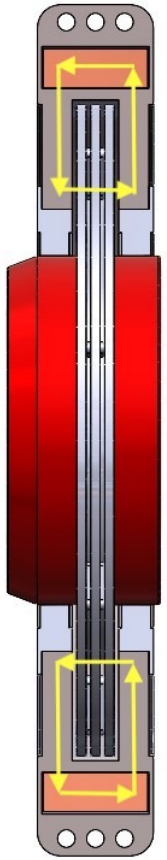
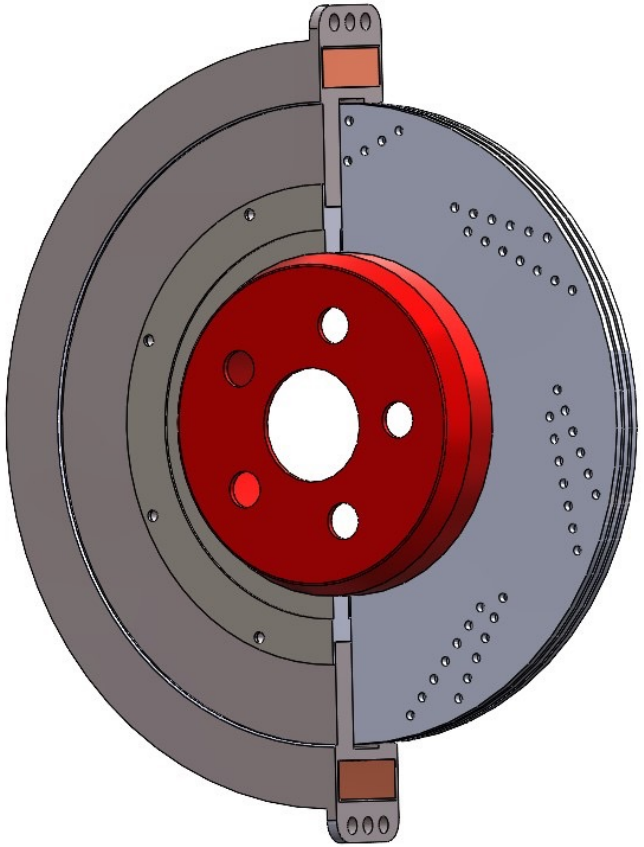
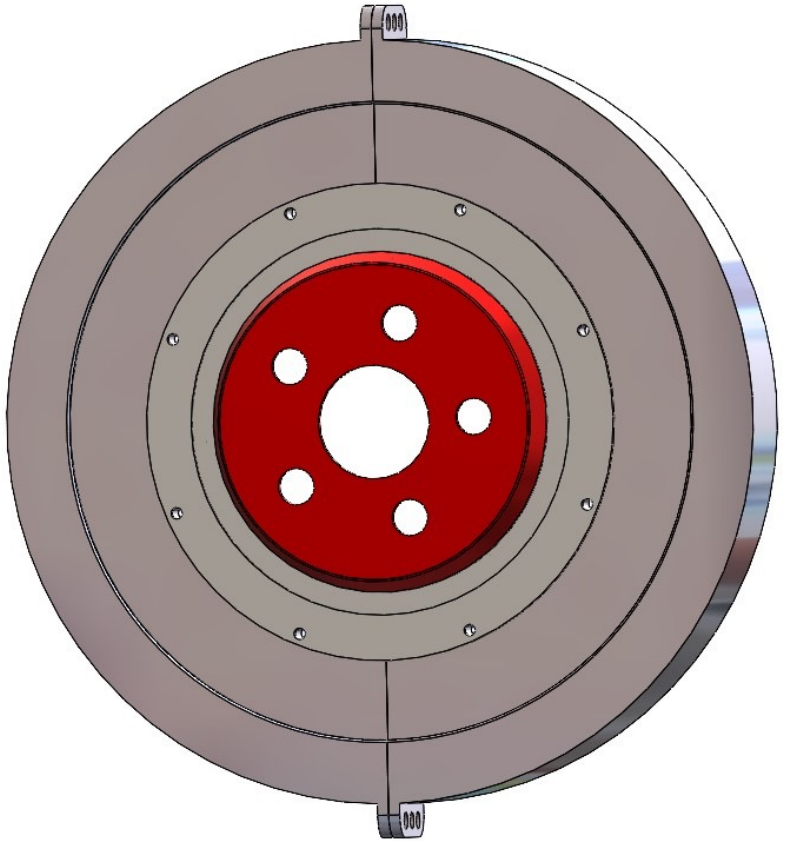
THESIS: Design and Simulation of a Magnetorheological Automotive Brake

The following figures show an initial design for my current thesis project. My thesis currently includes a thorough literature review and detailed design using SolidWorks. Further works will include finite element analysis using ANSYS Fluent. Based upon results an optimised design will be created and simulated to compare results.

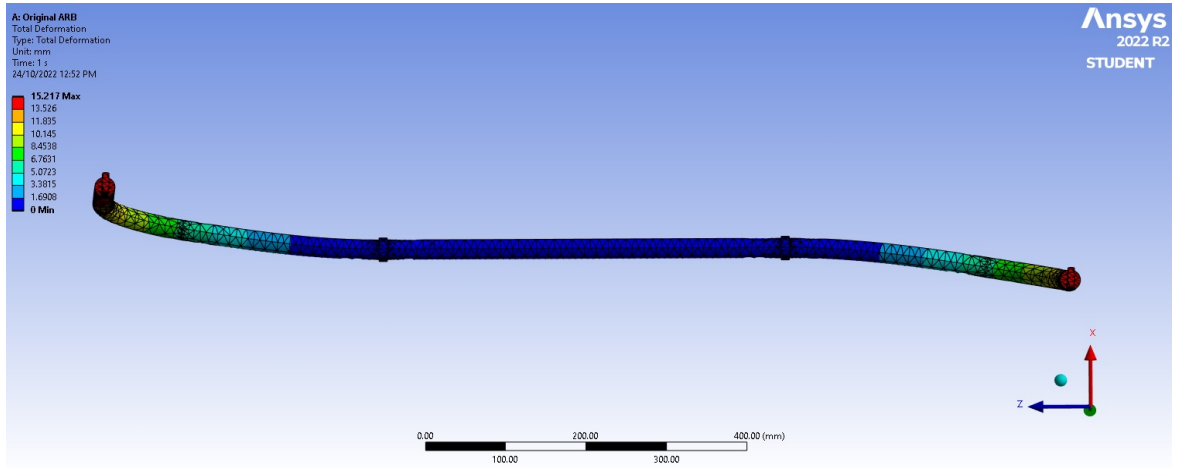


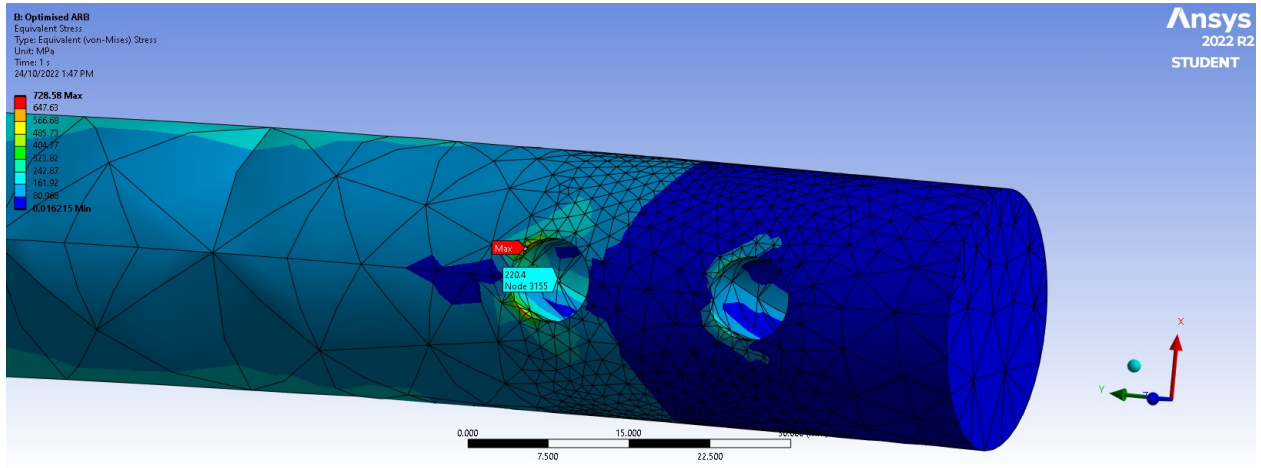


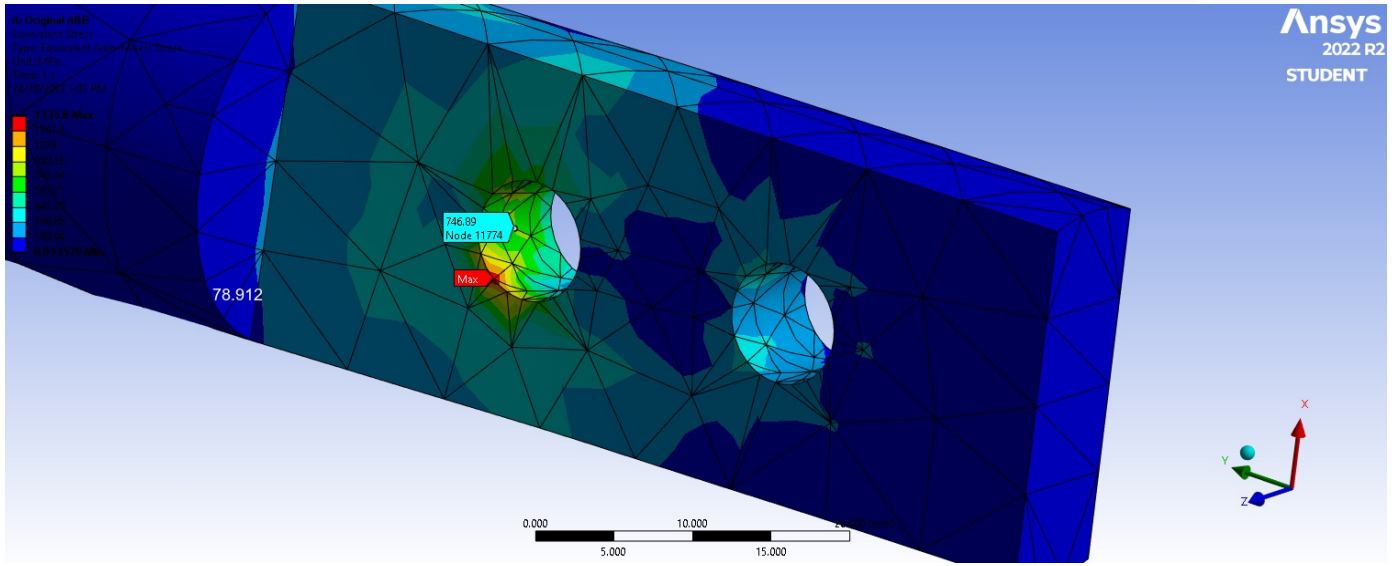


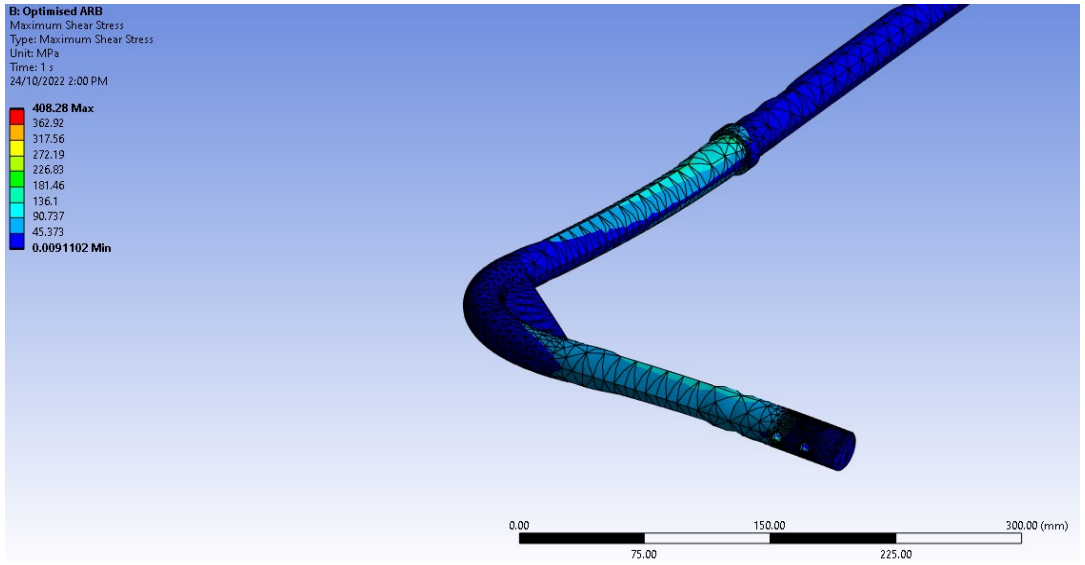
ANSYS Mechanical F.E.A of Anti Roll Bar

For the associated report, finite element analysis was performed using ANSYS Student 2022 R2 to determine total deformation, Von-Mise's stress and maximum shear stress on a standard anti-roll bar and an optimised design. To improve on the initial design, the mounting point thickness was increased, and ribs were inserted at the curvature point of the bar. The results showed a 16.58% reduction in deformation with a 45.5% and 43.3% reduction in the maximum Von-Mises and shear stress respectively.



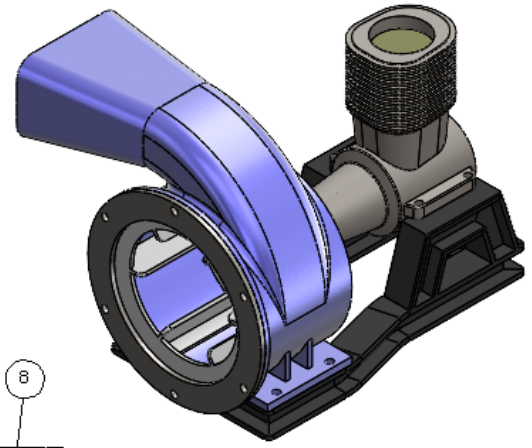


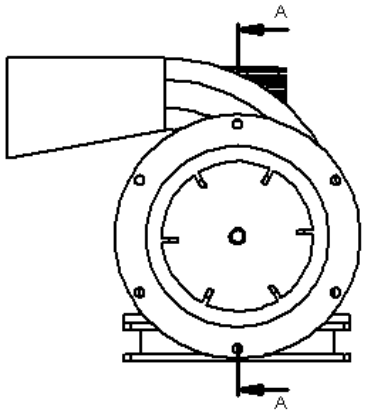




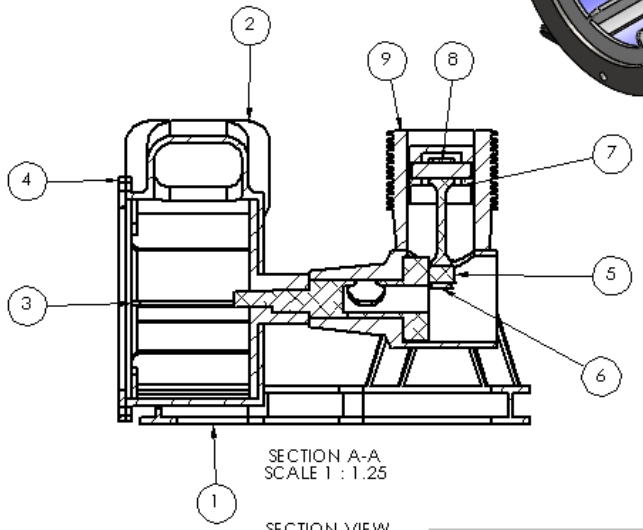
Air Blower Driven by an Internal Combustion Engine

ITEM NO.	PART NUMBER	PART DESCRIPTION	MATERIAL	QTY.
1	AB2021-FR018	FRAME	AISI 1020 STEEL	1
2	AB2021-IH007	IMPELLER HOUSING	CAST CARBON STEEL	1
3	AB2021-IP011	IMPELLER	CUSTOM PLASTIC	1
4	AB2021-FG003	FLANGE	CAST ALLOY STEEL	1
5	AB2021-CS013	CRANKSHAFT	1350 ALLOY STEEL	1
6	AB2021-CR005	CONNECTING ROD	1060 ALLOY STEEL	1
7	AB2021-PT009	PISTON	PLAIN CARBON STEEL	1
8	AB2021-PP002	PISTON PIN	AISI 1020 STEEL	1
9	AB2021-EB034	ENGINE BLOCK	AISI 1020 STEEL, COLD ROLLED	1





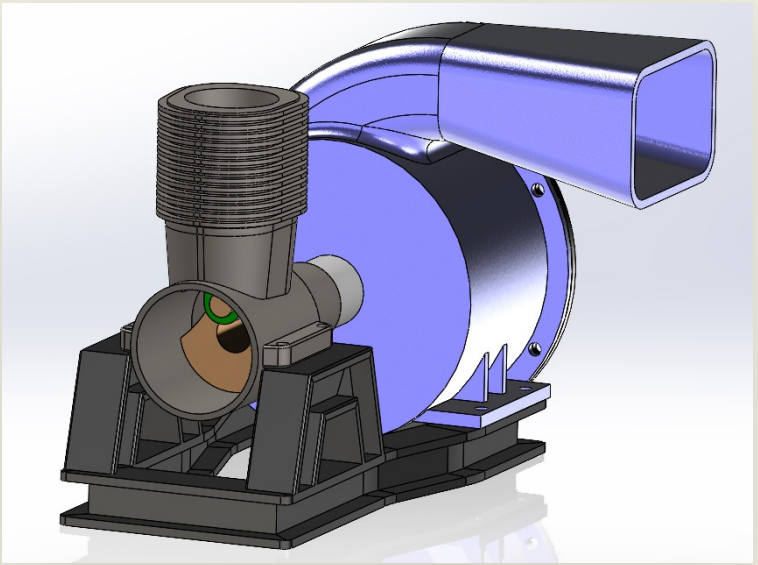
FRONT VIEW

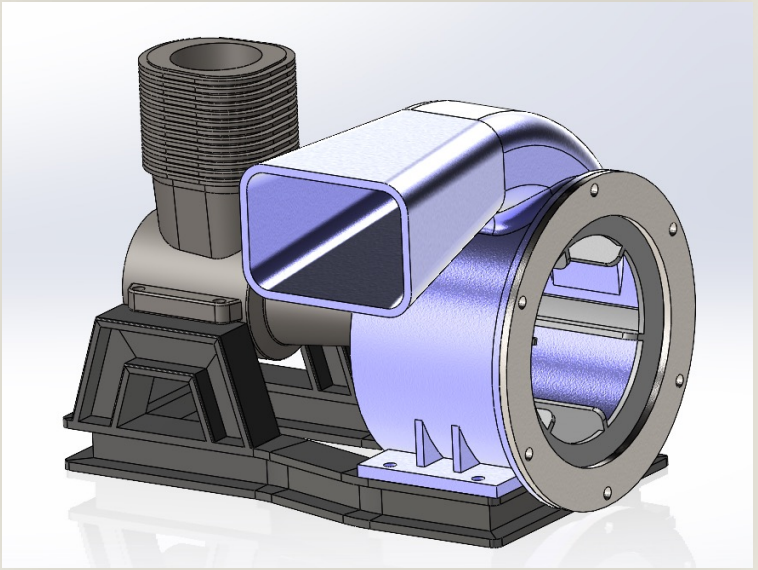


SECTION A-A
SCALE 1 : 1.25

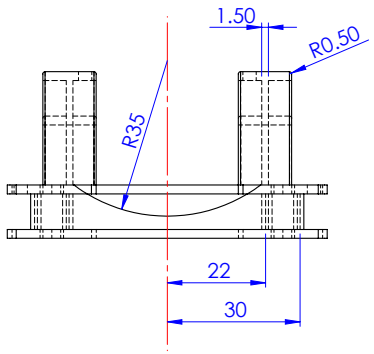
SECTION VIEW

MATERIAL: BoM	DO NOT SCALE DRAWING	REVISION
	USC ENGINEERING	
NAME: LACHLAN WENSLEY	ST. No. 1109326	TASK 1D
AIR BLOWER ASSEMBLY		
DWG NO. AB2021-AB057		A3
SCALE: 1:1.25	SHEET 1 OF 1	

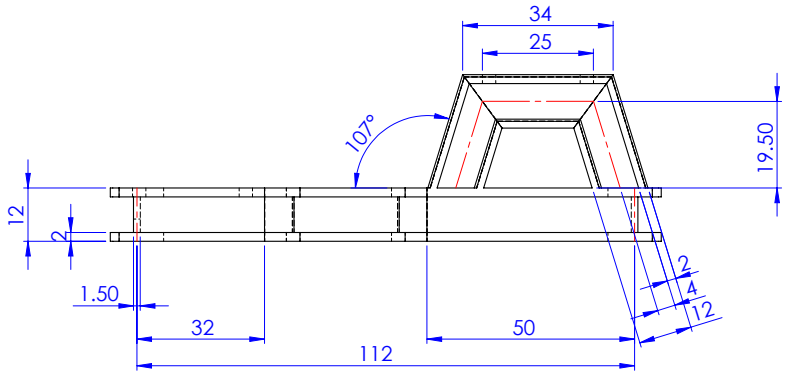




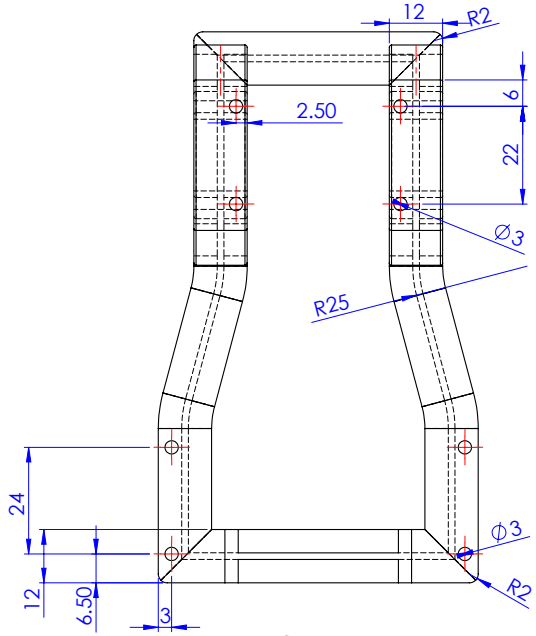
Air Blower Frame Drawing



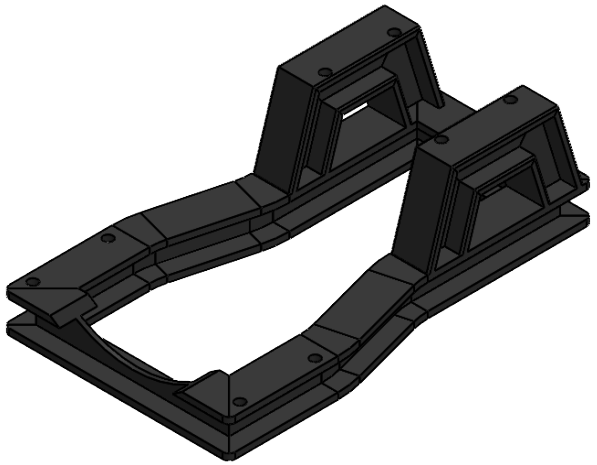
FRONT VIEW



SIDE VIEW



TOP VIEW



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	MATERIAL: 1020 STEEL FINISH:	DO NOT SCALE DRAWING	REVISION
		USC ENGINEERING	
NAME	SIGNATURE	DATE	TITLE: AIR BLOWER FRAME
DRAWN			
CHK'D			
APP'V'D			
MFG			
Q.A			
NAME	St. No.	TASK	DWG NO. AB2021-FR018
LACHLAN WENSLEY	1109326	1D	A3
			SCALE: 1:1 SHEET 1 OF 1

Air Blower Impeller Housing Drawing