



PROJECT Compilation (15th Feb 2023)

DES _ Exploration on BAMBOO JOINERY

Guided by Prof. Avinash Shende

Submitted by Infant Bibin 216130007

Approval Sheet

The Design Exploration Seminar project titled as “EXPLORATION ON BAMBOO JOINERY” by Infant Bibin, Roll no.216130007 is approved in partial fulfilment of the requirement for the degree of “Master of Design” in Industrial Design.



Guide: Prof. Avinash Shende

About the project

This joinery exploration project is focused on studying and understanding the potential of bamboo as a versatile material for varied application and how its functionality can be maximized by creating a new joinery system. Project aims to create a new joinery system rather application centric that can be scalable, adaptable and has a unique growth combination for varied creative applications. This new joinery system aims to connect bamboo strips or solid bamboos without any external puncturing or carpentry tooling but with the use of tensional/ elastics members.

Joineries with new element

Cork joinery



Existing mechanisms as joinery



Metal joinery



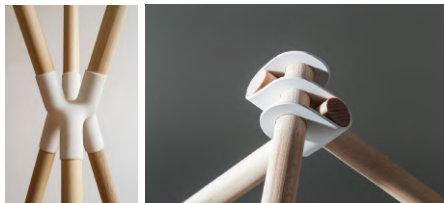
Metal joinery



Initial research focuses on understanding existing joineries and their making and applications. Then the research was divided into two, studying bamboo joineries that are completely made with just tooling on bamboo, secondly other types of joineries that use other materials and products to join bamboo.

Joineries with new element

Sheet and pipe metal joinery



High resistance Flexible
joinery



Elastic joinery



Tensional joinery



Joineries without new element

Rope joinery



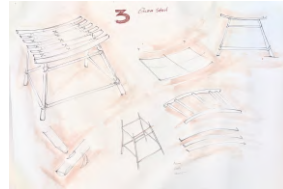
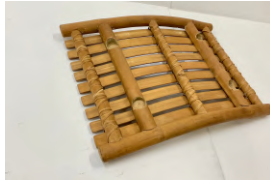
Interlocking



Interlocking



Tenon and Mortise Joint



Joineries without new element

Weave Joinery



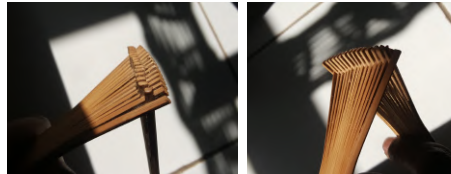
Weave Joinery

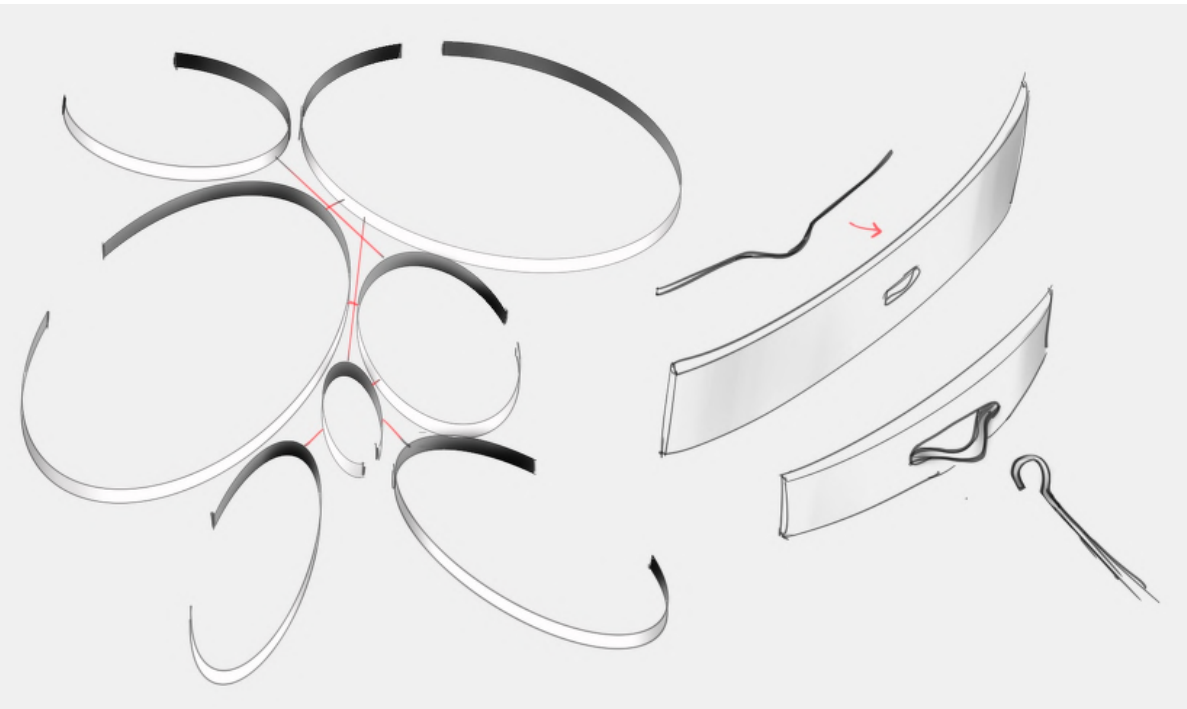


Subtracted form
Joinery



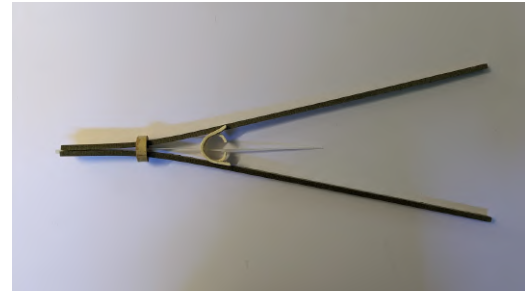
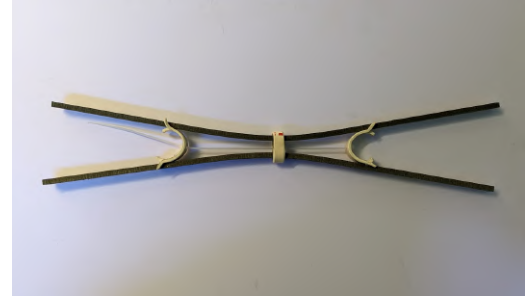
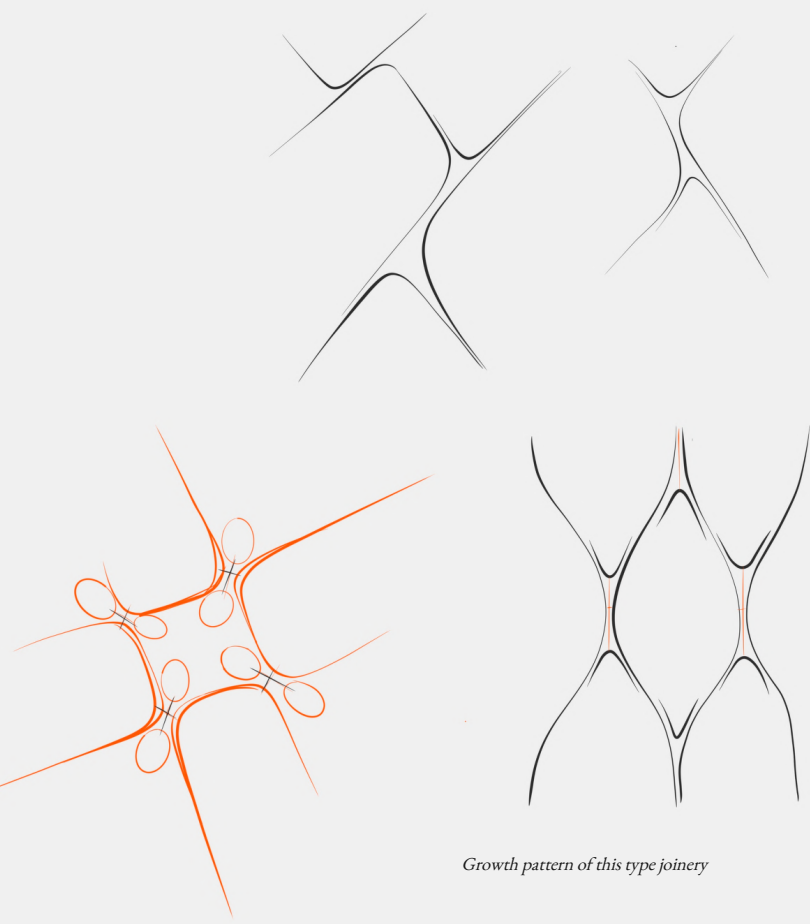
COMPRESSION
Joinery





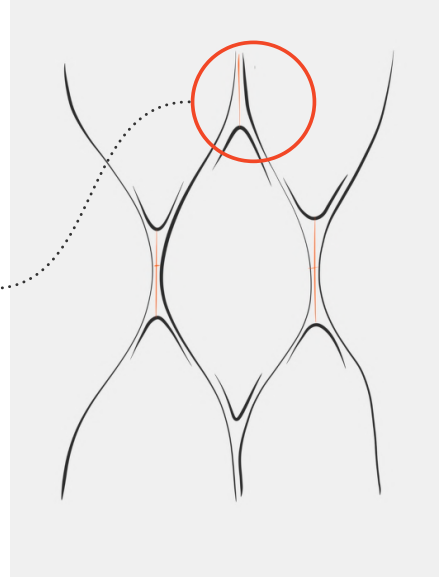
Ideation 2

Joinery that aims to connect bent bamboo strips with reduced puncturing area but with the use of tension.

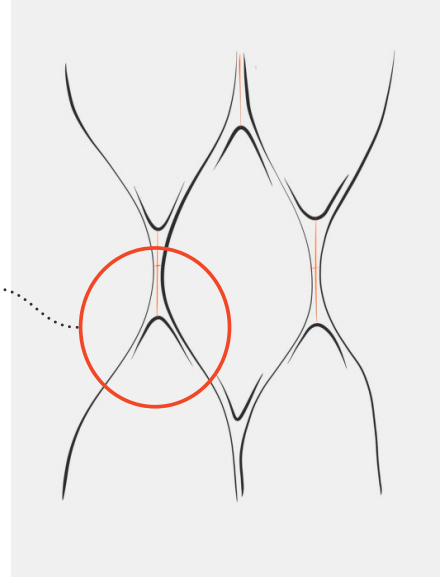
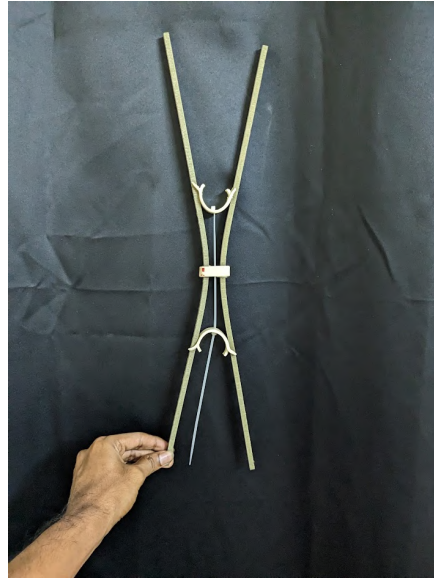
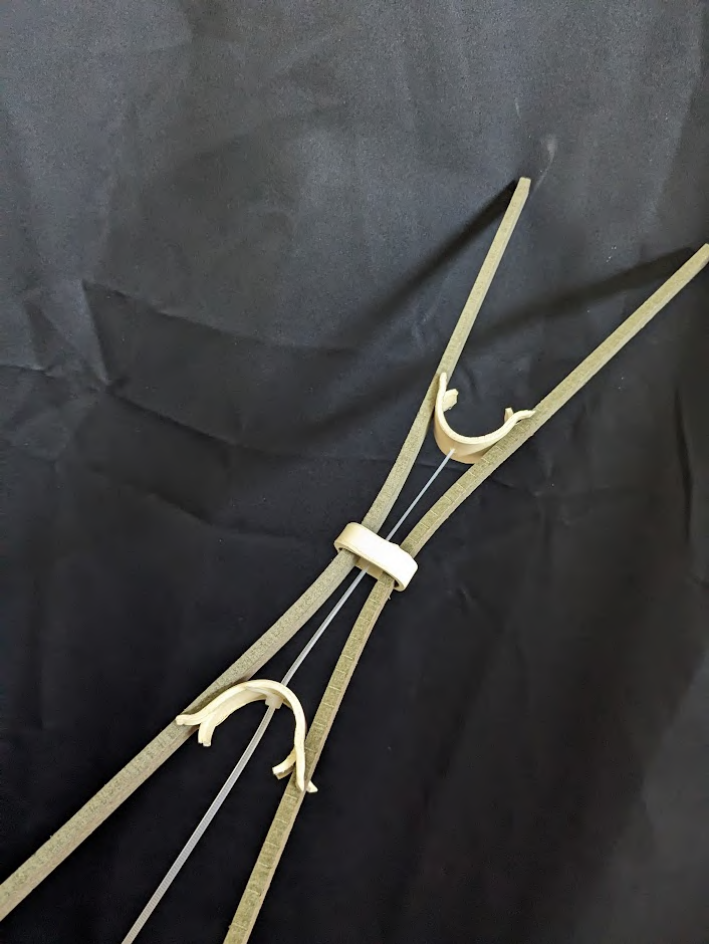


Ideation 2

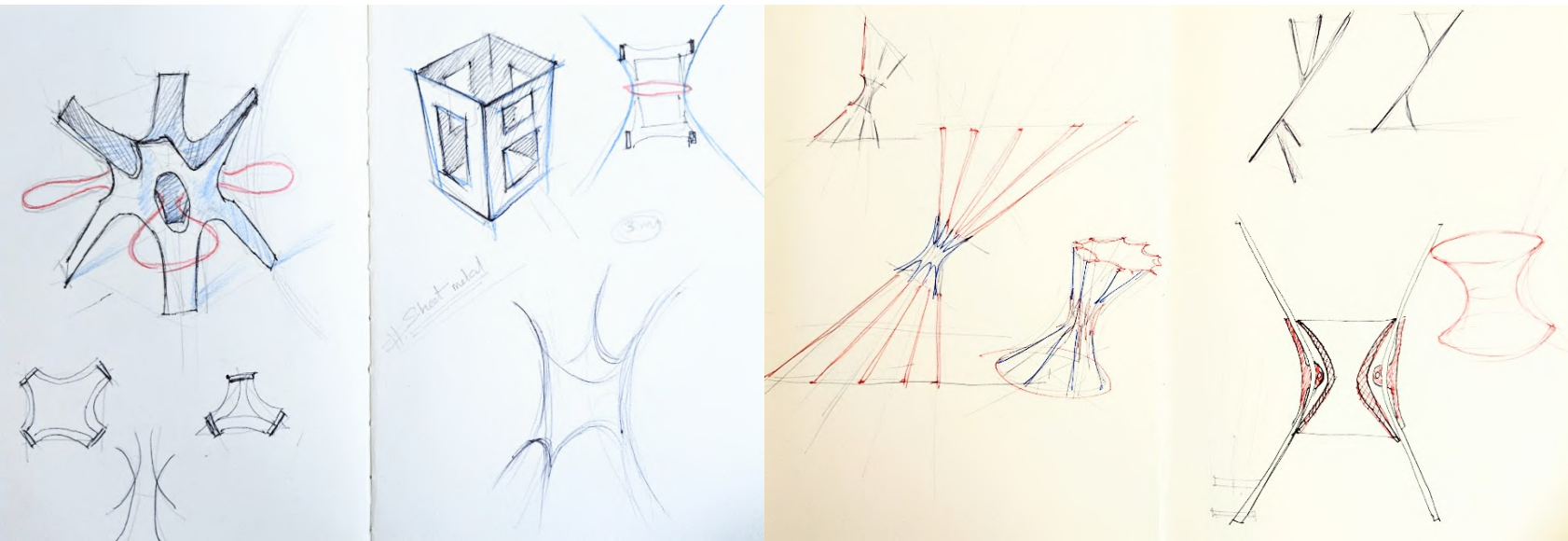
Joinery that aims to connect bent bamboo strips without puncturing but with the use of tension.



Ideation 2_ *End module joinery*

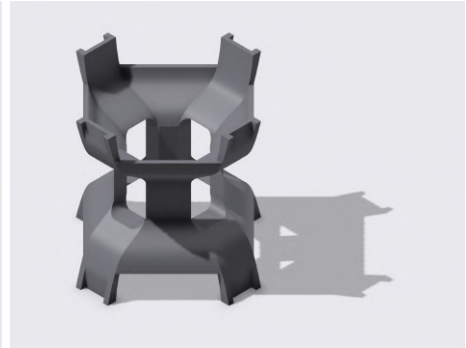
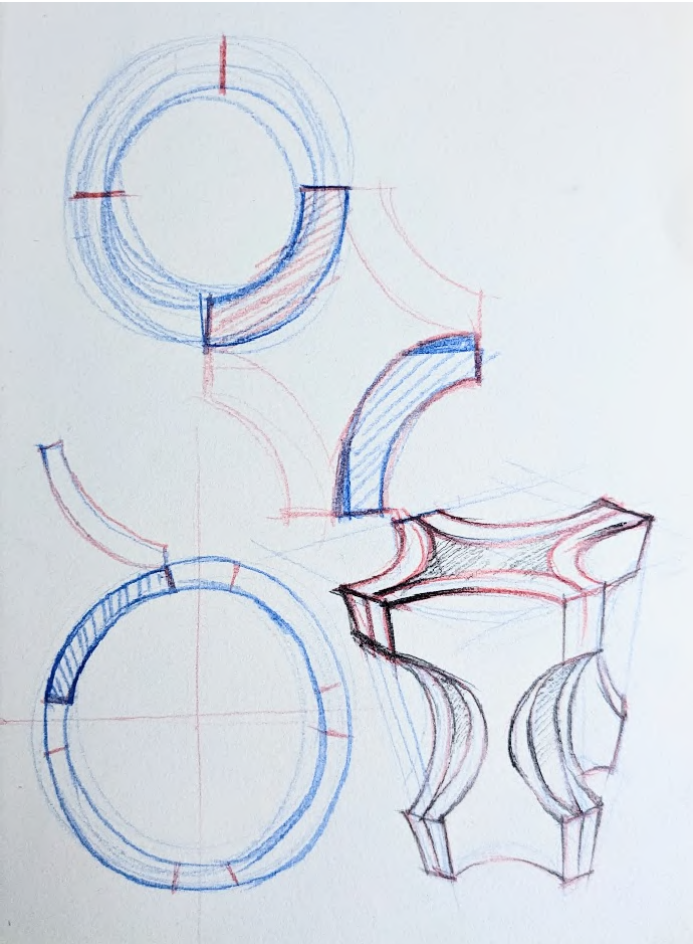


Ideation 2_ *Mid module joinery*

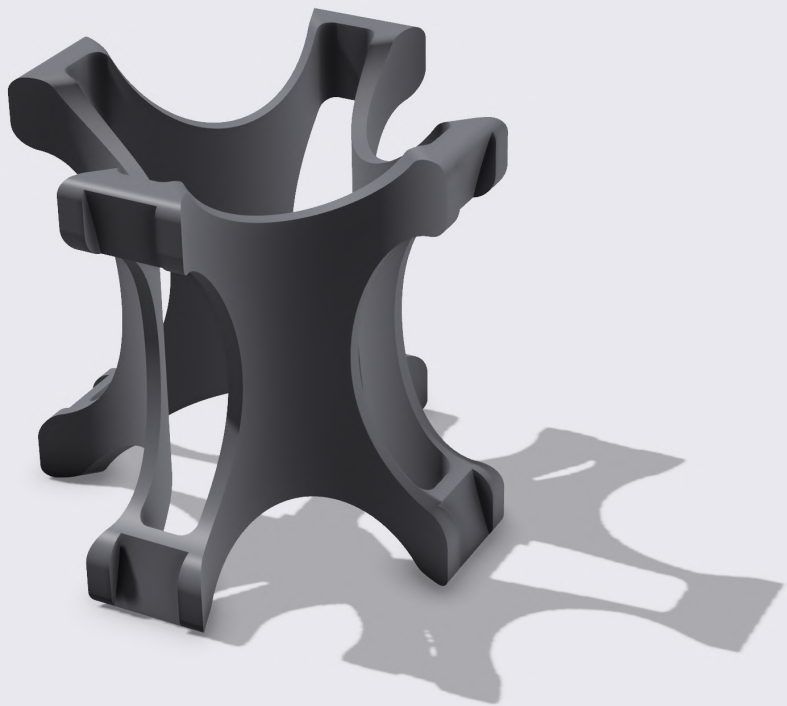


Ideation 3

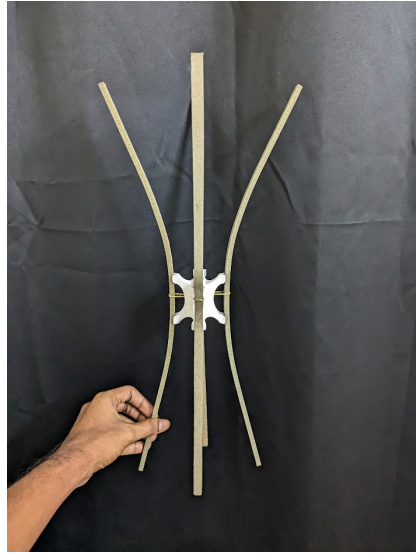
Central joinery system aiming to utilize tension along a loop integrated within the system to hold bamboo in position.



Ideation 3 _ 3D form of the joinery



Ideation 3



Ideation 3



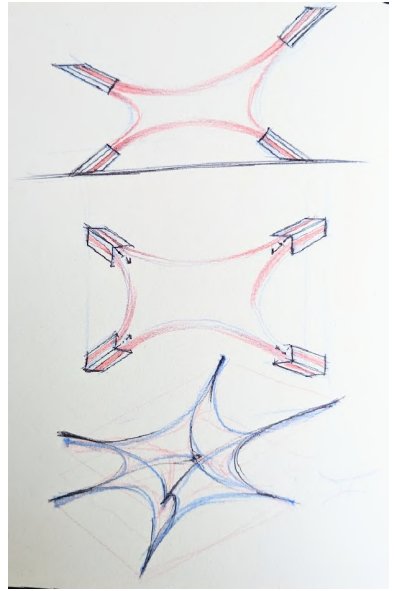
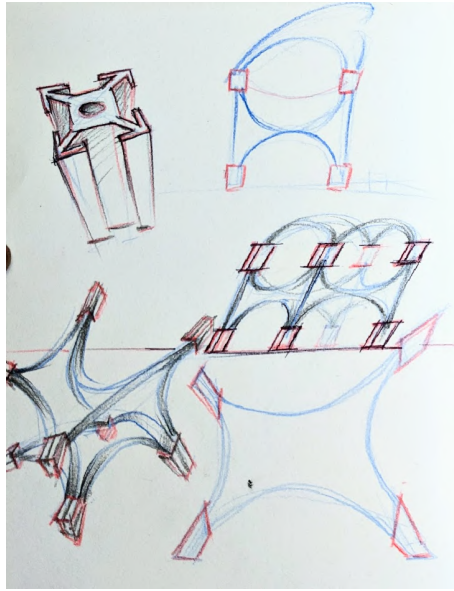
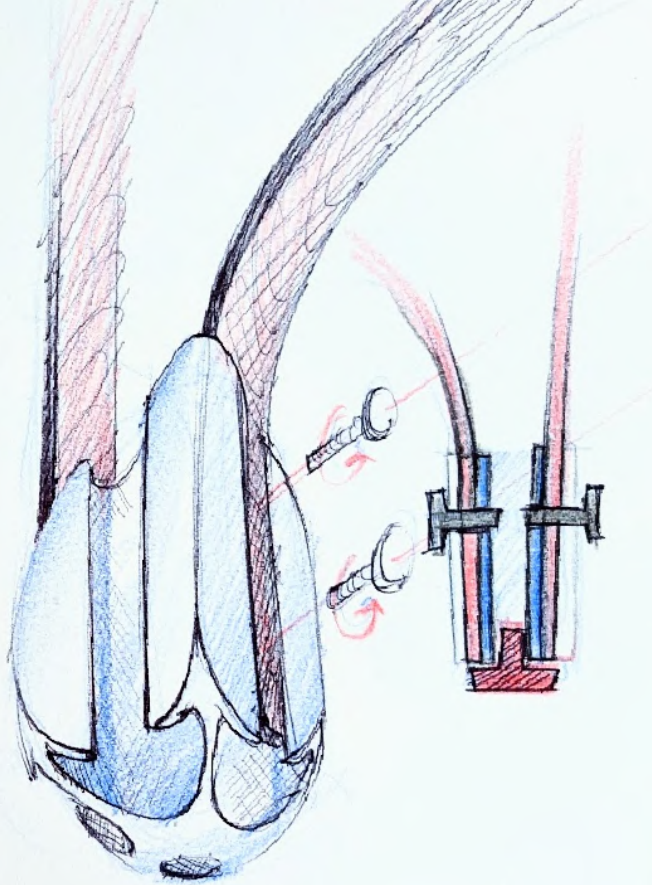


Ideation 3.1

Similar central joinery system but aiming to utilize tension linearly integrated within the system to hold bamboo in position.

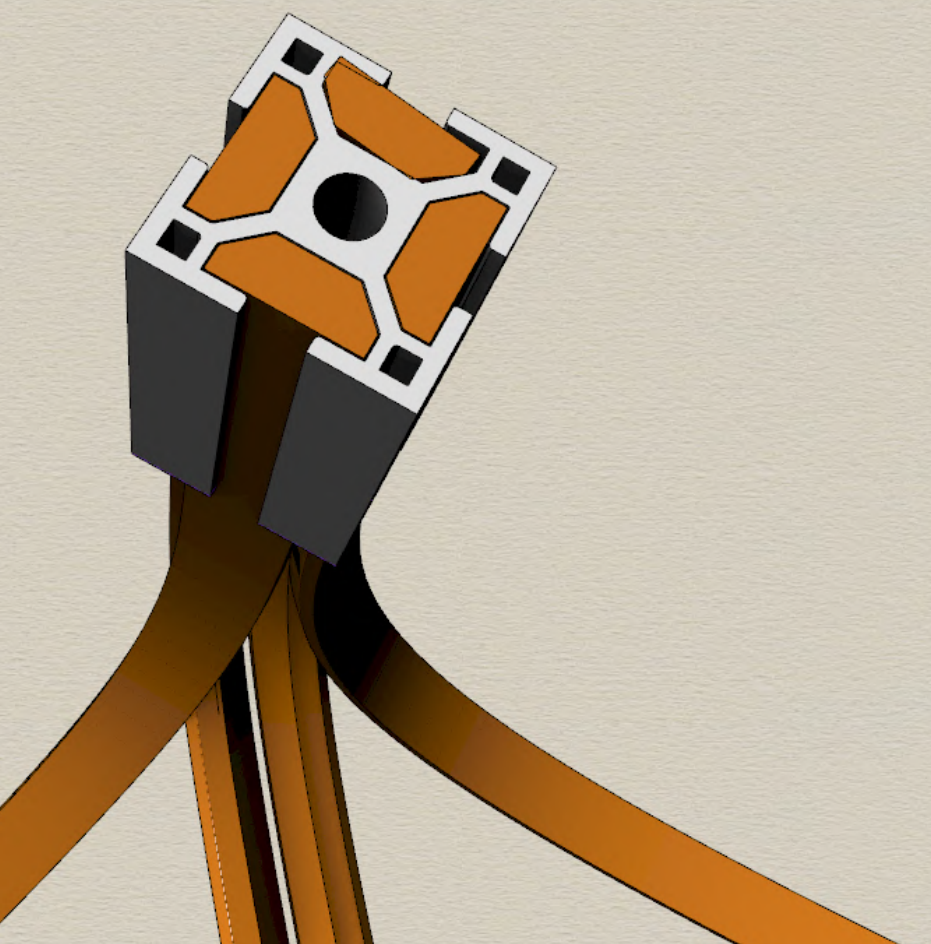


Ideation 3.1



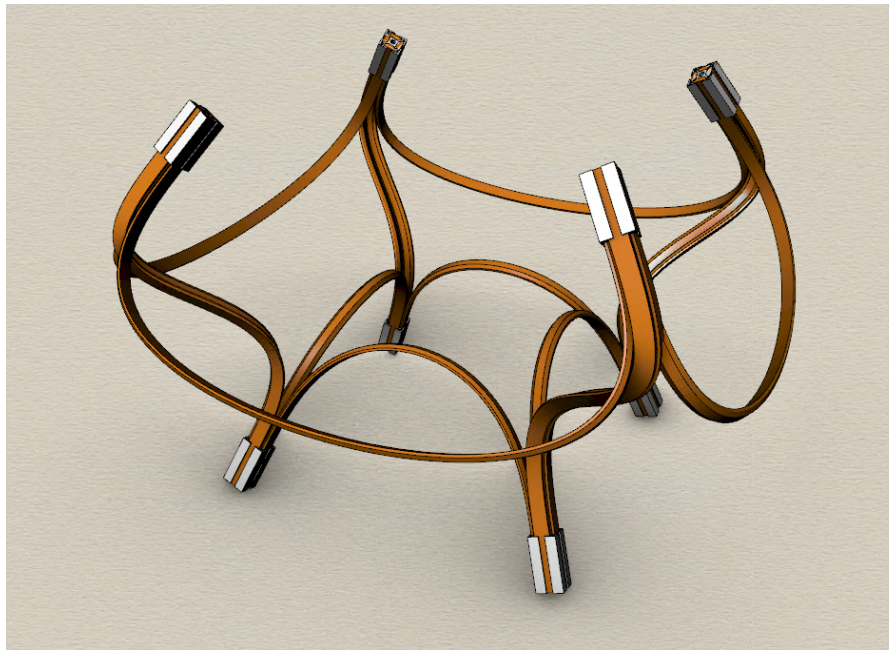
Ideation 4

Aluminium section as a corner joinery to achieve complex forms

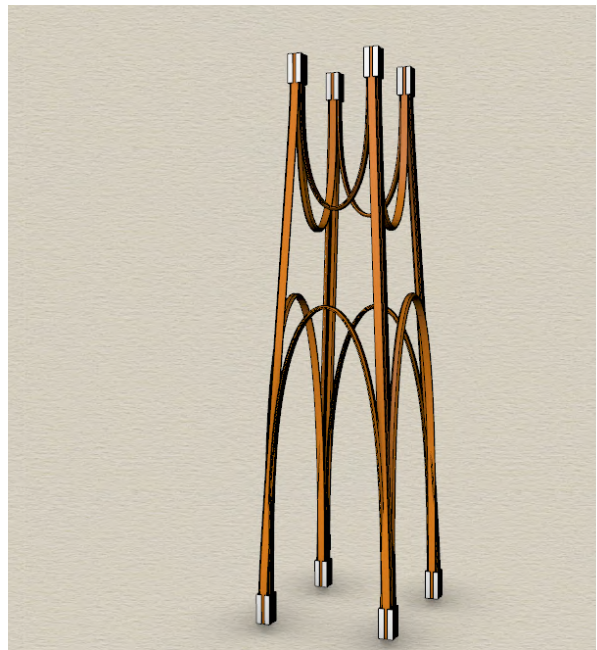


Ideation 4 - Detail

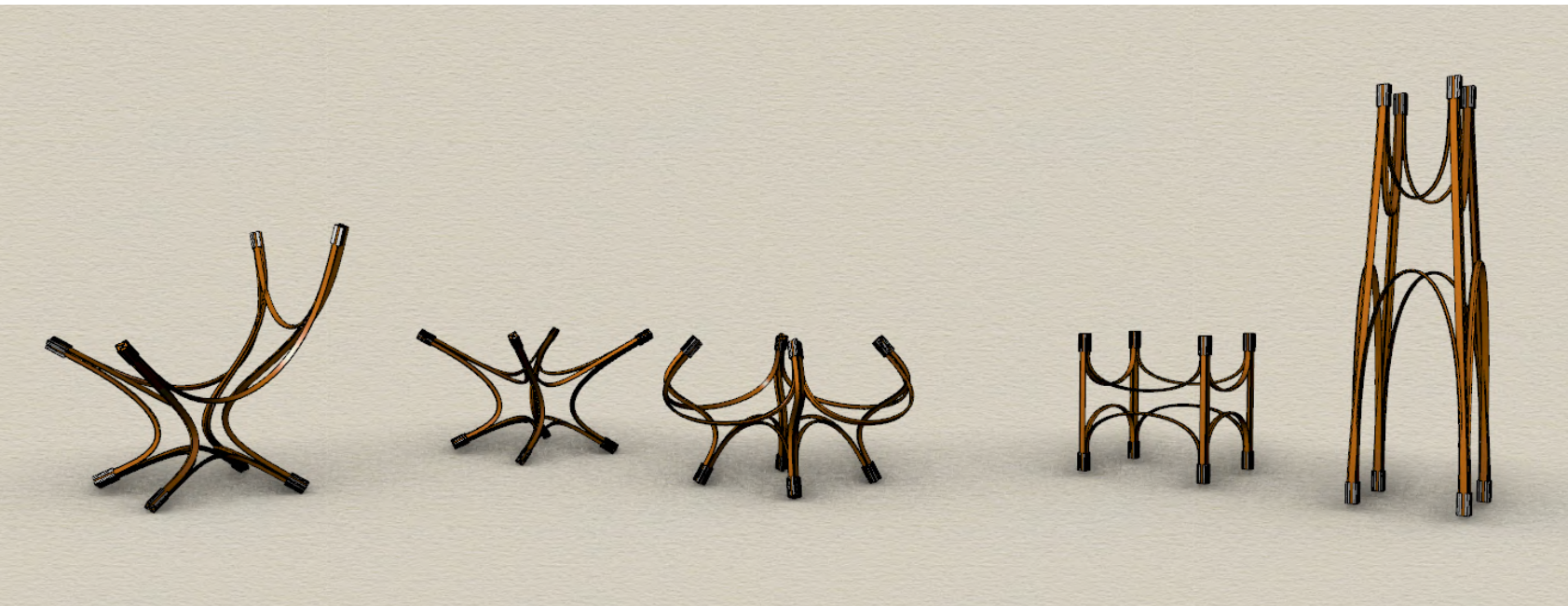
Aluminium section as a corner joinery



Ideation 4 - iterations



Ideation 4 - iterations



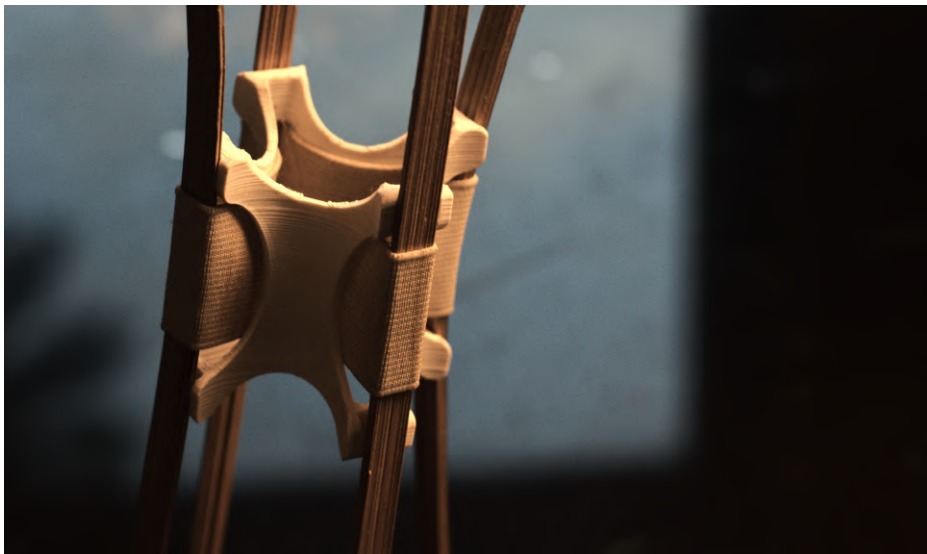
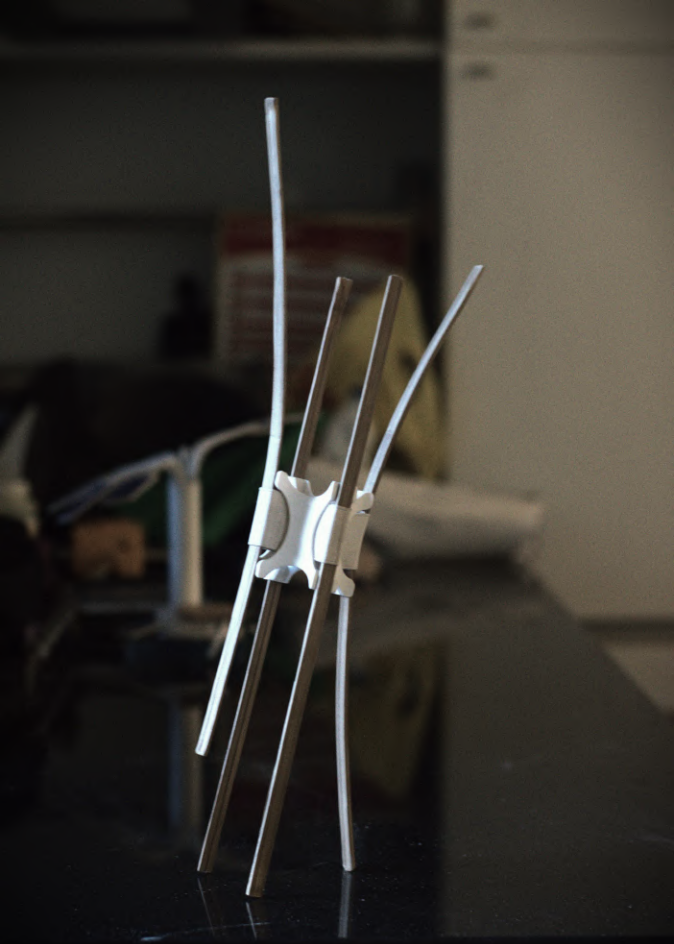
Ideation 4 - iterations

Final Joinery System Design

Initial ideations are made mostly using physical mockups for better understanding of joineries.

These explorations are mostly based on Tensional Member based joinery and aluminum cross sections based. Of which joineries developed with tensional members (Knitted elastic, elastomers) shows better functionality for special applications that demands collapsibility, easy assembly etc.

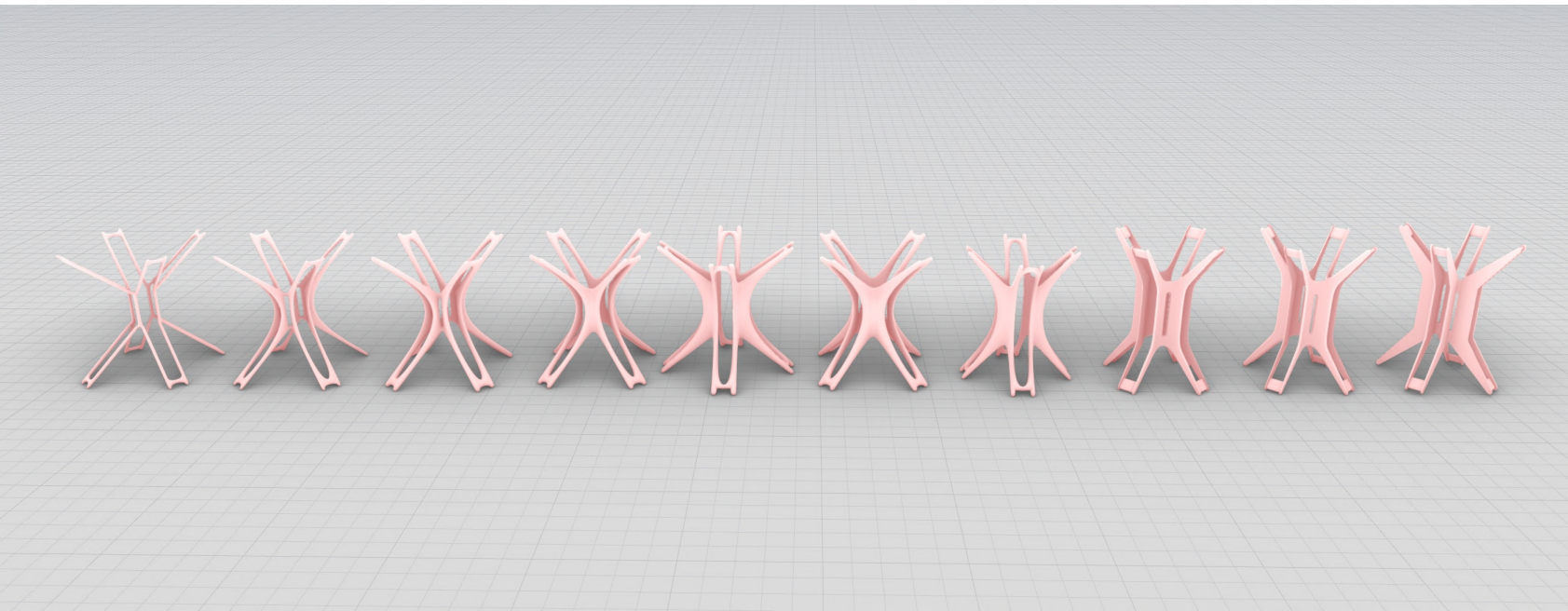
Ideation 3 can be a potential Parametric Joinery System, since this joinery is developed as a system to be flexible to cater various applications. So this joinery system can be used to join (x) number of bamboo linearly or circular or any curvilinear form and even variable dimensions within the joinery is possible to achieve complex forms.



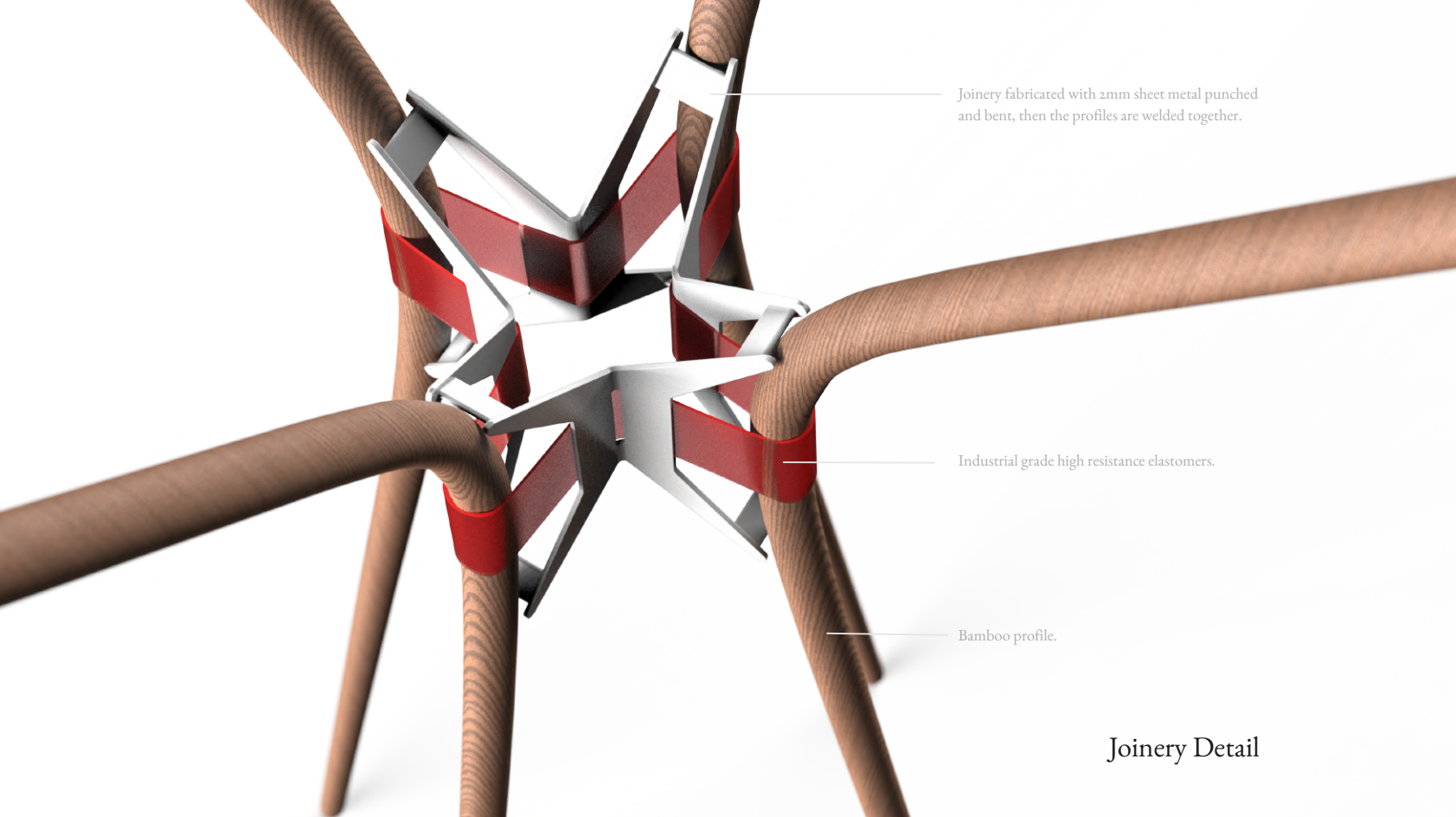
Final Joinery Design Conceptualized as Table lamp which can be adjustable to various angles, can be collapsed as ease



Final Joinery Design Conceptualized as Coat hanger.



Joinery fORM iterations

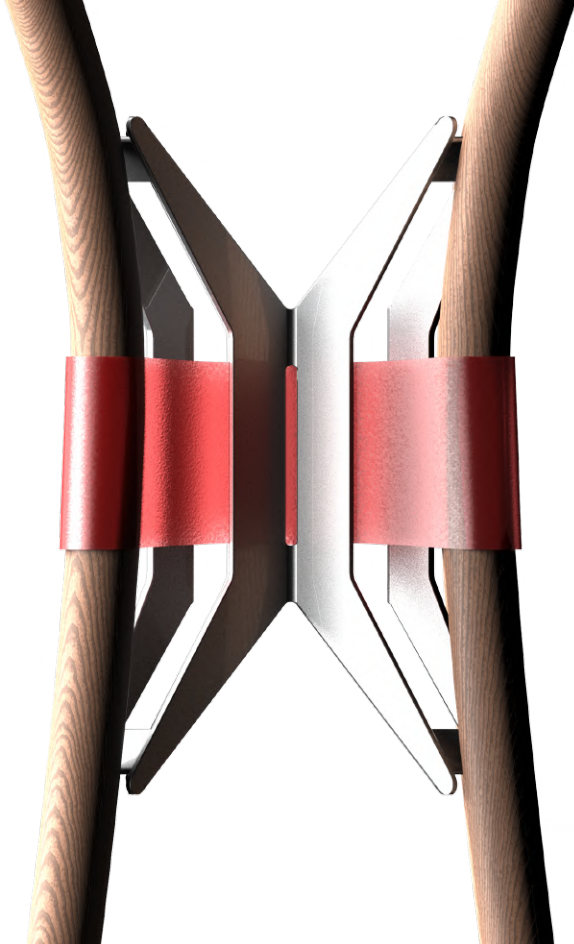


Joinery fabricated with 2mm sheet metal punched and bent, then the profiles are welded together.

Industrial grade high resistance elastomers.

Bamboo profile.

Joinery Detail



Joinery Application

Numerous possible applications can be derived using this joinery system, one such application is this Coat Hanger Design using the new bamboo joinery, making the hanger easy to assemble and easy to dismantle to flat pack.

End