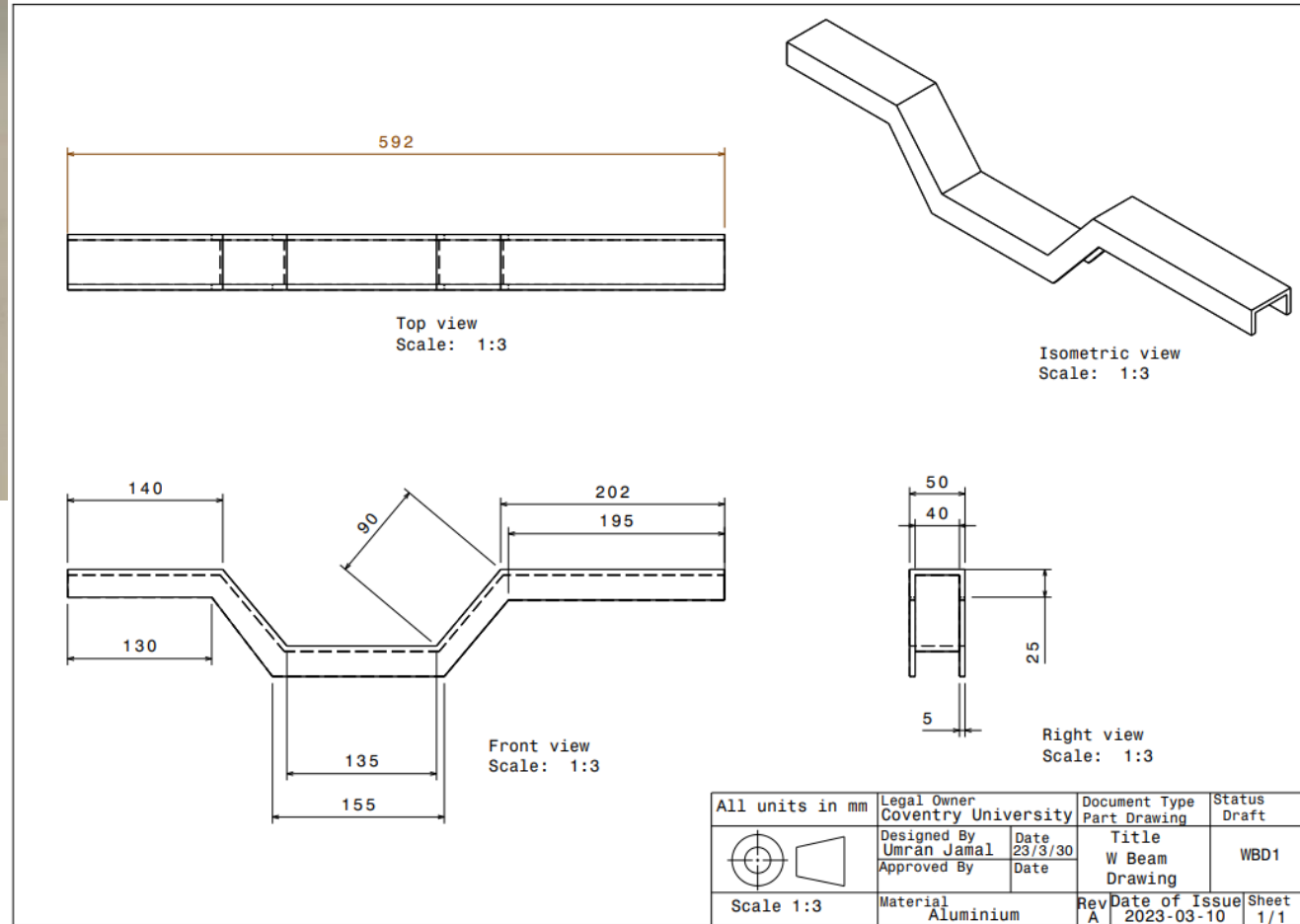
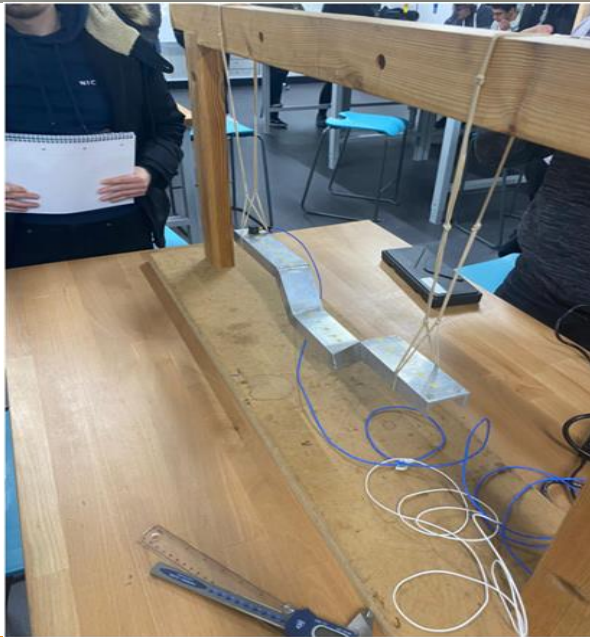


# Design Portfolio

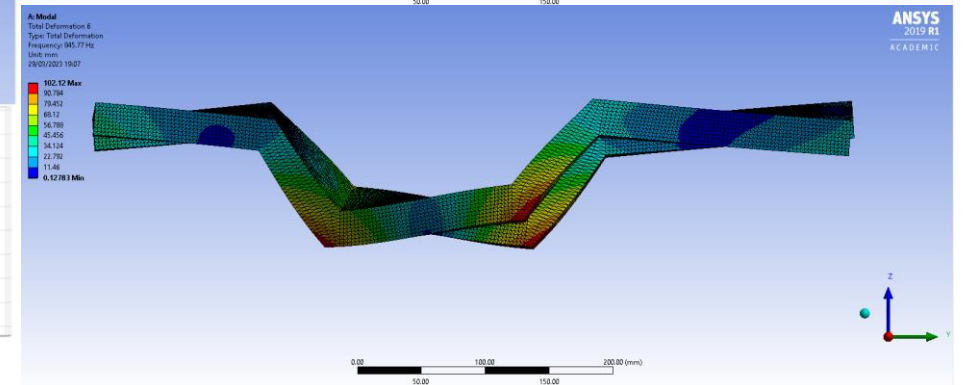
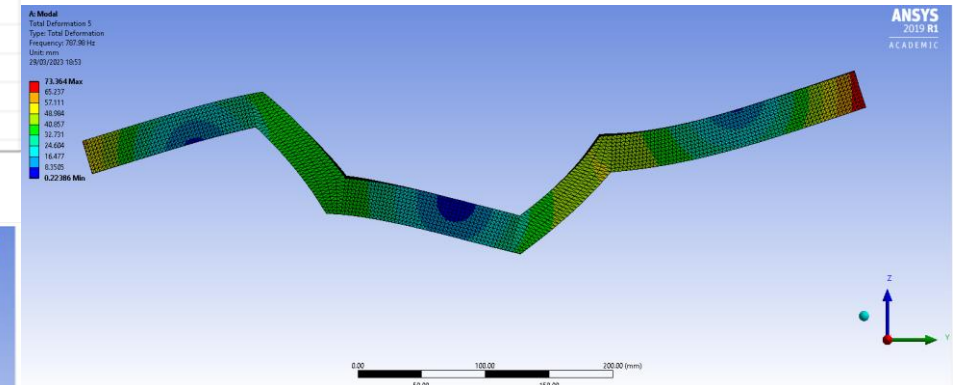
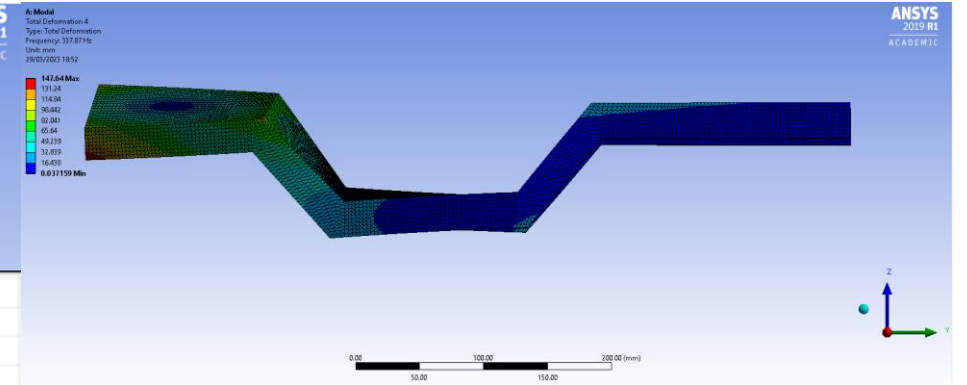
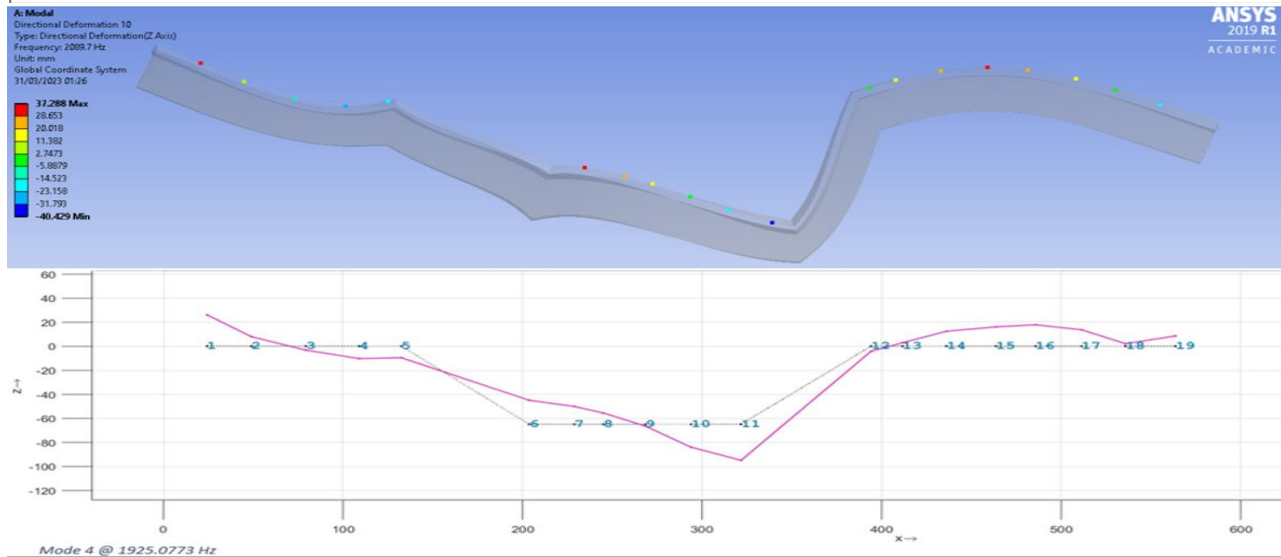
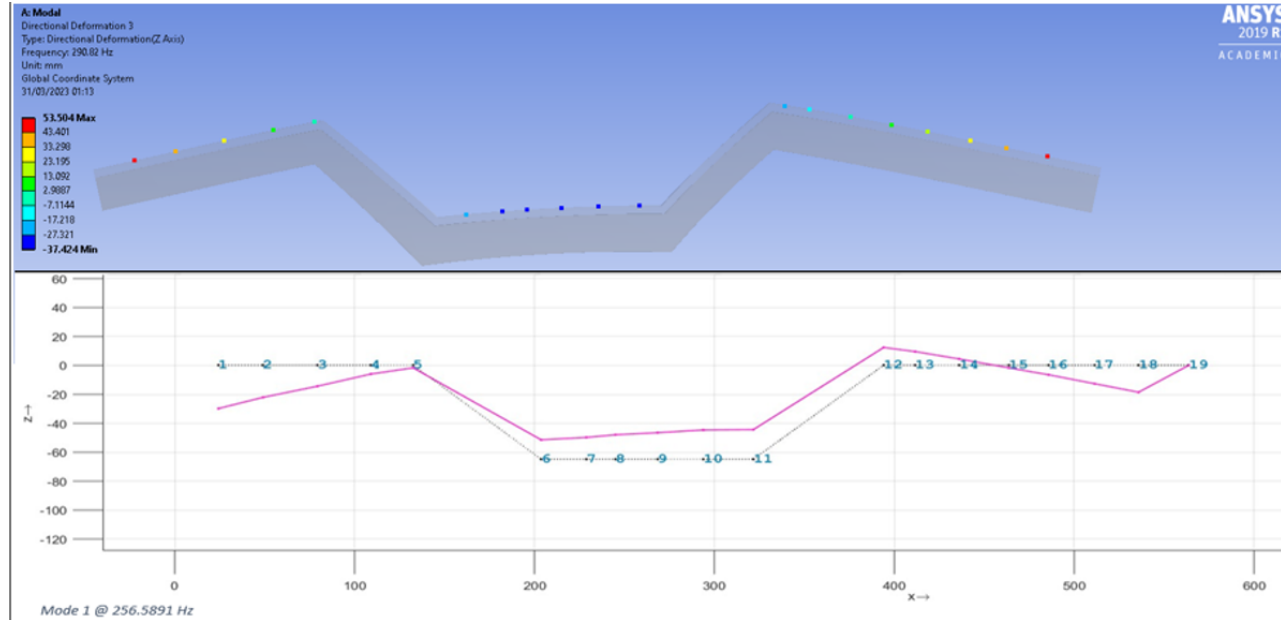
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UMRAN JAMAL

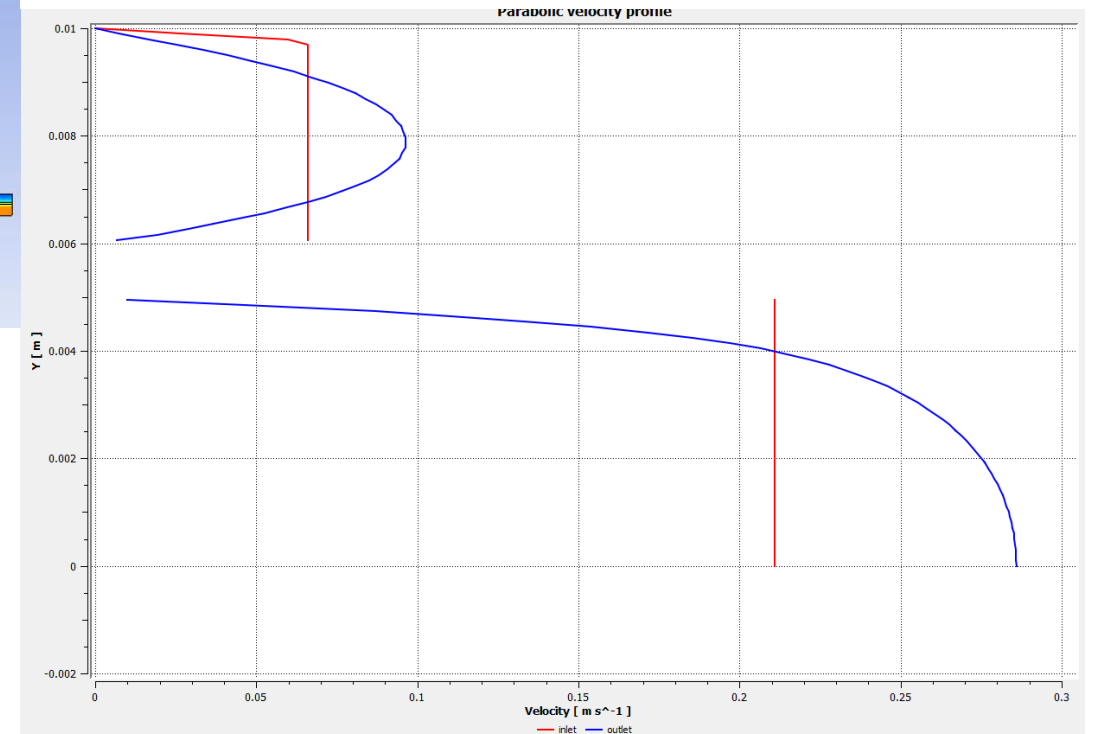
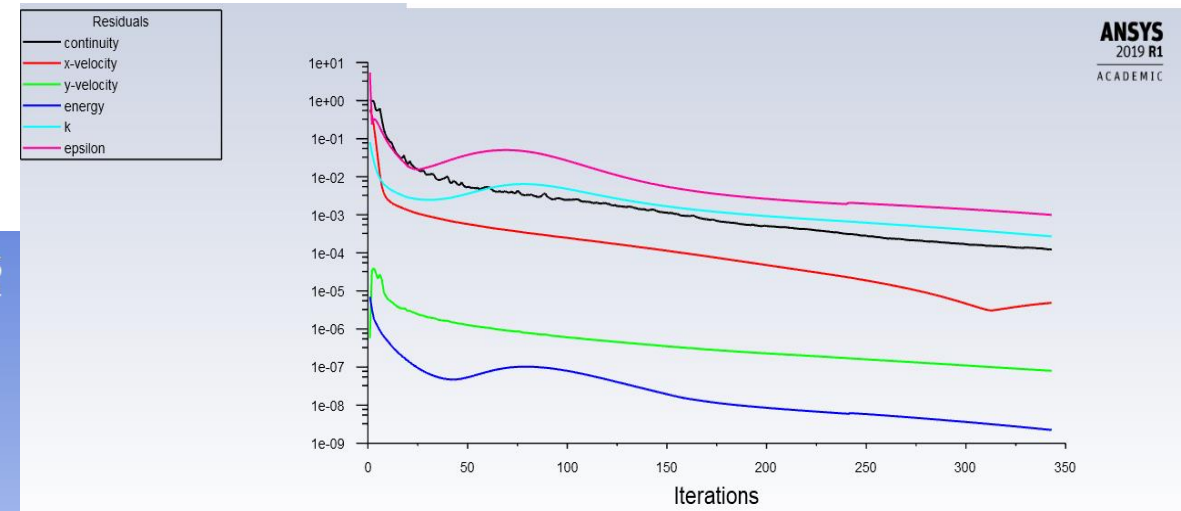
# W-Beam resonance and frequency



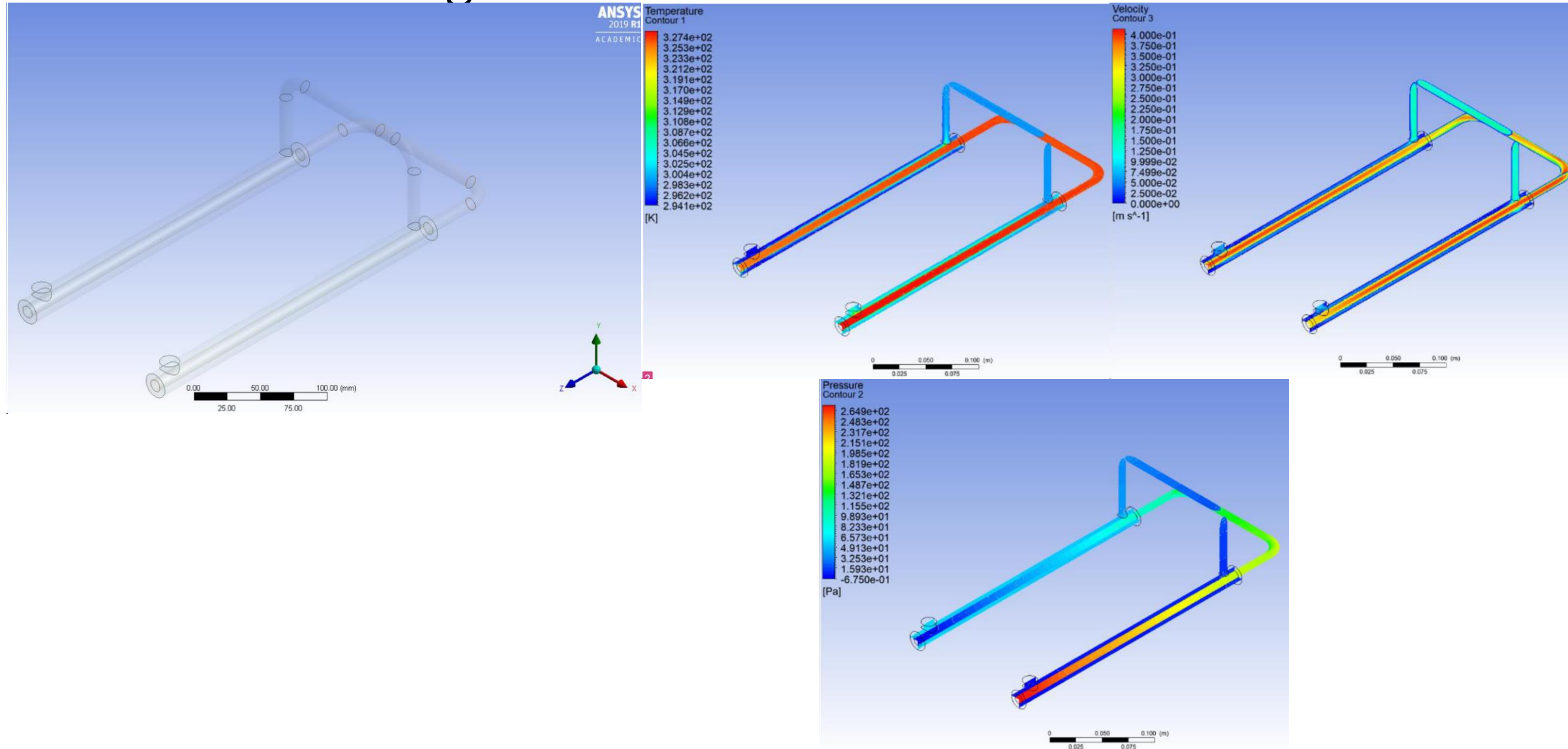
# W-Beam resonance and frequency



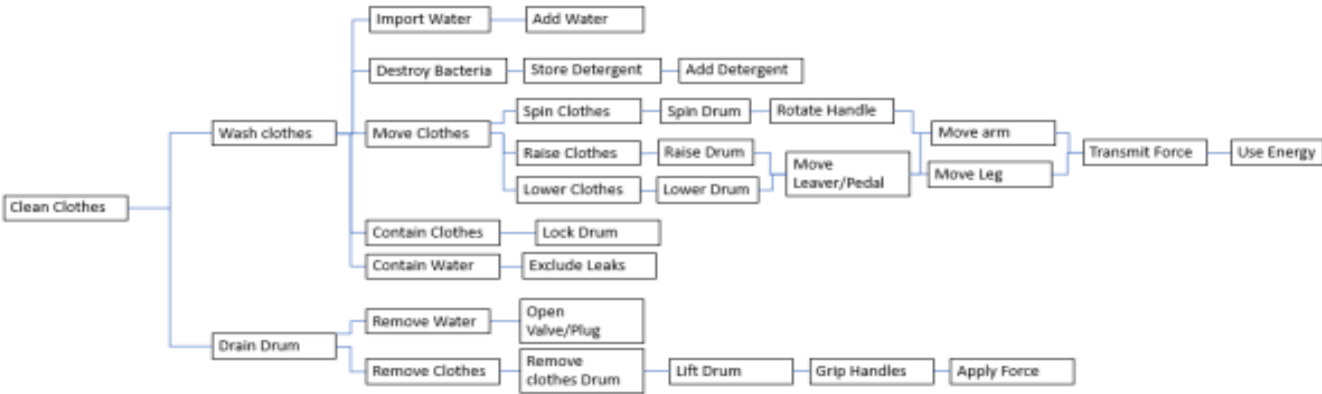
# 2D Heat exchanger Simulation



# 3D Heat exchanger Simulation

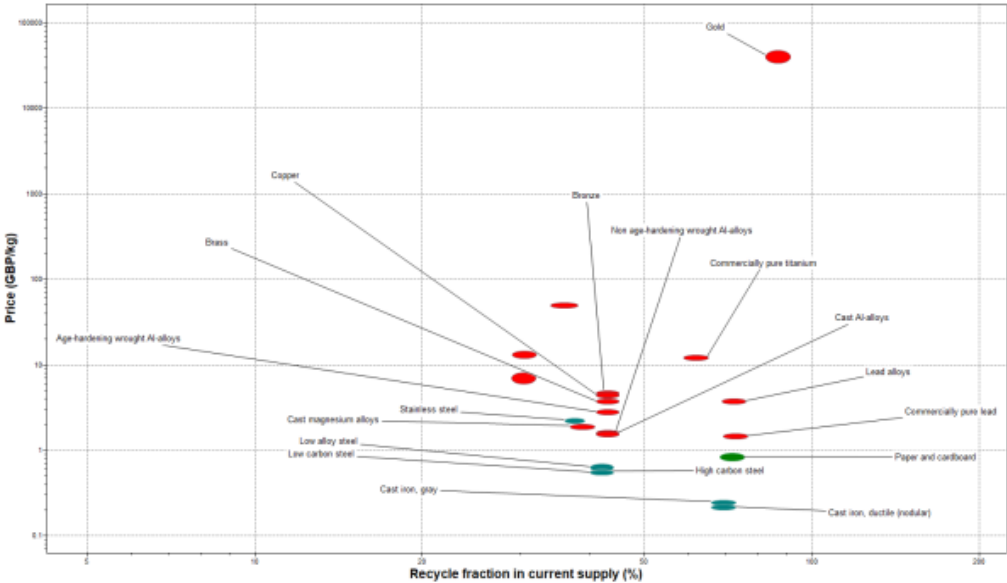


# Conceptual Design for Manual Washing Machine



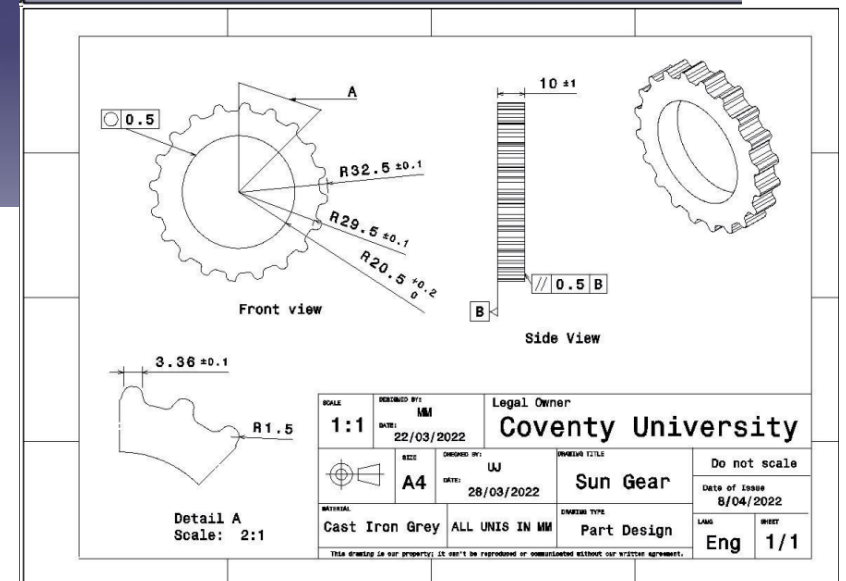
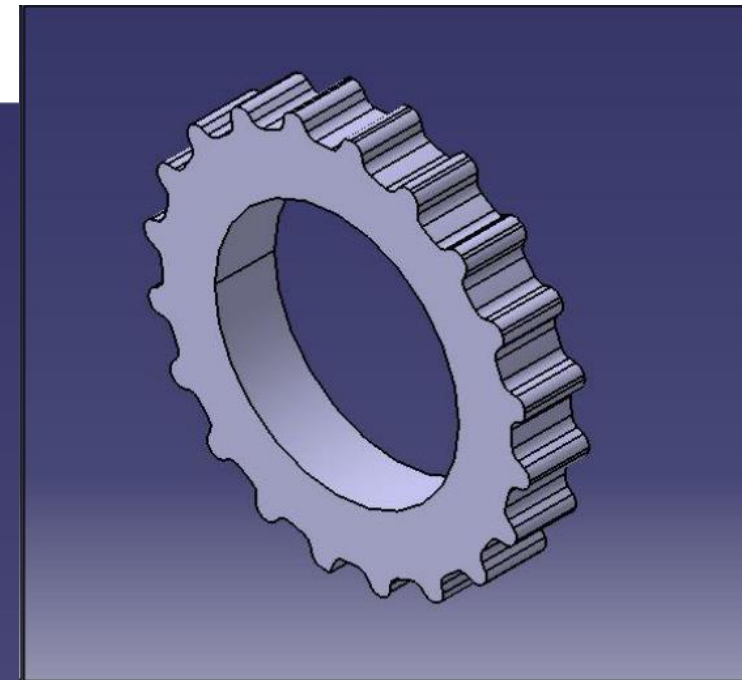
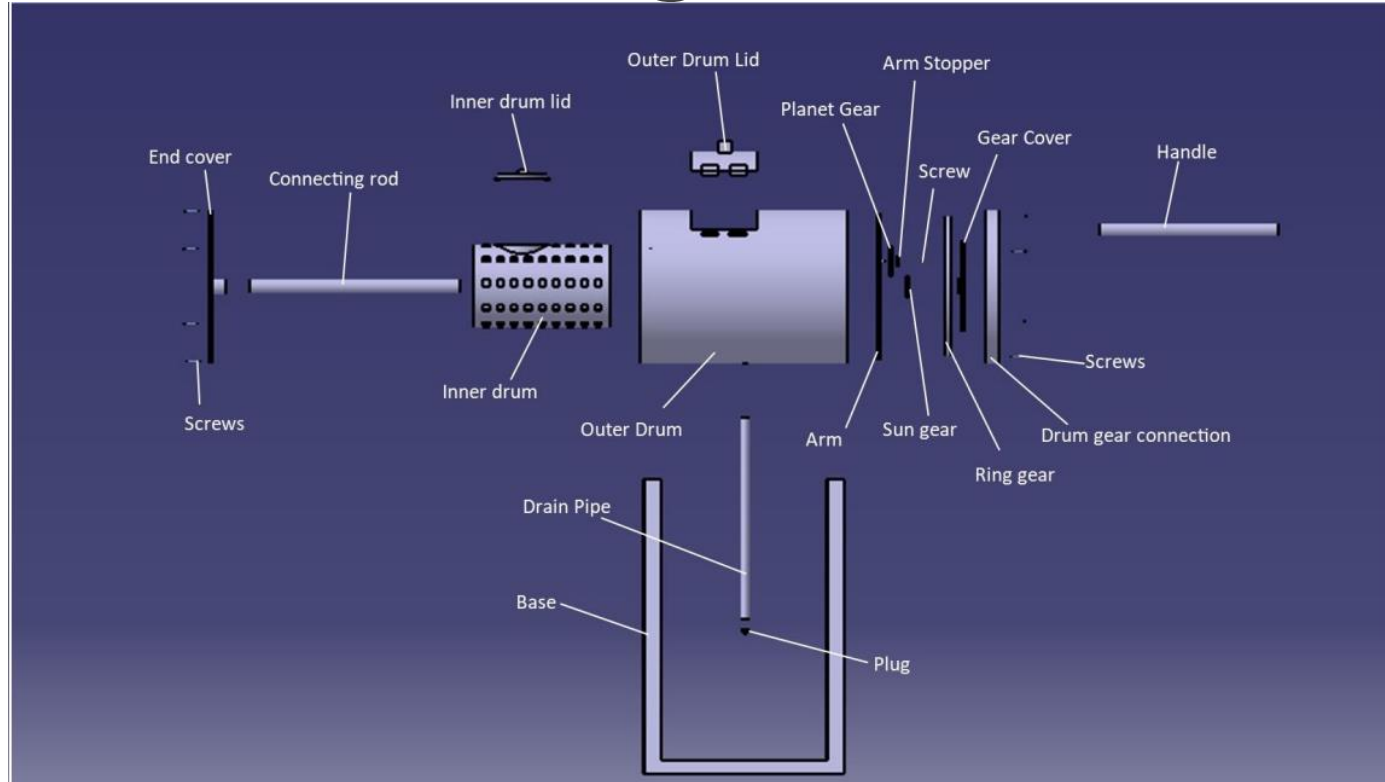
Requirement	Weighting (%)	Datum	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5	Concept 6	Concept 7	Concept 8
Easy to assemble	4.76		-	-	-	-	+	+	+	+
Easy to manufacture	4.76	D	+	-	-	+	+	+	+	-
Low maintenance	4.76		-	-	-	+	-	-	-	+
Can be used daily	9.52	A	+	+	+	+	+	+	+	+
Cheap	11.9		+	+	+	+	+	-	-	+
Sustainable	11.9	T	-	+	+	+	+	-	+	+
High Clothes capacity(4kg+)	7.14		-	+	+	+	+	+	+	+
Safe	14.32	U	-	-	+	+	-	-	-	-
Effectiveness of washing	7.14		+	+	+	-	+	-	+	+
Minimum effort to operate	9.52		-	+	+	-	-	-	-	-
High life expectancy	11.9		-	+	+	+	-	+	-	-
Portability	2.38	M	-	-	-	-	-	-	-	-
Total +			5	7	9	8	6	5	6	7
Total -			7	5	4	4	6	7	6	5
Total s			0	0	0	0	0	0	0	0
Overall Total			-2	2	5	4	0	-2	0	2
Weighted Total	100		-14.32	38.04	66.68	52.4	-23.84	-23.84	-9.56	19

Feature	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10
Draining	Valve (Stickley 2022)	Plug (CPC Farrell N.D.)	Removal of Drum (Vertical Motion) (FSTA 2015)	Suction goes into external removable well on the outside (Cobes 2020)	Draining Pipe (Screwfix N.D.)	Drain with cover (Amazon 2016)	Draining spout (Amazon 2016)	Screw on cap (Log pipe/spout) (Cobes 2020) Fuel Solutions N.D.)	Screw on flexible hose (McMaster 2019)	
Mechanical system	Pulley system (Amazon 2007)	Whisk (Spins) (Amazon 2007)	Piston (Vertical Motion) (FSTA 2015)	Push Pedal system (Spins) (Cobes 2020)	Pedal System (Spins) (Patent Docs 2011)	Type 1, 2 handled lever (Spins) (Amazon N.D.)	1 handled lever (Spins) (RS Components N.D.)	Eccentric Gear train (Spins) (LAWA 2017)	Spring loaded (Vertical Motion) (Mechanics Books 2016)	Compound gear train (Spins) (Ryan 2010)
Shape of product	Horizontal Cylinder	Sphere (Cobes 2020)	Cube	Vertical Cylinder	Cone (Cobes 2020)	Pill (BO Warehouse 2014)	Oval	Hexagon (Vector Stock N.D.)	Rectangular Cuboid	
Base	Plastic frame (Amazon N.D.)	Silicone feet (Amazon 2012)	Wheels with a locking feature (Ross Castor N.D.)	Drum sits in a cage (Regley 21)	Angled feet with indent for drum to sit in (Qib 2022)	Plastic Cover	Support legs (Ikea N.D.)	Adjustable base for ergonomics (Ty N.D.)	Flat (Amazon 2019)	Weighted (Amazon 2019)
Locking System of lid or door	Spring lock (RS Components N.D.)	Clips (The Range N.D.)	Bolt (Toolstation N.D.)	Twist lock handle (Quickie Clean Accessories N.D.)	Twist lock lid (Qib 2021)	Hook lock (Amazon 2019)				
Additional Features	Suction Cups (RS Components N.D.)	Extra supports	Damping	Hinged door (RS Components N.D.)	Mesh inner drum (Cobes 2020)	Holes in inner drum	Removable handle (BWhouse N.D.)	Internally ribbed cylinder		

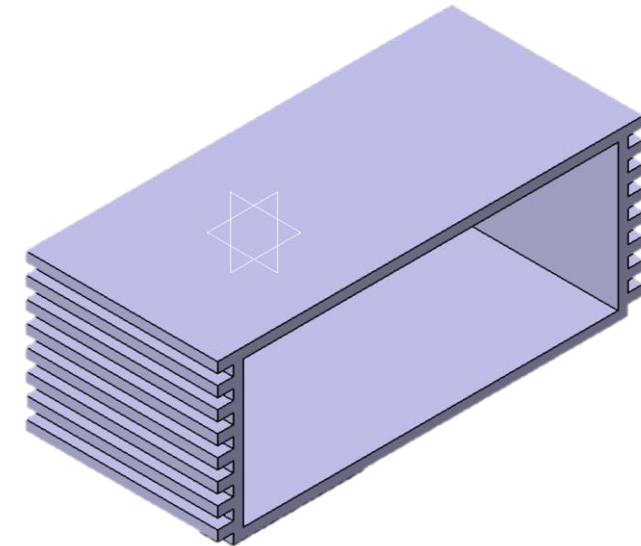
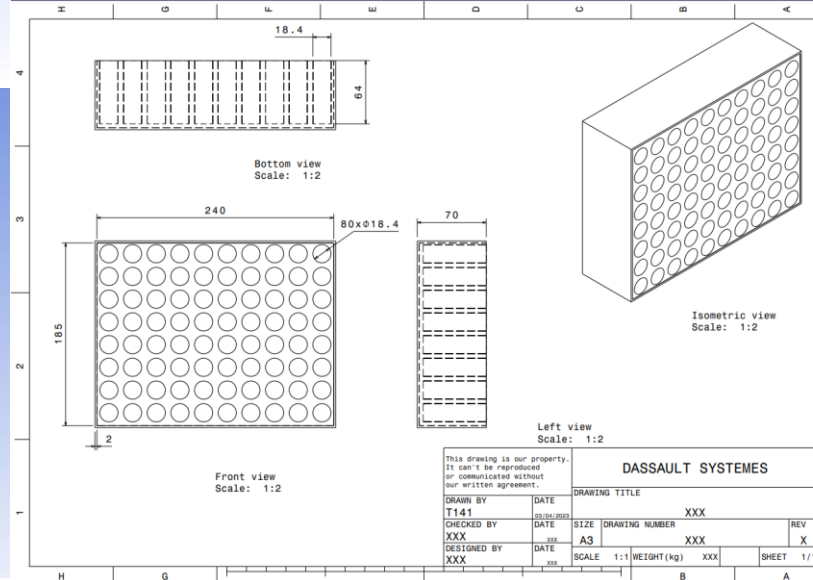
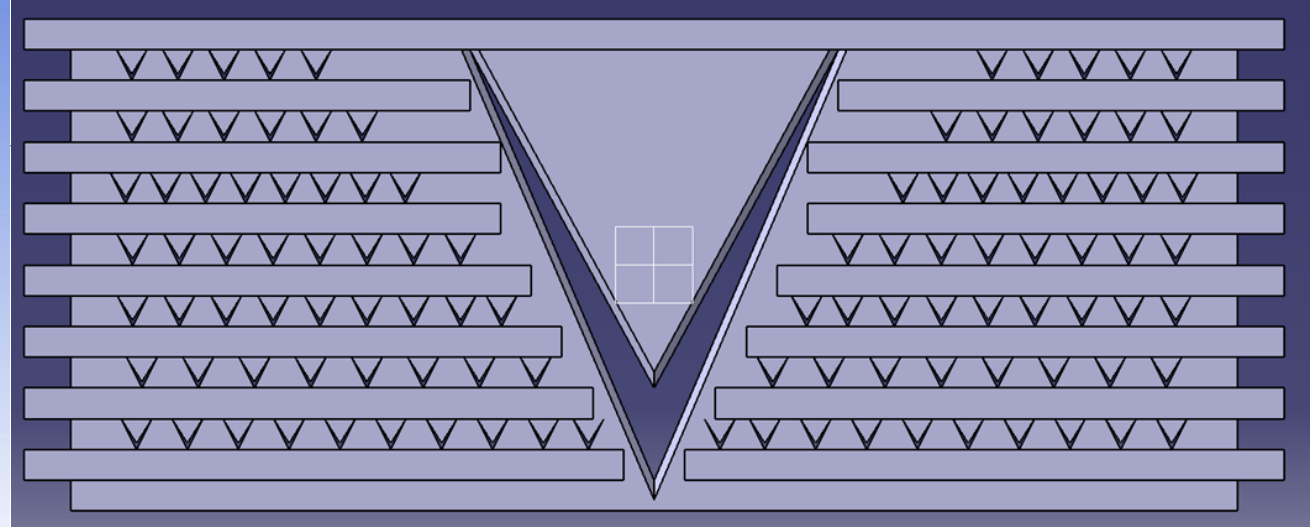
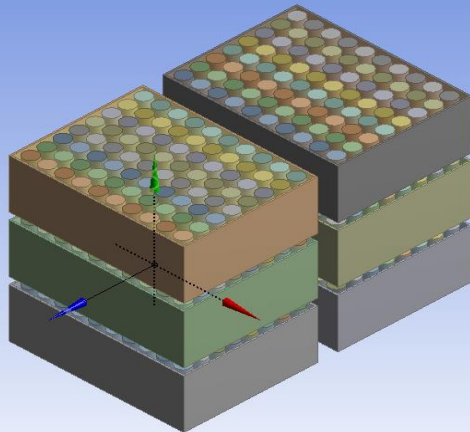
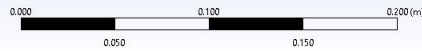
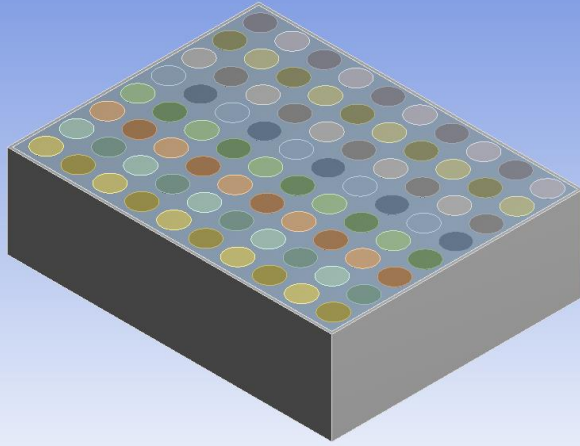




# Manual washing machine

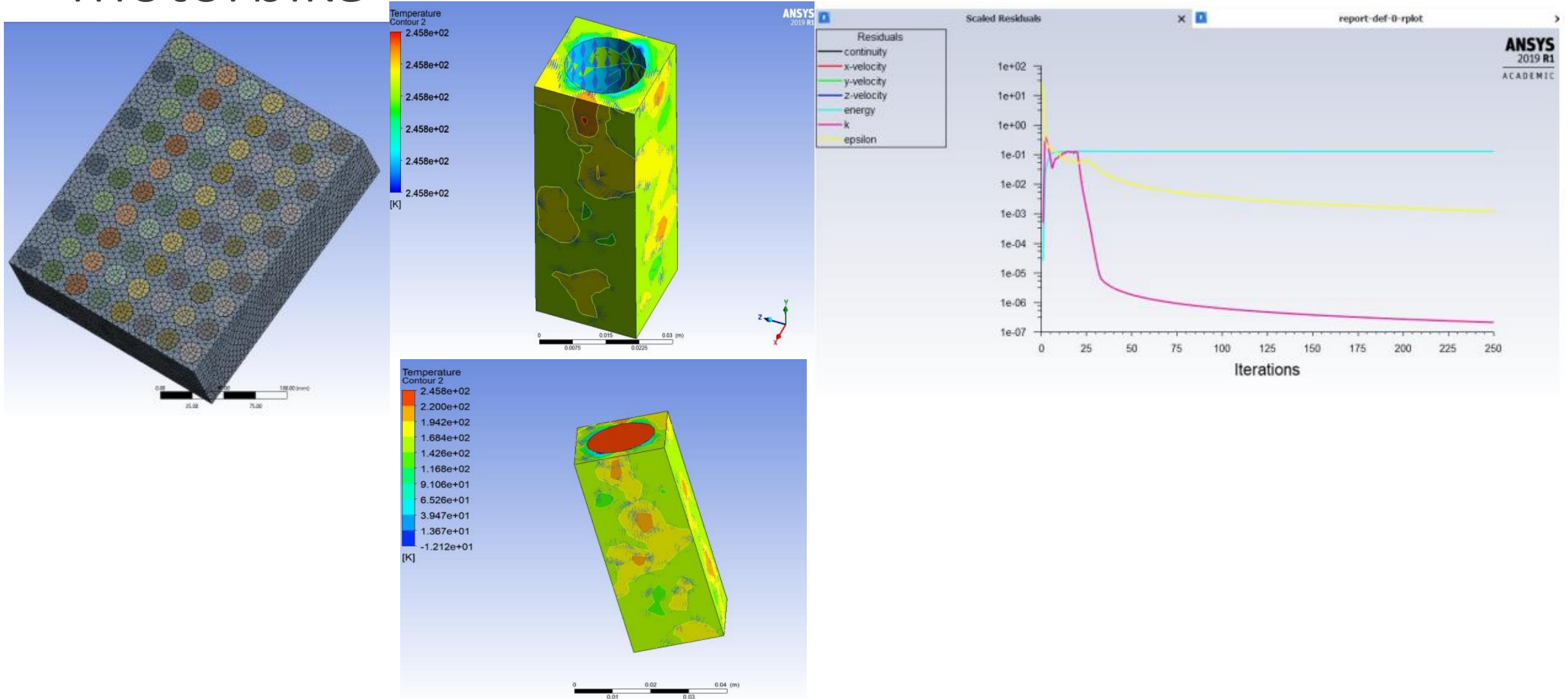


# VEITIS eV Twin Battery Casing and Packs

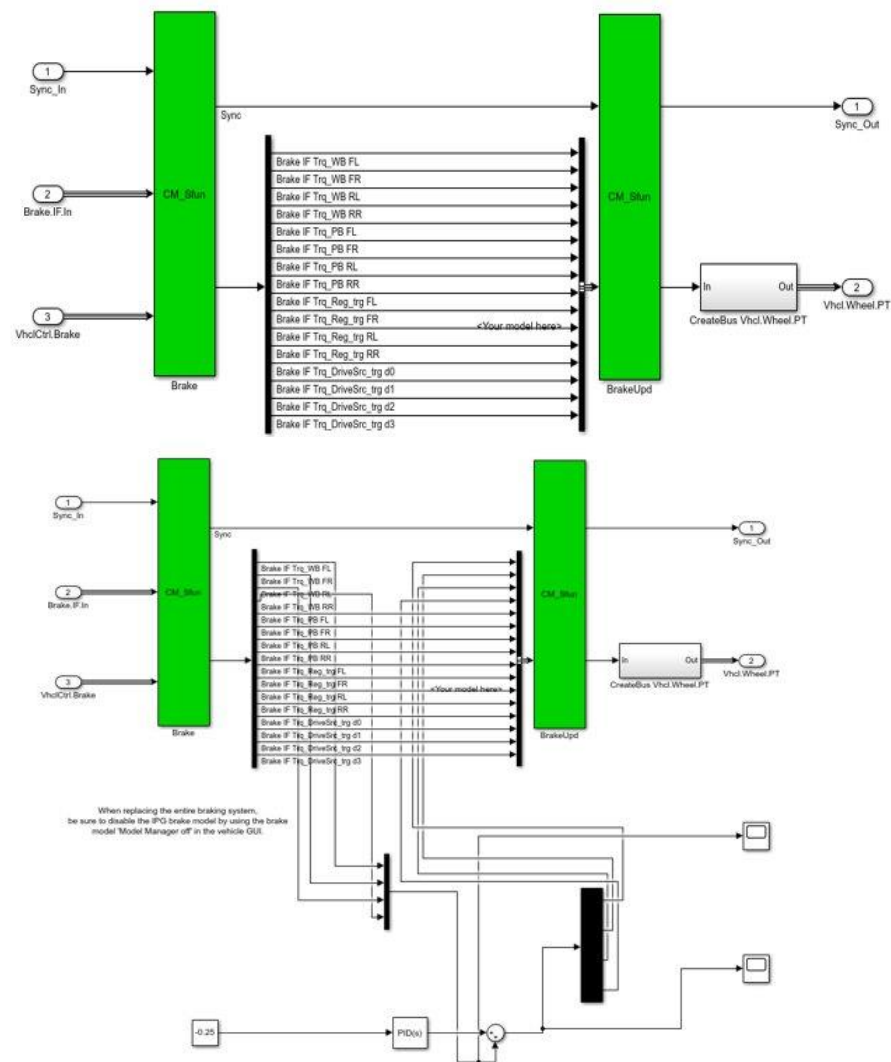
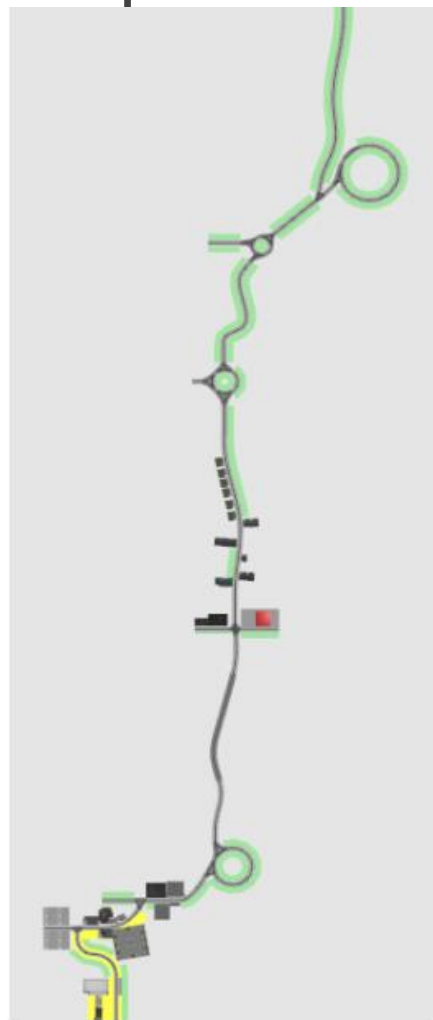




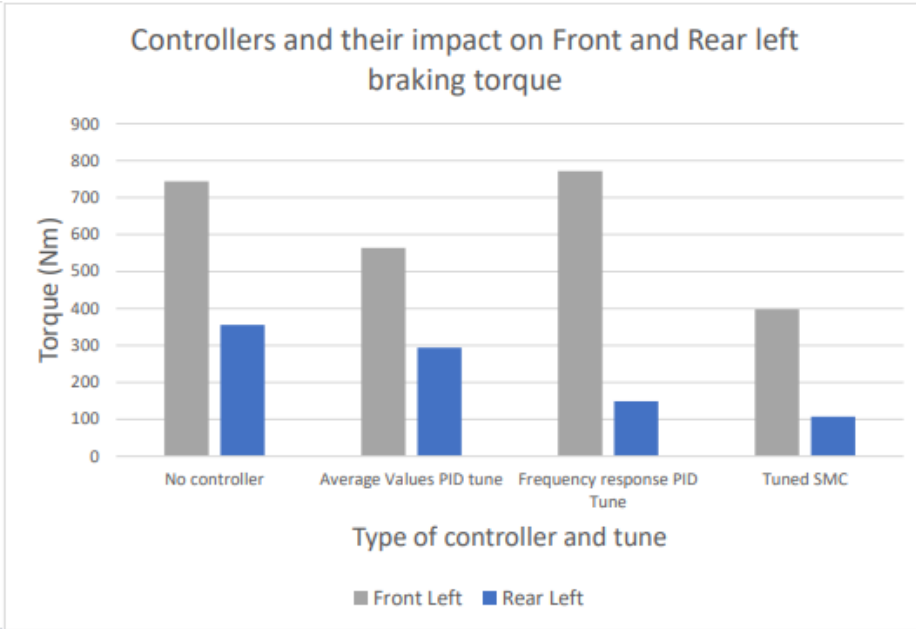
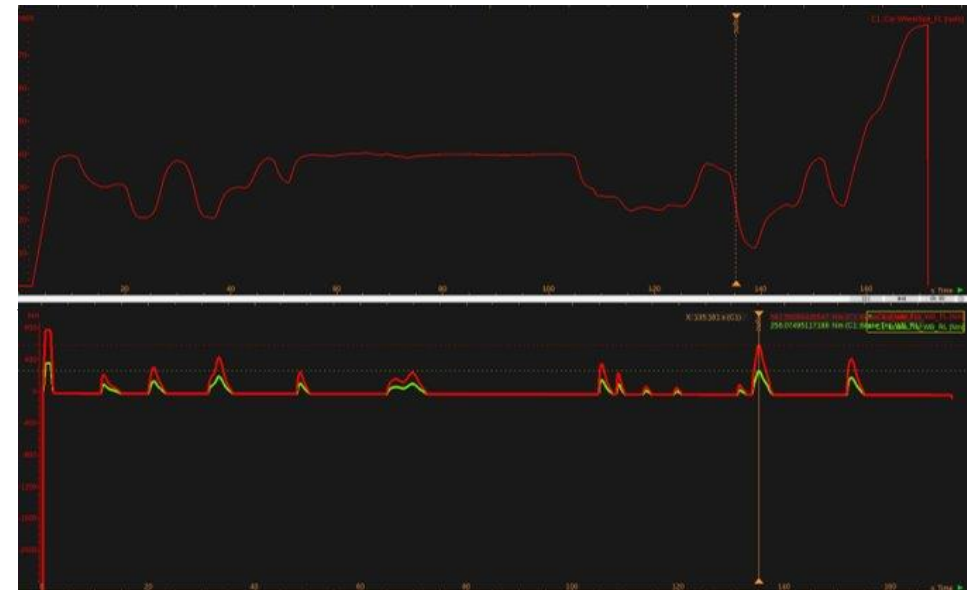
# Battery PCM investigation for VEITIS electric motorbike



# Anti-Slip Controllers and their impact on Electric Vehicles



PID Controller



# Anti-Slip Controllers and their impact on Electric Vehicle.

