



# Heather

Circular Design and  
Local Irish Materials

Final Year Project  
7 Month Duration

# Design

## The Research Question

This self directed research project centres on the transition to a circular economy within the furniture industry. This transition is backed by upcoming EU regulations and directives with an increased emphasis on consumer transparency.

The Irish furniture industry is reliant on imported materials and linear production models, with few practical examples of how circular design principles might be applied within a local context.

Using local materials significantly reduces the project's carbon footprint. The material chosen was wool, a byproduct of the meat industry in Ireland, which has been undervalued since the rise of synthetic fibres.

The opportunity arose to present the research for this project at the All Ireland Conference for Undergraduate Research at the University of Limerick in March, 2026.

A part of the research involved completing modules in CirCLER, an online EU training course to help the transition towards the circular economy within the furniture industry.



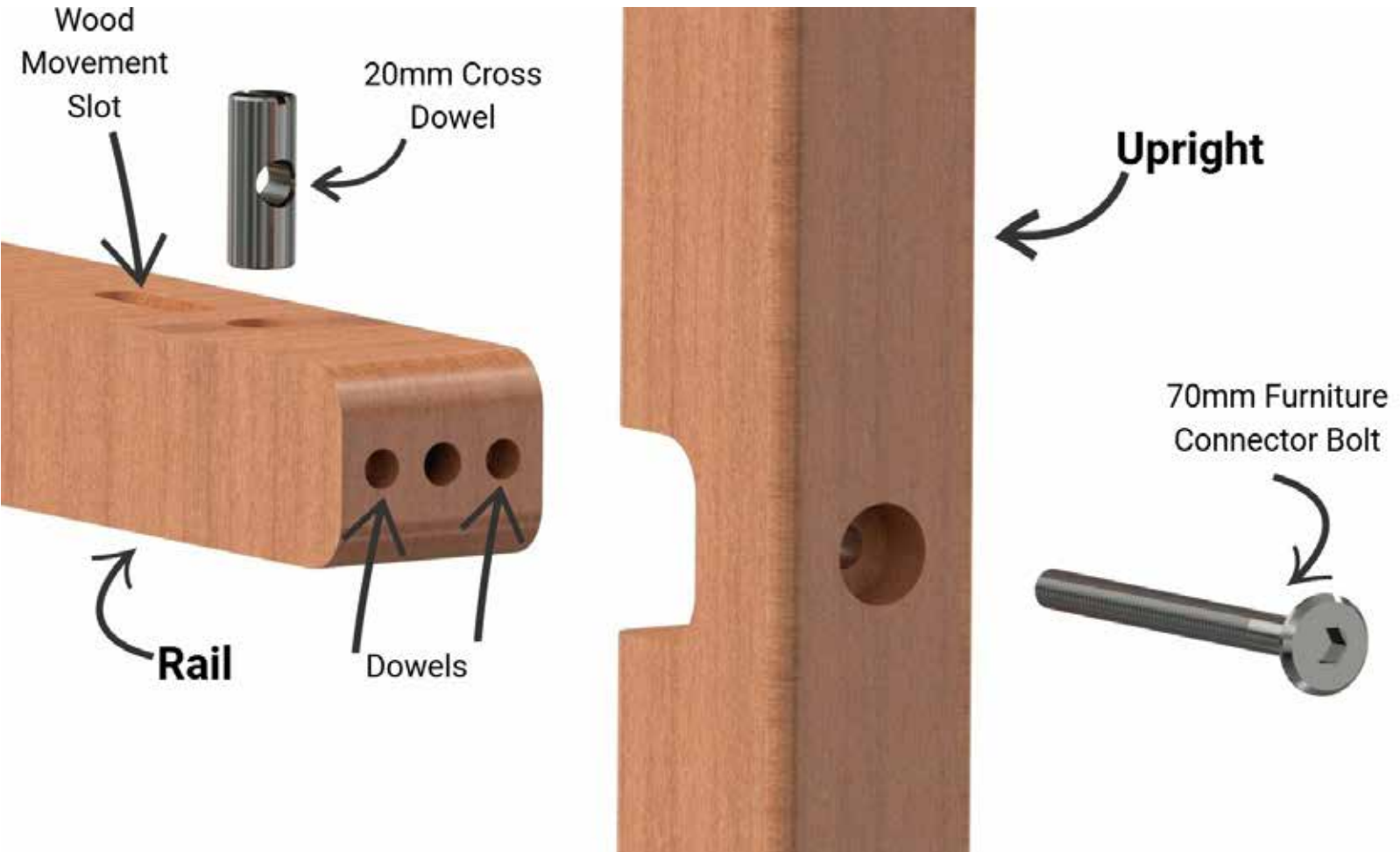
Moodboard

# Design for Disassembly

## Ecodesign Strategy

Every decision in the project was guided by circularity. By using ecodesign strategies, which aims to reduce the environmental impact across the entire lifecycle, the unit can be fully disassembled, easily repaired, and at the end of its life, returned to the earth or recycled.

Breaking the core frame into three identical components, the uprights and two rails, simplifies the manufacturing. The unit is a glueless assembly using furniture connector bolts, barrel nuts and dowels. The shelves are connected with screws accounting for wood movement by using slots.



Exploded Joint Infographic



Felted Crocheted Friction Fit Bolt Cover

# CAD Assembly

The construction of the unit is simple:

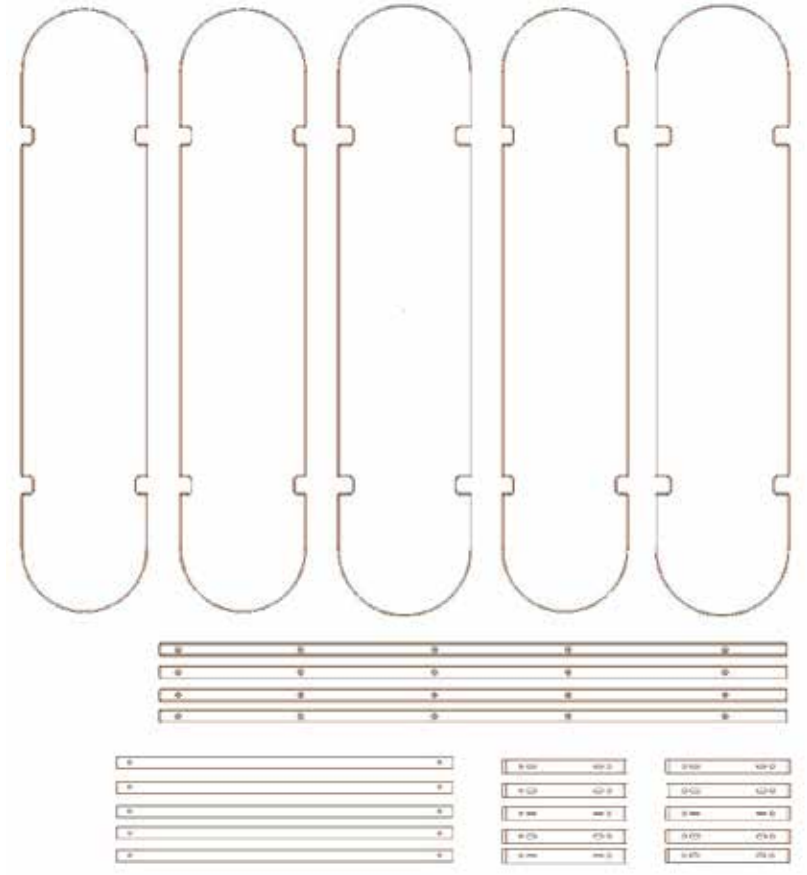
- 1. Assemble both end ladders using the uprights and rails,
- 2. Assemble both ladders with the mid rails,
- 3. Screw the shelves on from below.



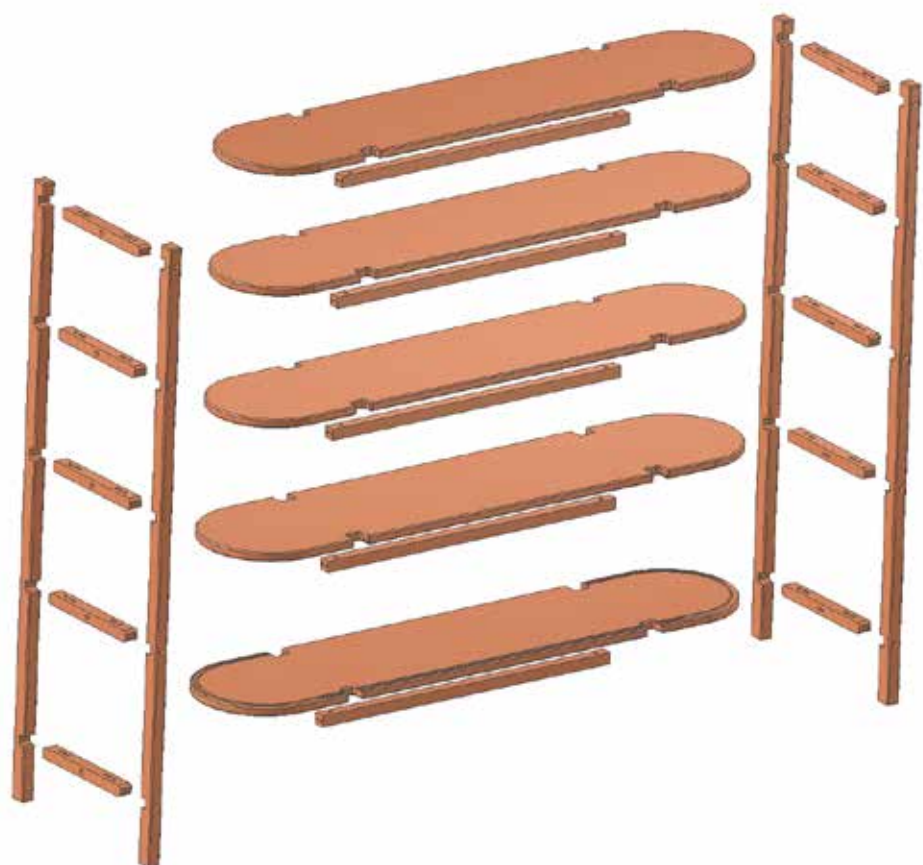
Assembly Breakdown



Fusion Render

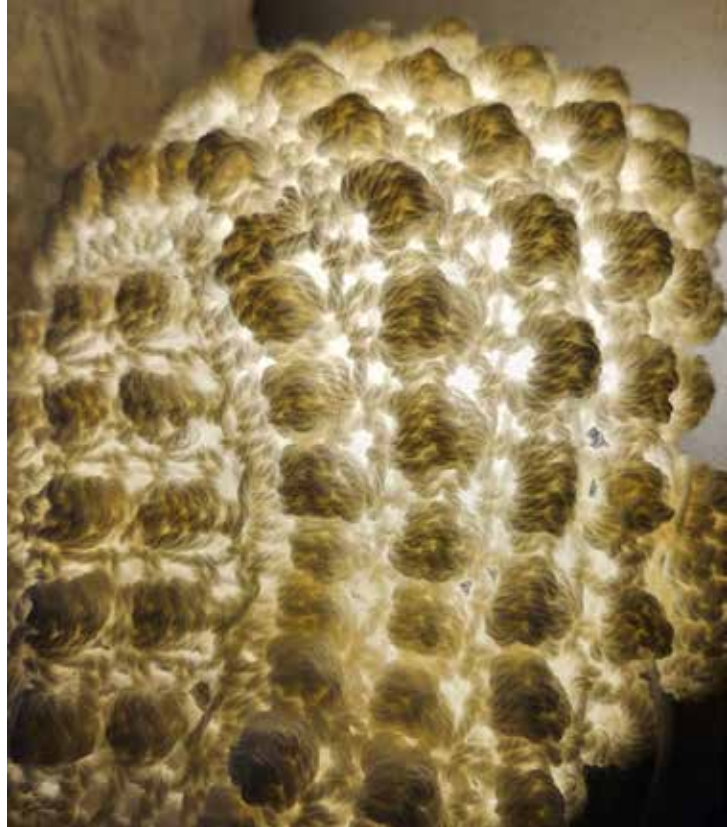


Unit Parts

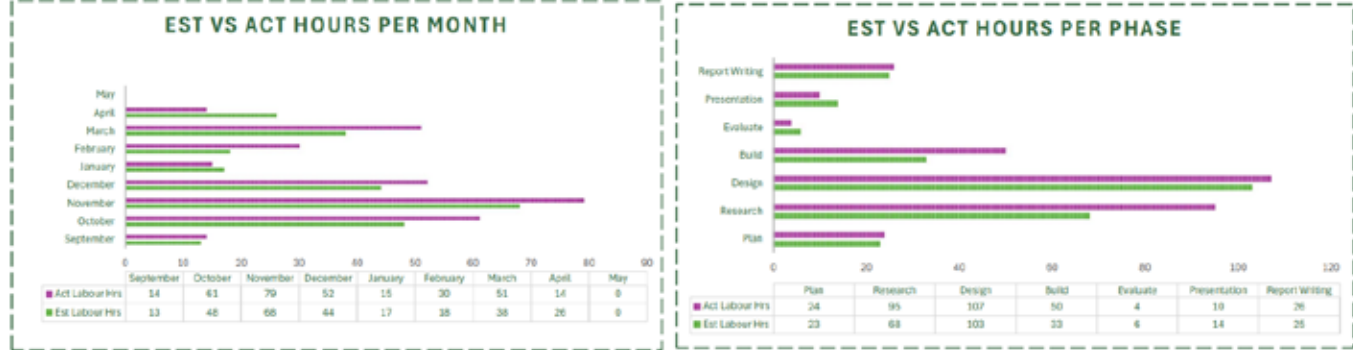
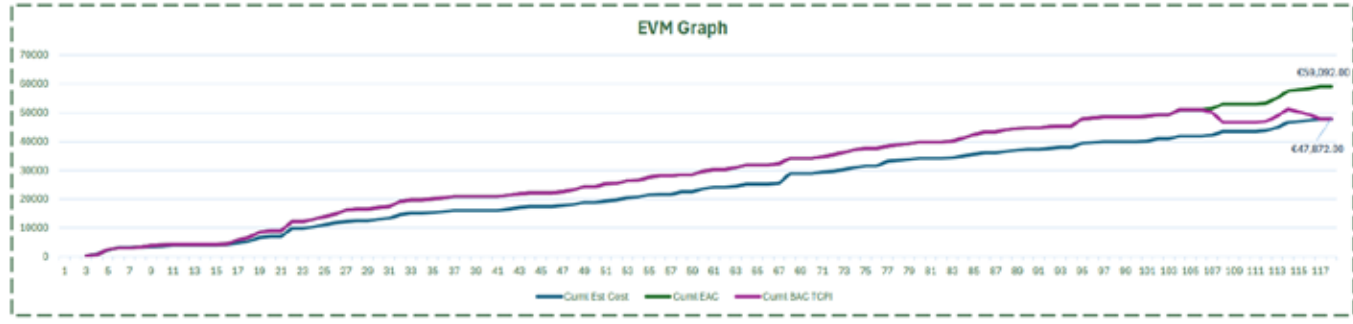


Full Exploded View

# Prototyping and Development



Project Overview		Key Dates		Earned Value Management		Critical Path Summary		Material Cost Summary	
Project Name	PDP Final Project	CA1 - Plan	17/10/2025	BAC	€ 47,872.00	Standard Deviation	3.670452591	Total Cost	€ 14,078.56
Project Leader	Mel Shiel	CA2 - Draft Report	22/12/2025	EV	€ 45,056.00	Confidence 90%	140	Hardwood	€ 13,948.94
Leader No.	000418702	CA3 - Outcome	27/03/2026	AC	€ 55,616.00	Confidence 95%	150	Ancillary	€ 129.02
Project Start Date	23/09/2025	CA4 - Presentation	27/04/2026	CPI	0.810126582	End Date 90%	08/04/2026	Sheet Material	€ -
Project End Date	01/05/2026	EAC	28/04/2026	EAC	€ 59,092.00	End Date 95%	09/04/2026	Veneer	€ -
Total Duration	142	CAS - Report	01/05/2026	BAC TCPI	-0.363636364			Edgebanding	€ -
				CV	-€ 10,560.00			Softwood	€ -
				ETC	€ 59,092.00				€ -

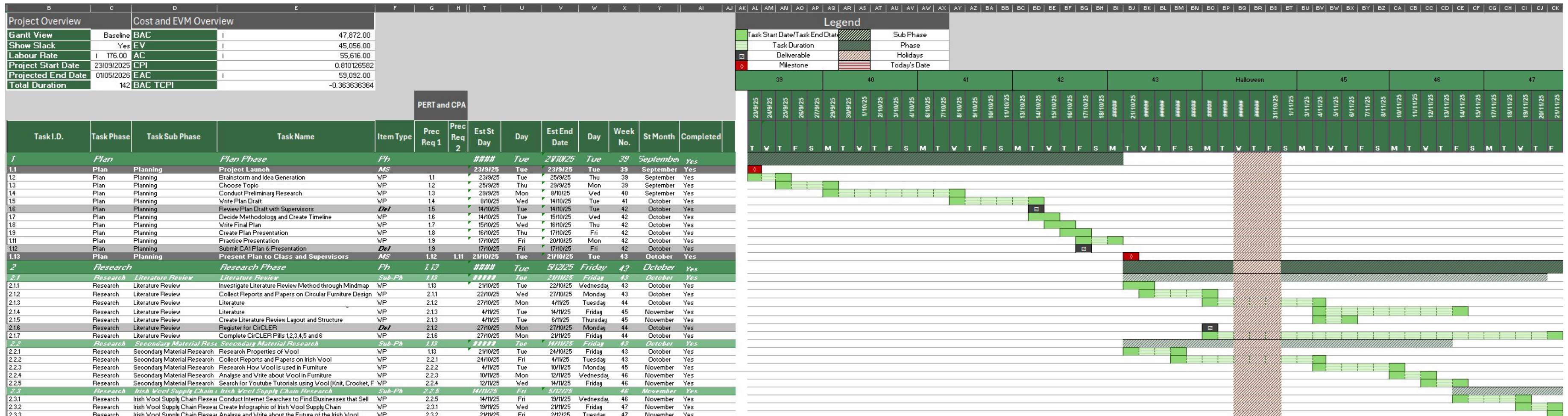


Excel Dashboard including graphs

Component Name	Type	Material	L (mm)	W (mm)	T (mm)	Tot Qty	Edgebanding	Tot Req M3
Top Shelf	Hardwood	Elm 2"	1600	340	24	3	NE	0.039168
Base Shelf	Hardwood	Elm 2"	1600	350	24	2	NE	0.02688
Upright	Hardwood	Elm 2"	1700	45	35	4	NE	0.01071
Rail	Hardwood	Elm 2"	315	35	30	10	NE	0.0033075
Cross Rail	Hardwood	Elm 2"	880	30	30	5	NE	0.00396
Back Panel	Hardwood	Elm 2"	386	108	18	8	NE	0.006003072
Tambour Slat	Hardwood	Elm 2"	397	20	12	82	NE	0.00781296
Door Rail	Hardwood	Elm 2"	460	35	12	4	NE	0.0007728
Door Vertical	Hardwood	Elm 2"	386	20	12	4	NE	0.00037056
Bolt	Ancillary	Furniture Connector Bolt 70mm				35	NE	35
Cross Dowel	Ancillary	Cross Dowel 20mm				35	NE	35
Dowels	Ancillary	Dowel				70	NE	70
Screws	Ancillary	Screws				56	NE	56
Dyed Carded Wool	Ancillary	Dyed Carded Wool				0.5	NE	0.5
Osmo Oil	Ancillary	Osmo Matt Clear				0.3	NE	0.3

Type	Material	Purchase UOM	Cost UOM	UOM Cost	Conv Factor	Costing Price	Waste	Costing Price Incl Waste	Tot Qty	PO Req	Cost
Hardwood	Elm 2"	FT3	M3	€ 113.00	35.314	€ 3,990.48	0.4	€ 5,586.67	0.098984892	3.49552476	€ 13,948.94
Ancillary	Furniture Connector Bolt 70mm	Each	Each	€ 0.30	1	€ 0.30	0.05	€ 0.32	35	35	€ 10.50
Ancillary	Cross Dowel 20mm	Each	Each	€ 0.16	1	€ 0.16	0.05	€ 0.17	35	35	€ 5.60
Ancillary	Dowel	Each	Each	€ 0.02	1	€ 0.02	0.05	€ 0.02	70	70	€ 1.61
Ancillary	Screws	Each	Each	€ 0.06	1	€ 0.06	0.05	€ 0.06	56	56	€ 3.22
Ancillary	Dyed Carded Wool	Kg	Kg	€ 200.00	1	€ 200.00	0.05	€ 210.00	0.5	0.5	€ 100.00
Ancillary	Osmo Matt Clear	Litre	Litre	€ 28.98	1	€ 28.98	0.15	€ 33.33	0.3	0.3	€ 8.69
<b>Total Cost</b>											<b>€ 14,078.56</b>

Project Costing



Gantt Chart



Photos: Conor Doherty



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# Completion

Heather is a shelving unit designed and made using Irish elm and Galway wool. It acts as a demonstrator for circular furniture design in Ireland, exploring what is realistically achievable when ecodesign principles are applied using local, renewable materials.

It features enclosed storage using felted wool tambour doors and sliding doors. The hand-felted wool doors are instantly recognisable as the Connemara landscape, which has been an inspiration during my studies. This design feature purposefully frames wool as a tactile surface worth looking at.

## Dimensions

L 1600 x W 350 x H 1700

## Materials

Irish Elm, Ballyhoura Fibres dyed Galway Wool

## Finish

Osmo Oil

