

GROUP NO: G13



Project Report

ETE 2112

**RETRACTABLE WALL CLOTH
HANGER**

By

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Abstract

The aim of the project is to produce a meaningful product that is useful to our community, students at large. Thus we decided to design a retractable wall cloth hanger. Currently there are some wall cloth hangers, but most of them are inefficient and costly for the use of the students. The result of the design process is to achieve a manufacturable product that is also cost-effective.

Acknowledgments

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1 Introduction

1.1 Background

Dressing is an integral part of human life thus it is necessary to manage them in a efficient way. As university students we have shortage of places to hang our cloths temporarily to remove the wetness accumulated during the day time. Thus most of the students resort to walls around their hostel/boarding places to put their dresses to dry or using their beds / chairs. It is quite uncomfortable to keep clothes outside the rooms and to keep them in chairs / beds. Thus it is necessary to identify a proper solution to the issue.

1.2 Problem

The problem we identified is that Students in hostels/boardings do not have a proper mechanism to store their sweaty clothes temporarily to dry them off after returning from outside.

1.3 Solution

As per above mentioned things, we have decided to create a retractable wall cloth hanger. It will be able to fit to a wall and be expandable / shrinkable on purpose while keeping the clothes hanging. The wall cloth hanger will save more space for students and will be a easier to operate as well. It will be cost-effective than most other solutions. It is more durable and has high strength.

2 Design Concepts

2.1 Design Process

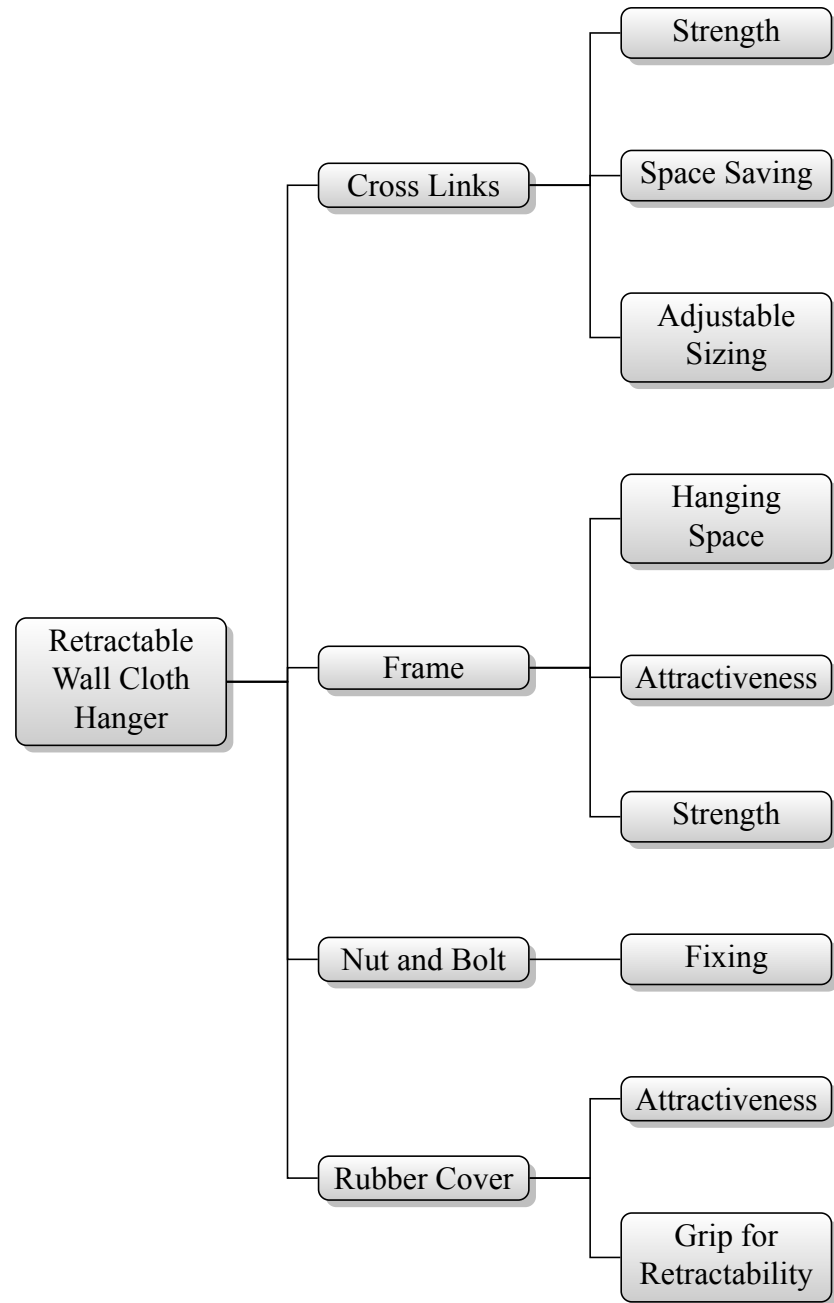
According to the model of French;

- First we had a problem of arranging clothes in a proper way. For that we decided to have a cloth hanger.
- After that we analysed our problem, and found out that the space is also limited and it must bear a lot of weight.
- Then We approached the issue as a whole problem, and created a conceptual design.
- Thereafter we decided to have a retractable wall clothes hanger which is space saving and strong.

2.2 Functional Analysis

In the functional analysis, we analyse the major functions of the proposed design of Retractable wall cloth hanger. Thus through this we aim to determine importance of the parts of the design.

Figure 1: Functional Analysis of Retractable Wall Cloth Hanger



2.3 Morphological Analysis

Morphological analysis is a technique that can be used to generate additional ideas for product concepts that would not normally spring to mind. The technique involves considering the function of a generic solution to a problem and breaking it down into a number of systems or subfunctions.[1, p. 77]

Table 1: Morphological Analysis of Retractable Wall Cloth Hanger

#	Function	Option 1	Option 2	Option 3	Option 4
A	Hanging Method	Hangers	Rods	Hooks	Springs
B	Frame Material	Stainless Steel	Plastic	Wood	Aluminum
C	Frame Fixing method	Welding	Nut and Bolt	Riveting	Glueing
D	Cross Link Material	Stainless Steel	Plastic	Wood	Aluminum
E	Cross Link Fixing	Nut and Bolt	Riveting	Bearings	
F	Cross Link Pieces	1	2	3	4
G	Method of wall fix	Glueing	Anchor Bolt	Hooks	
H	Grip Material	Rubber	Plastic	Matte Cloth	
I	Grip Style(Pattern)	Criss-cross Knurling	Spiral Knurling		

Design Concept 1

Design Concept 2

Design Concept 3

2.4 Weighted Descision Matrix

A weighted decision matrix is a tool used to compare alternatives with respect to multiple criteria of different levels of importance. It can be used to rank all the alternatives relative to a “fixed” reference and thus create a partial order fo the alternatives.[2]

Table 2: Weighted Decision Matrix of Retractable Wall Cloth Hanger

Selection Criteria	Design Concept 1		Design Concept 2		Design Concept 3		Weight
	Rate	Score	Rate	Score	Rate	Score	
Durability	5	1.25	4	1	3	.75	25%
Ease of Use	5	0.25	4	0.2	3	.15	5%
Ease of Manufacturing	3	0.3	2	0.2	5	.5	10%
Strength	5	1.25	4	1	4	1	25%
Cost	2	0.1	1	0.05	2	0.1	5%
Stability	4	0.6	5	0.75	2	0.3	15%
Attractiveness	4	0.2	3	0.15	5	0.25	5%
Effective	3	0.3	3	0.3	3	0.3	10%
Total	4.25		3.65		3.35		
Rank	1		2		3		
Develop	Yes		No		No		

Table 3: Weighted Design Matrix Legend

Rate	Decision
1	Not Satisfactory
2	Satisfactory
3	Good
4	Very Good
5	Excellent

3 Proposed Design

3.1 Dimensions

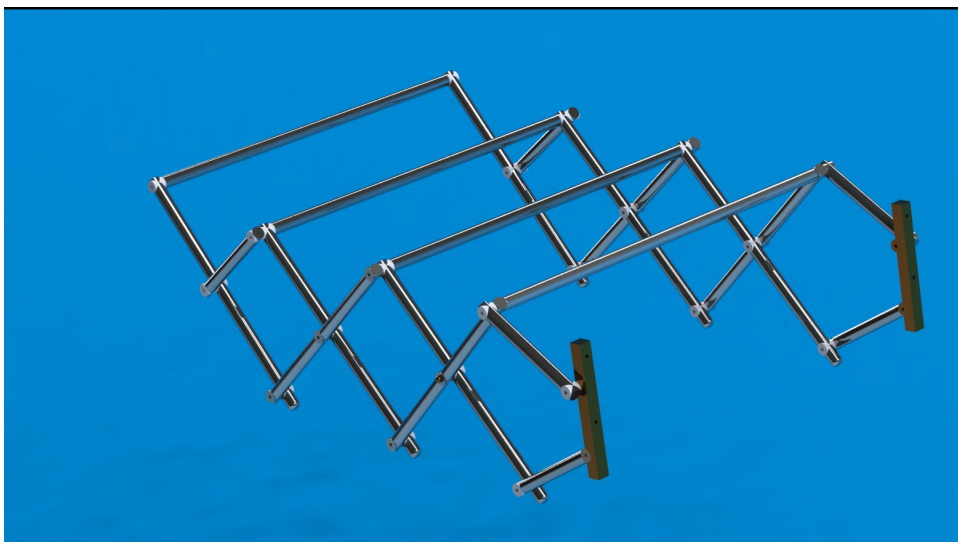
Expanded Length = 1 meter

Retracted Length = 50 cm

Length of Rod = 80cm

3.2 3D Design

Figure 2: 3D Photo of the Retractable Wall Clothes Hanger



References

- [1] Peter R.N. Childs. *Mechanical Design Engineering Handbook*. Elsevier, 2014, p. 77.
- [2] Fil Salustri. *Weighted Decision Matrix*. https://deseng.ryerson.ca/dokuwiki/design:weighted_decision_matrix. June 23, 2018 (accessed February 8, 2019).