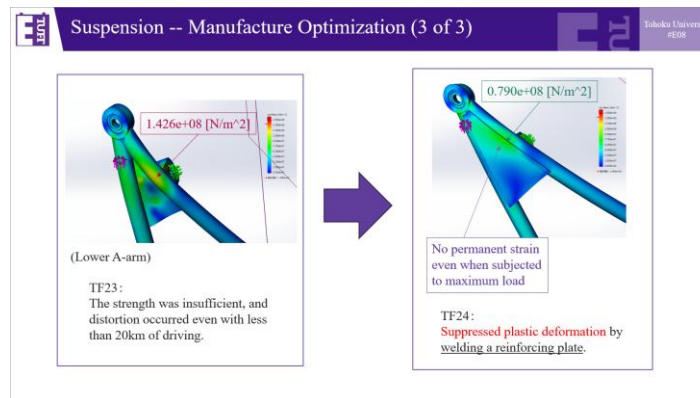
University	tohoku university	Car #	E08	Part Cost	5	309.12
System	Frame & Body	Model				1
Assembly	Frame Assembly	Material	EA TohokuAuto.F304L1CB Super.FB			
Part	Frame	Finishing Cost				309.12
Part Base	Basic					
Subst.	AA					
Detail						

Item Code	Material	Use	Area Name	Area	Length	Density	Quantity	Sub Total
100	Steel, Mild	FR Vertical	round 25.4 x 1.0	119.63	180	7.85e-06	1.5	1.61
110	Steel, Mild	FR Horizontal	round 25.4 x 1.0	119.63	125	7.85e-06	1.5	1.37
120	Steel, Mild	FR	round 25.4 x 1.0	119.63	144	7.85e-06	1.5	1.30
130	Steel, Mild	FR Upper 1	round 25.4 x 1.2	91.23	147	7.85e-06	1.5	1.12
140	Steel, Mild	FR Upper 2	round 25.4 x 1.2	91.23	149	7.85e-06	1.5	1.09
150	Steel, Mild	FR Lower	round 25.4 x 1.2	91.23	134	7.85e-06	1.5	1.02
160	Steel, Mild	FR Diagonal 1	round 25.4 x 1.2	91.23	109	7.85e-06	1.5	1.06
170	Steel, Mild	FR Diagonal 2	round 25.4 x 1.2	91.23	126	7.85e-06	1.5	1.09
180	Steel, Mild	Front Suspension Bracket support	round 25.4 x 1.2	91.23	124	7.85e-06	1.5	0.97
190	Steel, Mild	Front Hood	round 25.4 x 2.0	186.23	1.454	7.85e-06	1.5	2.98
200	Steel, Mild	Front Hood Flap	round 25.4 x 1.0	91.23	125	7.85e-06	1.5	0.92
210	Steel, Mild	SS Upper	round 25.4 x 1.0	119.63	99	7.85e-06	1.5	0.82
220	Steel, Mild	SS Lower	round 25.4 x 1.0	119.63	95	7.85e-06	1.5	0.76
230	Steel, Mild	SS Diagonal	round 25.4 x 1.0	119.63	119	7.85e-06	1.5	1.04
240	Steel, Mild	Cockpit Floor	round 25.4 x 1.0	119.63	107	7.85e-06	1.5	1.05
250	Steel, Mild	Main Hoop	round 25.4 x 1.2	186.23	2.069	7.85e-06	1.5	1.49
260	Steel, Mild	Main Hoop Floor	round 25.4 x 1.2	91.23	90	7.85e-06	1.5	1.11
270	Steel, Mild	MRB	round 25.4 x 1.0	119.63	89	7.85e-06	1.5	0.95
280	Steel, Mild	MRB Upper	round 25.4 x 1.0	119.63	66	7.85e-06	1.5	0.81
290	Steel, Mild	MRB Lower1	round 25.4 x 1.0	119.63	65	7.85e-06	1.5	0.79
300	Steel, Mild	MRB Lower2	round 25.4 x 1.0	119.63	110	7.85e-06	1.5	1.31
310	Steel, Mild	MRB Diagonal	round 25.4 x 1.0	119.63	97	7.85e-06	1.5	1.04
320	Steel, Mild	MRB Floor	round 25.4 x 1.0	91.23	90	7.85e-06	1.5	1.11
330	Steel, Mild	MRB	round 25.4 x 2.0	186.23	113	7.85e-06	1.5	1.00
340	Steel, Mild	CRB Race	round 25.4 x 1.2	91.23	107	7.85e-06	1.5	1.10
350	Steel, Mild	Motor Protect Upper	round 25.4 x 1.2	91.23	100	7.85e-06	1.5	1.10
360	Steel, Mild	Motor Protect Lower 1	round 25.4 x 1.2	91.23	88	7.85e-06	1.5	0.85

Cost Event 100pt

Evaluate

- Cost report accuracy
- Problem-solving skill



Design Event 150pt

Evaluate

- Technology choice
- innovation



Presentation Event 150pt

Evaluate

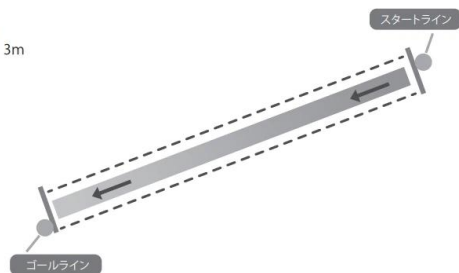
- Business plan based on concept

Dynamic Events

アクセラレーション<Acceleration>

コース概要

- 直線75m
- コース幅 3m



- ★直線 0-75m の加速タイムを競う。
- ★上位チームのタイムは3秒後半〜4秒前半。
- ★スタート時のタイヤの空転を抑え、あとは動力性能の勝負となる。

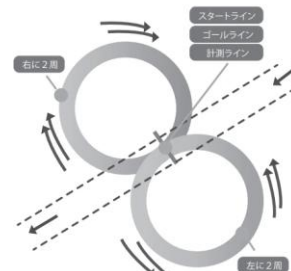
Acceleration 100pt

Accelerating from 0 to 75 meters in a straight line

スキッドパッド<Skidpad>

コース概要

- 8の字コース(右2周・左2周)
- コース幅 3m

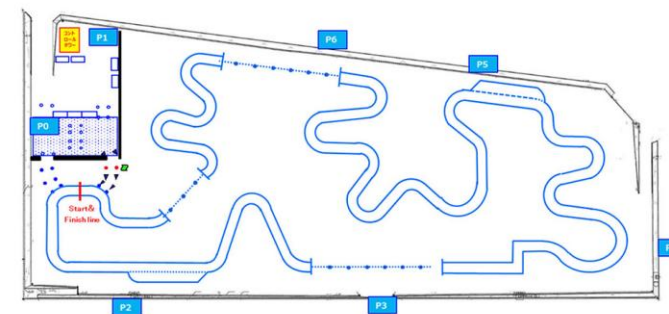


- ★左旋回と右旋回の周回タイムの平均を競う。
- ★上位チームのタイムは5秒を切る。
- ★パイロンペナルティーは、各 0.25 秒のペナルティとなり、車両の旋回性能が大切となる。

Skid Pad 75pt

Run figure-of-eight course
Evaluate turning ability

Autocross/Endurance



Autocross 125pt
1 Lap time

Endurance 275pt
Complete 20km

Enter all events, complete the endurance event

TF-24

Perfect Foundation

Create a foundation for the machine as well as the team

Machine's foundation:

- Gain understanding of evaluation methods
- Obtain data

Team foundation:

- Team management
- Sponsorship
- Way of thinking



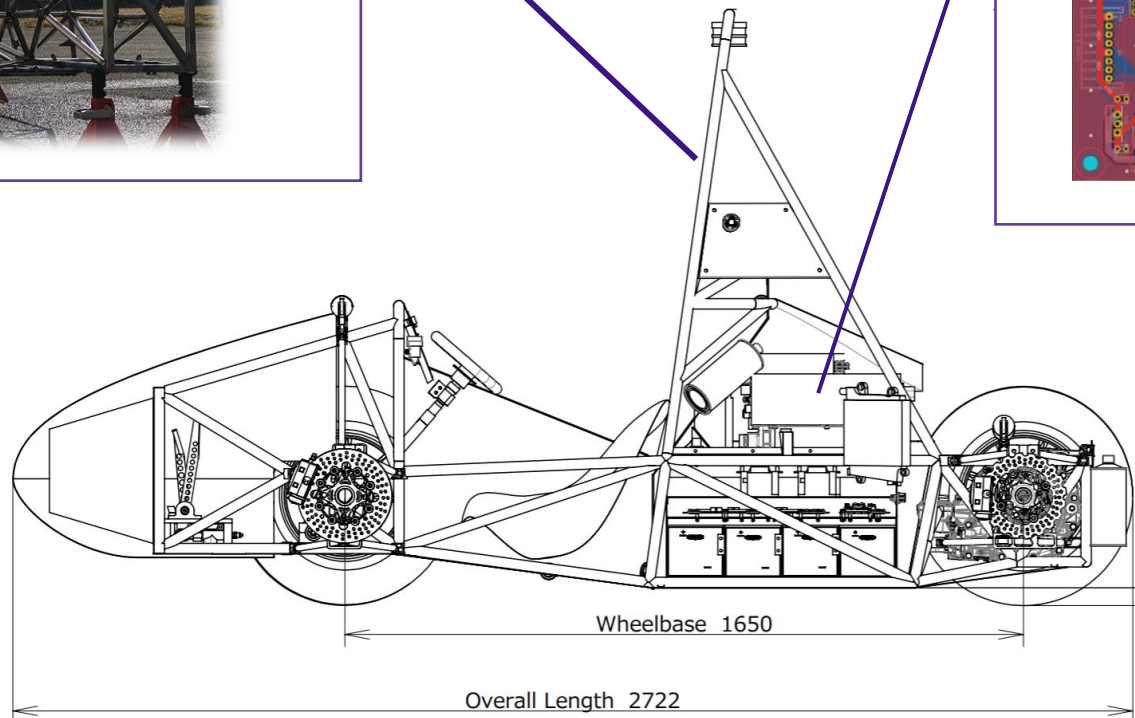
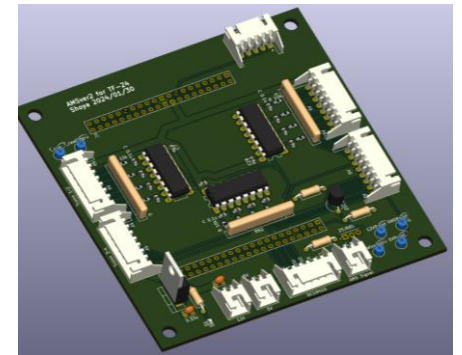
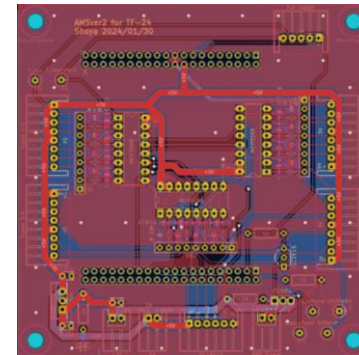
Reusing frame

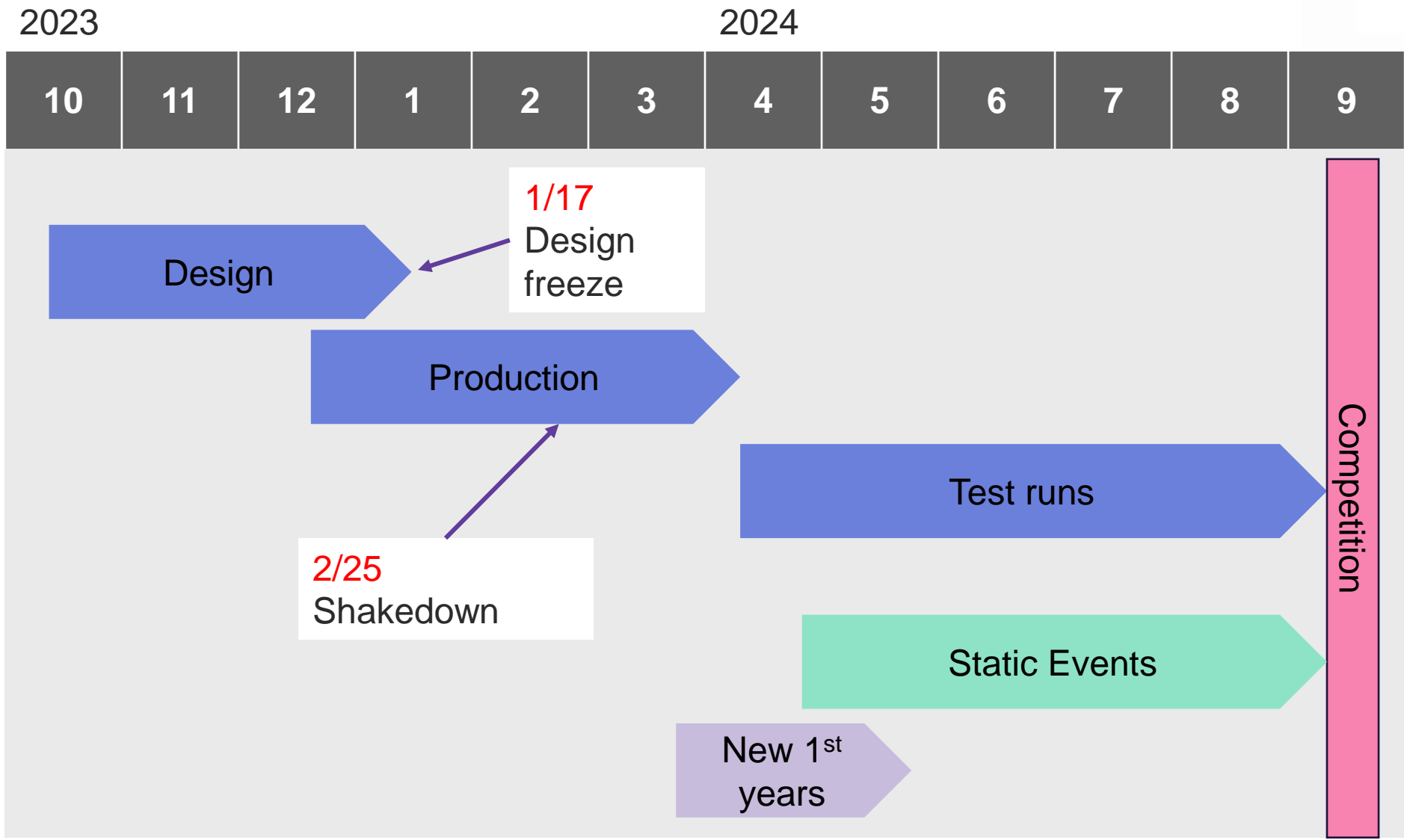
Local rule allows for EV machines to use a frame for 2 years
→ Cut down production time



Electrical system

Remake the defective print circuit board
Improve the safety of the battery management system
→ Improve reliability





Test Runs: Test distance
10 **Over 200 km**



Most in TUFT history



Event	Points	Ranking
Presentation	27.19/75	63rd
Design	54/150	42nd
Cost	26.9/100	35th
Acceleration	4.50/100	33rd
Skidpad	33.36/75	25th
Autocross	54.84/125	34th
Endurance	88.74/275	24th
Efficiency	47.51/100	5th
Penalty	0	
Total	335.04/900	29th/5th (EV)

Awards:

- Japan Automobile Manufacturers Association Chairman's Award
- **1st Place** Best Mechanical Inspection

Mechanical and electrical inspection passed on first attempt

First time since 2017 to enter all dynamic events

First time for team to finish the endurance event



- Time for troubleshooting and testing from reusing frame
- A reliable car foundation
- Participated in every event
- Finished endurance event for the first time
- Hunger for more speed



- This season we have received support from over 50 corporate organizations and individuals. This activity would not be possible without their support. We would like to express our sincere gratitude to all for making our activities possible and fruitful.



We look forward to your continued support of the
Tohoku University Formula Team