Imperial Eco-Marathon

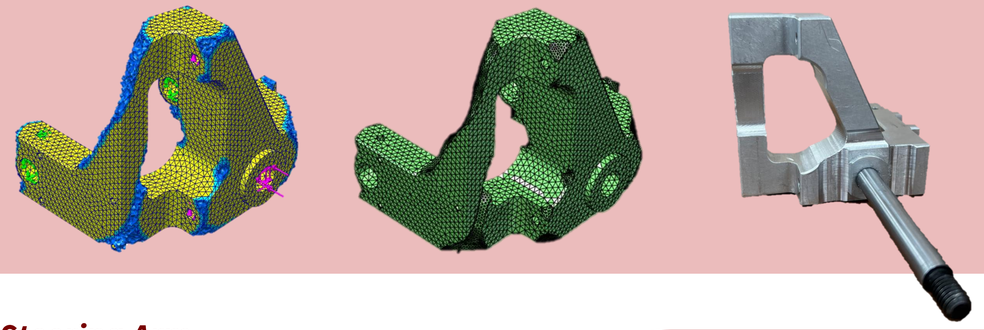
DMT 02A – Shell Eco-Marathon: Steering Upright & Monocoque Interface

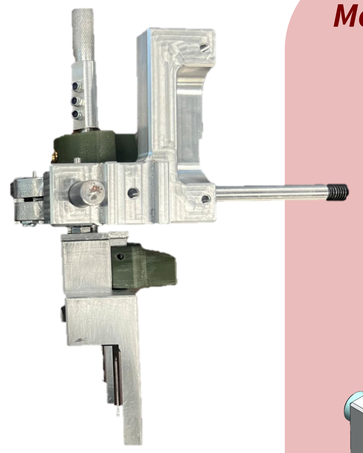
1 Product Overview

- Steering system for Imperial's Gen II Eco-Marathon car, consisting of:
  - Steering uprights
  - Tie rod assembly
  - Monocoque mount
- Dual function: govern steering mechanics, **and** support weight of car
- Vehicle, along with our steering system, is **currently being raced in Poland**

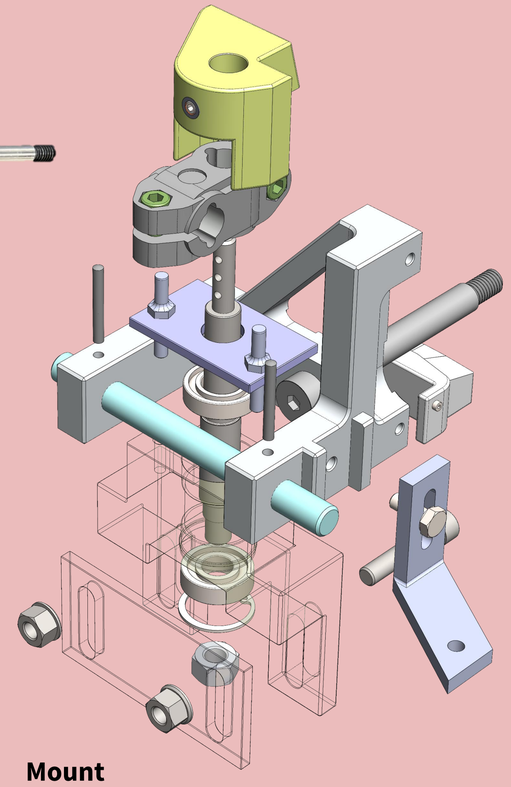
Steering Uprights

- Adjustable camber of ±12˚
- Cross clamp connection between the mount and upright
- Upright Material: **Aluminium 7050-T6**
- Sent for outsourcing (CNC machining), with post-processing completed in STW





Mount-Upright Assembly



Mount

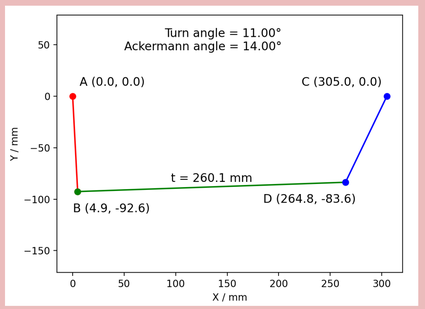
- Facilitates **adjustable ride height**
- Steering rod connects to kingpin through mount
- Camber limiters at **±12˚** and studs to limit steering

2 Design Specification

Front Track Width	500mm
Wheelbase	1350mm
Ackermann Angle	10.7˚/14 ˚/17.3 ˚
Camber	Nominal: 0˚ Range: ± 12˚
Caster	0˚
Mechanical trail	Nominal: 15mm Range: ± 3mm
Kingpin Inclination	0˚
Wheel Offset	97.5mm
Minimum Turn Radius	7.25m

Tie Rod Assembly

- Toe-adjustable carbon-fibre tie rod
- **Three interchangeable geometry setups**, each optimised to minimise cornering losses for a particular track configuration



3 Performance

Existing Subassembly	3.3kg
Our Subassembly	2.6kg
Weight reduction	21%
£ / kg saving	£2,100

4 Testing

Clamp-shaft frictional interface

- Clamp withstands **>1.6x** the peak load expected, **for an entire 35-minute run**
- Recommended setup – High-tensile bolts at **15Nm torque** provides balance between integrity of bolt and clamp

Load Induced Camber

- **1° preset positive camber** recommended to minimise weight-induced camber

Alex Sedcole, Ameera Dulloo, Kathlyn Tham, Yi Jin Supervisor: Harminder Flora Project Director: Alexis Ihracska

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