# James Wolf
# Bamboo Master:
# The Journey


AP Photo

RHODE·ISLAND·SCHOOL·OF·DESIGN·1877·
RISD

1995

BALI

DENPASAR

WORLD BAMBOO CONGRESS
Bali 1995


bamboohardwoods®
SINCE 1995

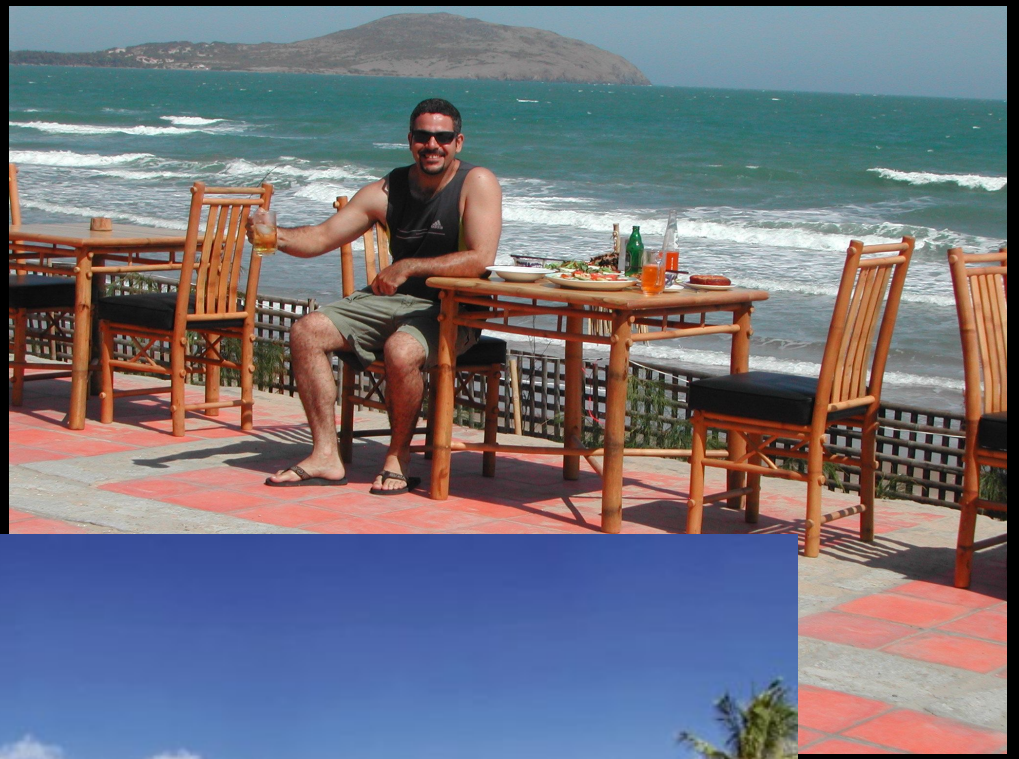

3B 01 39

- Energy Consumption
- Glue Use
- Machining
- Waste
- Dust Extraction


SUNGSHIN VIETNAM

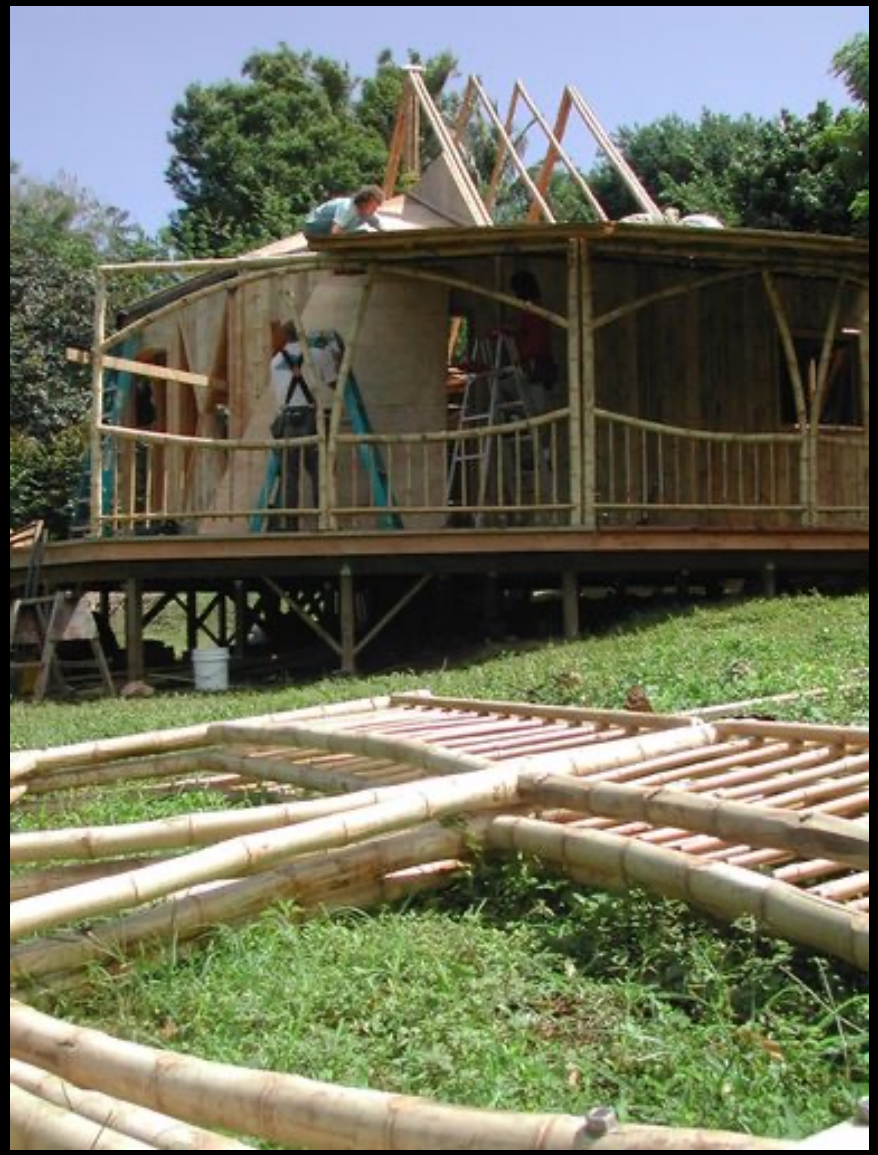
Vietnamese Tam Vong

Vietnamese Tre Gai




Bamboo Village

BAMBOO LIVING



BAMBOO HARDWOODS / BAMBOO LIVING  is the only builder of bamboo houses that passes US building code.

INTERNATIONAL STANDARDS FOR BAMBOO CONSTRUCTION

- TYPE OF BAMBOO
- LOCATION OF BAMBOO SOURCE
- CHAIN OF CUSTODY
- SPOT CHECKING BY 3rd PARTY INSPECTORS
- ADHEREANCE TO ESTABLISHED SPECIFICATION
- ENGINEERING APPROVAL FOR EVERY BUILDING
- FEES FOR TESTING
- FEES TO REMAIN in the program
- FEES FOR EVERY BUILDING

- Close to half a million dollars spent and continuing fees required to sell “approved” bamboo houses in the USA.

Tre Vang specialises in high quality design, development and production in bamboo and other materials. Our Bamboo Masters can provide you with the finest quality bamboo construction, materials and products.

Bamboo

Bamboo is the worlds fastest growing plant.

Tre Vang sustainably manages our bamboo plantations and we only buy the finest poles when we purchase from farmers and dealers. We practice more than Fair Trade by paying more and we teach and reward growers for switching to more sustainable practices.

- Commercial Construction
- Custom Furniture
- Construction Materials
- High Quality Production
- Export FOB by Container Load
- Local Projects by Contract

# BAMBOO MASTERS

TRE VANG
BAMBOO MASTERS

www.trevang.com.vn

High Quality Bamboo Production, Design and Materials.

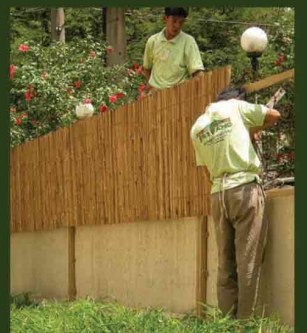
TRE VANG
BAMBOO MASTERS

www.trevang.com.vn

## Commercial Construction

## Custom Furniture

High design and originality is what set TreVang apart from the rest. We provide actual creation of what others couldn't dream of and can't produce. Skill, patience, engineering and experience guide us to the top as well. RISD graduate, James Wolf leads the design process and works together to direct and teach his talented craftspeople. Wolf also keeps comunications with clients precise, clear



At TreVang, we select, treat and work with only a few types of bamboo the species that have proven themselves to be the "premium species", surpassing the strength, stiffness, logevity and insect resistance of other bamboos.

**Furniture & Custom Construction**
We can build to your specifications, or offer you our designs.
Furniture Examples: Mirrors, beds, chairs, sofa, tables, shop fixtures, displays…
Construction Examples: Fences, entry gates, bars, gazebos, restaurant décor, spa details…

**High Quality Manufacturing**
Tre Vang is consistantly manufacturing the most exacting standards of high quality bamboo producst to clients in USA, Europe and Japan. We understand bamboo and how important quality is to building a sustainable brand with bamboo products.

www.trevang.com.vn


ALLEZ BOO
Happy hour
from 8pm-to 11pm
Buy 2 cocktail
get 1 Free


ALLEZ BOO


ALLEZ BOO
ALLEZ BOO
ALLEZ BOO

You think I’m playin’

**Green Elf Toyworks**

100% Bamboo construction
Handmade
Water-based Finishes
EN71/3 safety rating CE
Award winning green design EU

Ride the Smooth Vibes


XE
THỂ THAO
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CYCLE MODE
international
11/6 7 8
スポーツバイクの
JBCF 幕張クリテリウム &
幕張エンデューロ


SHIMANO
boo
BICYCLES


ZTR ARCHEX
SCHWALBE




Gavel Worlds #1
National Championship #1
Miami Vuelta #1
Crusher in the Tushar #1
Ridden by Team USA in the CX World and National Championships (podium finishes)


TRAINING PEAKS
boo


boo
boo
boo
boo
PACTIMO

First Place Finish
Single Speed
Gravel Worlds 2019


boo


BAMBOO
MASTER

Bamboo Master Farm


BAMBOO
MASTER


BAMBOO
MASTER

Bamboo + Shipping Container = HOME

Bamboo Master NEW Factory


BAMBOO
MASTER


HANDLE WITH CARE

whkmp's own loungebank Long Island ...
wehkamp.nl

whkmp's own hemelbed Long Isla...
wehkamp.nl

whkmp's own kussenh...
wehkamp.nl · In stock

whkmp's own ligbed Long Island | wehka...
wehkamp.nl · Out of stock

whkmp's own loungeset + hocker Lon...
wehkamp.nl

Lounge set — Mocadazu luxury bamboo tents
mocadazu.com · In stock

whkmp's own tuinkruk ...
wehkamp.nl

whkmp's own loungebank Long Island...
pinterest.com

whkmp's own loungeset Long Island | w...
wehkamp.nl

whkmp's own buitenkleed Long I...
wehkamp.nl


HANDLE WITH CARE


HANDLE WITH CARE


HANDLE WITH CARE

Go with the flow…

ZEN GARDEN
+ BAMBOO

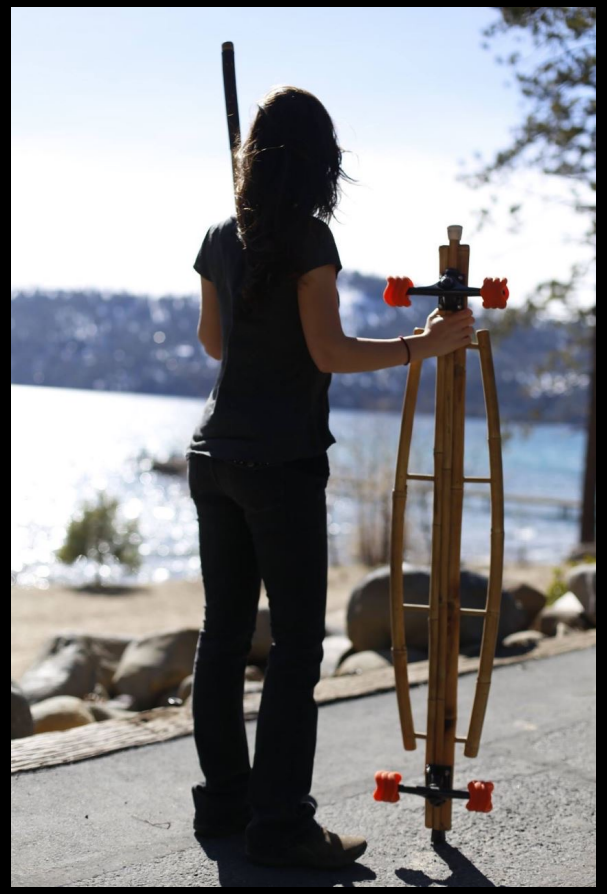

BAMBOO ACCENTS
BAMBOO WATER SPOUT & PUMP
FOUNTAIN KIT
7" THREE-ARM
FITS 6"~15" DIAMETER BOWL
TURN ANY CONTAINER
SUBMERSIBLE
FOUNTAIN PUMP
50 GPH (2-wire)
HANDMADE WITH 100% NATURAL BAMBOO

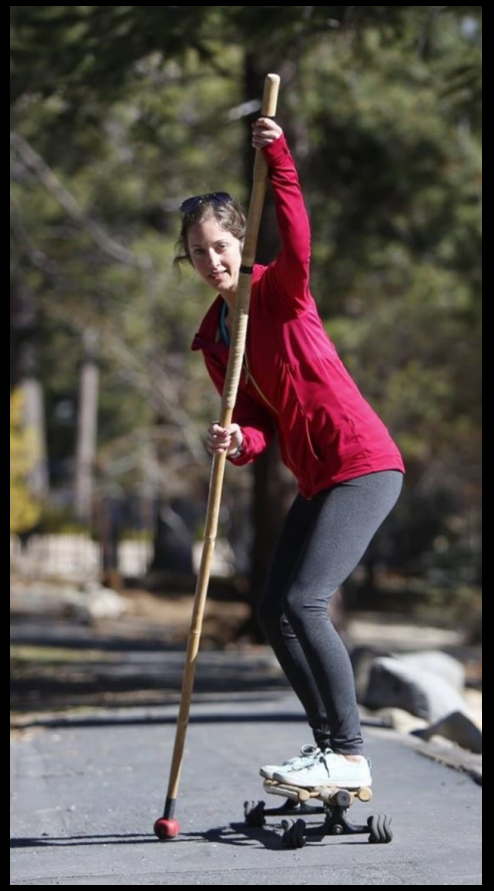




# Stick It

STREET SUP





# Stick It

STREET SUP


MAROU
FAISEURS DE CHOCOLAT
SAIGON
Sô Cô-La Đen
Tiên Giang 70%
SINGLE ORIGIN
DARK CHOCOLATE


MAROU
FAISEURS DE CHOCOLAT


MAROU
FAISEURS DE CHOCOLAT

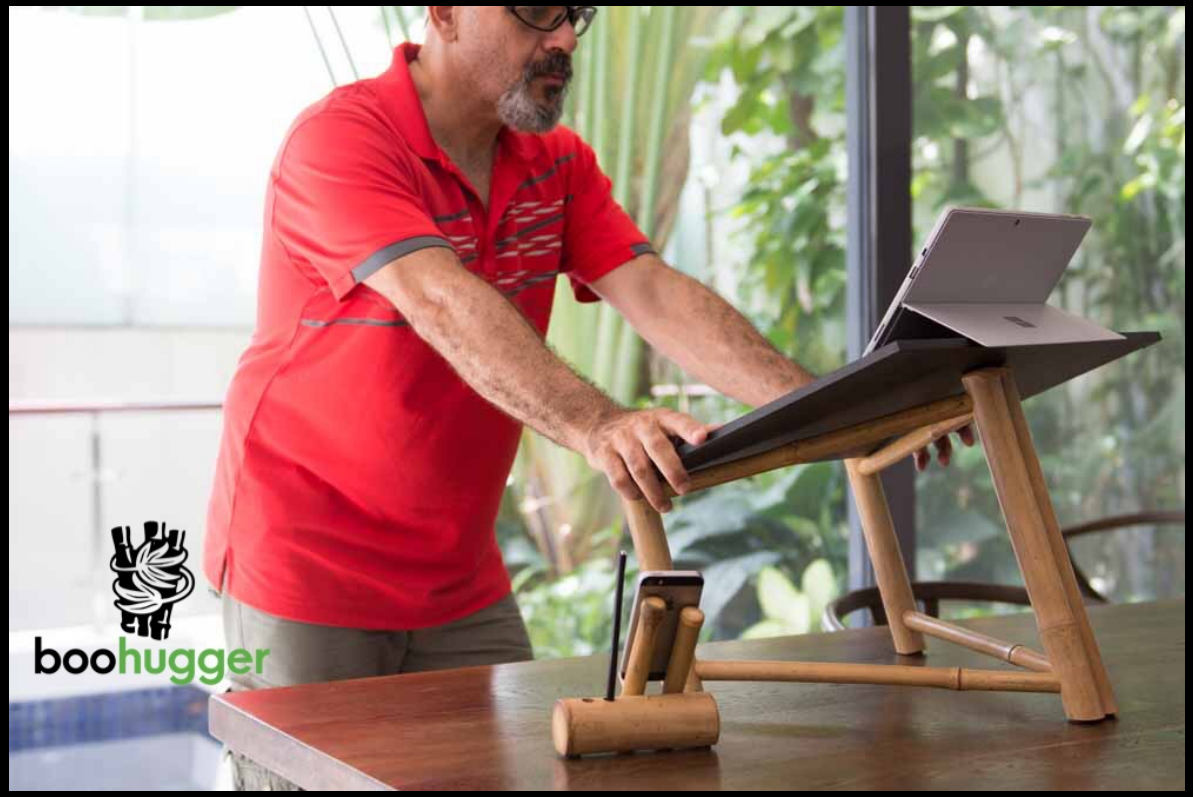

MAROU
FAISEURS DE CHOCOLAT
MAROU

# boohugger


boohugger


HANDMADE • BAMBOO • GOODS
boohugger
www.boohugger.com

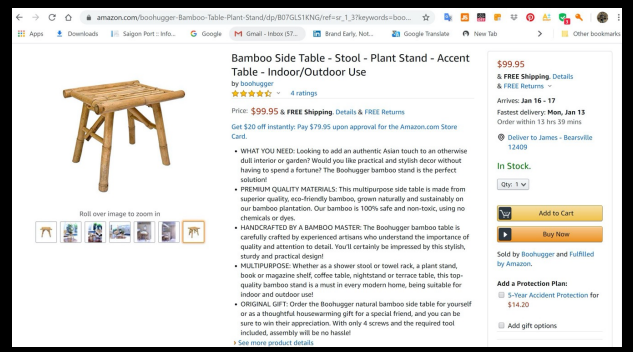

boohugger

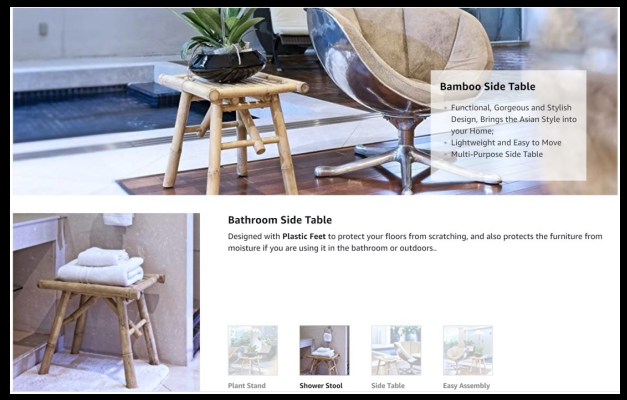

boohugger

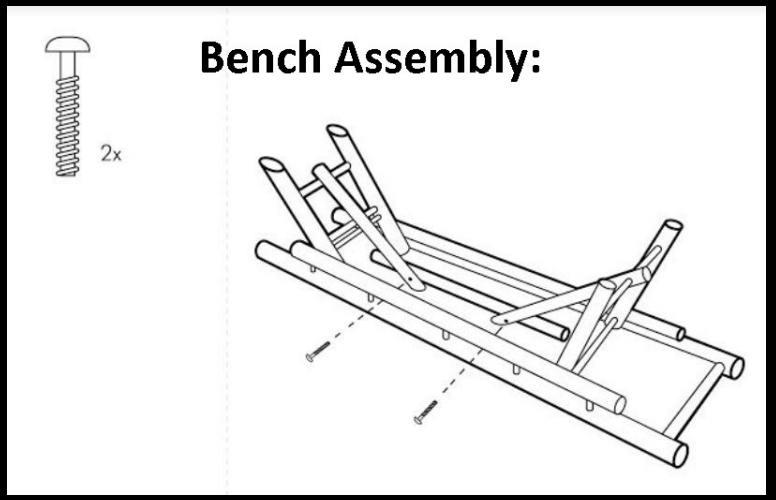

boohugger

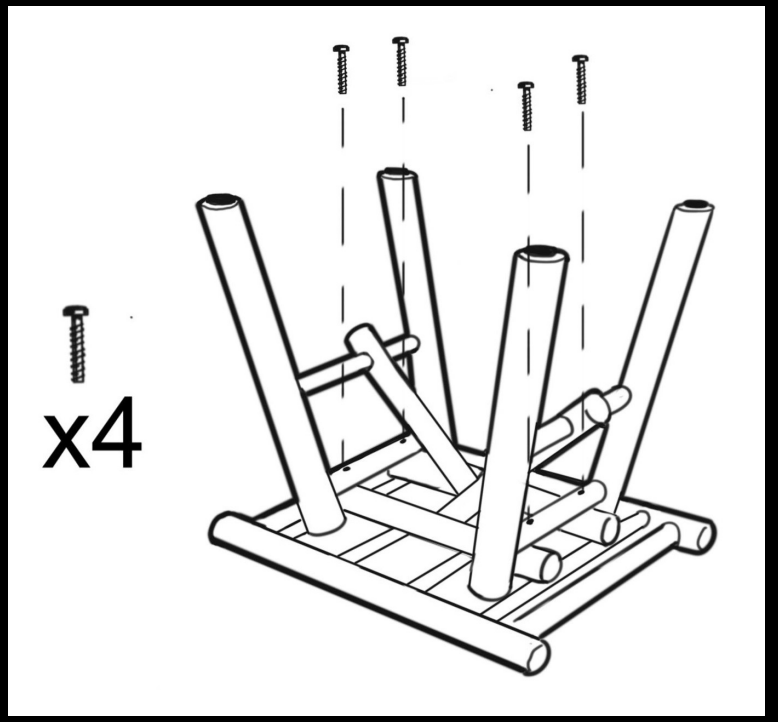

DESIGN
DESIGN


boohugger
THIS BAMBOO SIDE TABLE IS STRONG ENOUGH TO BE USED AS A STOOL OR EVEN A PLANT STAND.
Plantation grown and handmade in Vietnam
www.boohugger.com
X001V7O3SR
boohugger Bamboo Side Table
New

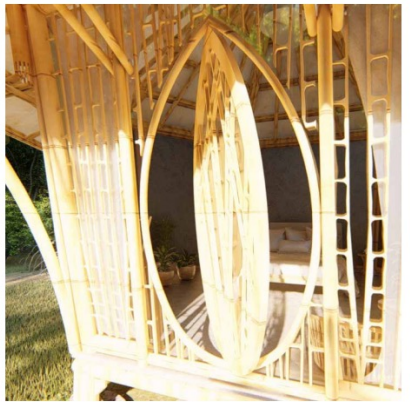

Bamboo Side Table - Stool - Plant Stand - Accent Table - Indoor/Outdoor Use
by boohugger
4 ratings
Price: $99.95 & FREE Shipping. Details & FREE Returns
Get $20 off instantly: Pay $79.95 upon approval for the Amazon.com Store Card.
WHAT YOU NEED: Looking to add an authentic Asian touch to an otherwise dull interior or garden? Would you like practical and stylish decor without having to spend a fortune? The Boohugger bamboo stand is the perfect solution!
PREMIUM QUALITY MATERIALS: This multipurpose side table is made from superior quality, eco-friendly bamboo, grown naturally and sustainably on our bamboo plantation. Our bamboo is 100% safe and non-toxic, using no chemicals or dyes.
HANDCRAFTED BY A BAMBOO MASTER: The Boohugger bamboo table is carefully crafted by experienced artisans who understand the importance of quality and attention to detail. You'll certainly be impressed by this stylish, sturdy and practical design!
MULTIPURPOSE: Whether as a shower stool or towel rack, a plant stand, book or magazine shelf, coffee table, nightstand or terrace table, this top-quality bamboo stand is a must in every modern home, being suitable for indoor and outdoor use!
ORIGINAL GIFT: Order the Boohugger natural bamboo side table for yourself or as a thoughtful housewarming gift for a special friend, and you can be sure to win their appreciation. With only 4 screws and the required tool included, assembly will be no hassle!
See more product details
$99.95
& FREE Shipping. Details
& FREE Returns
Arrives: Jan 16 - 17
Fastest delivery: Mon, Jan 13
Order within 13 hrs 39 mins
Deliver to James - Bearsville 12409
In Stock.
Qty: 1
Add to Cart
Buy Now
Sold by Boohugger and Fulfilled by Amazon.
Add a Protection Plan:
5-Year Accident Protection for $14.20
Add gift options

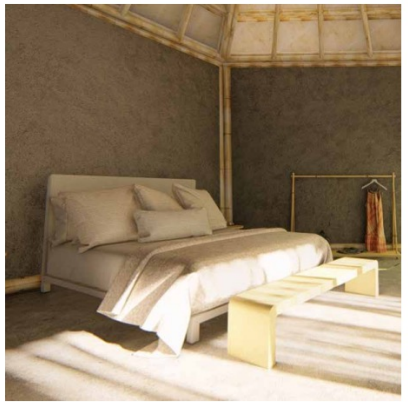

Bamboo Side Table
Functional, Gorgeous and Stylish Design, Brings the Asian Style into your Home;
Lightweight and Easy to Move
Multi-Purpose Side Table
Bathroom Side Table
Designed with Plastic Feet to protect your floors from scratching, and also protects the furniture from moisture if you are using it in the bathroom or outdoors..
Plant Stand
Shower Stool
Side Table
Easy Assembly


2x
Bench Assembly:


x4

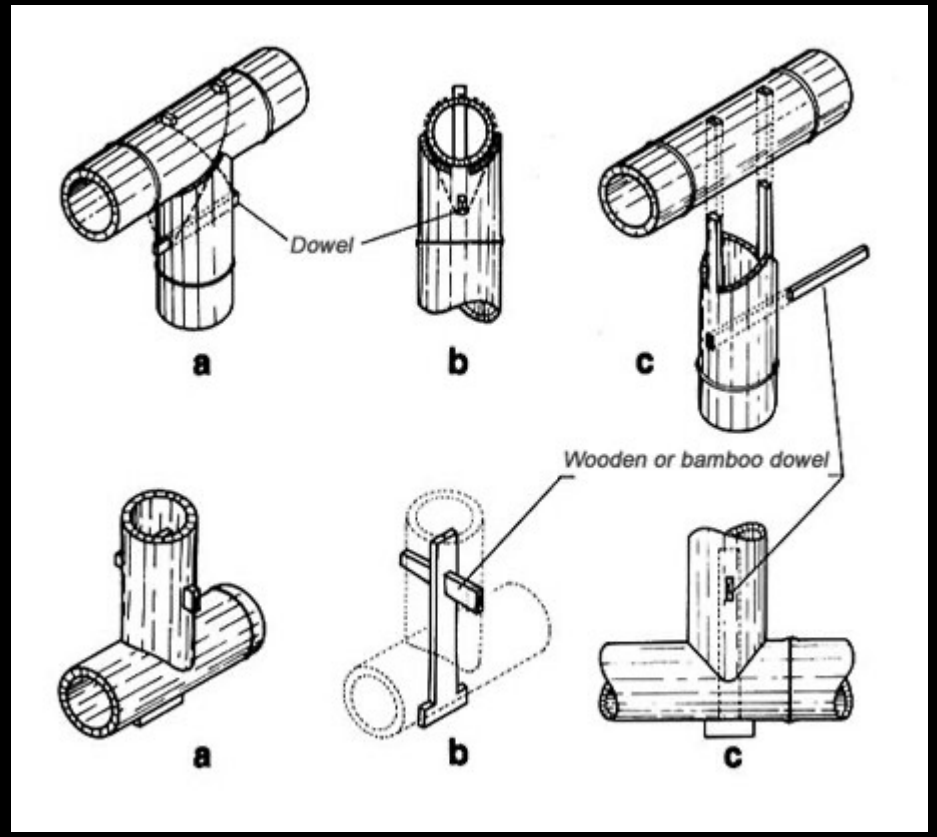
# IBUKU






CORNER CONSTRUCTION: Filled ends, parts built in jigs with modern tools, large dowel with smaller cross pinning of dowel

EFFICIENCY – SAFETY – ERGONIMICS – PROCESS IMPROVEMENT
BEFORE: 2 people, one holding and watching, another worker cutting with a knife, working on the floor
AFTER: 1 person working in an ergonomic position, safe and secure work stand and with power tools


Dowel
a
b
c
Wooden or bamboo dowel
a
b
c

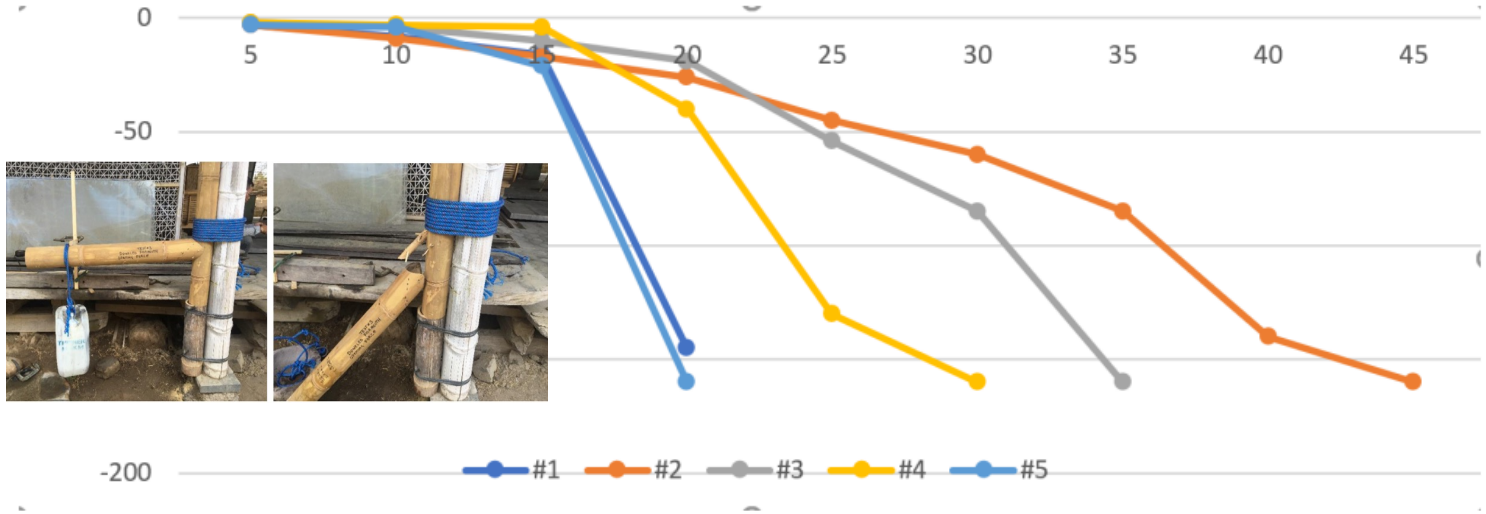
# Bamboo Joint Testing

Carried out at PT Bamboo Pure on December 27th, 2019
By James Wolf

**Purpose**
The purpose of the test was to compare several common and modified bamboo connections.
To apply measured force and note the deflection and eventually the failure of each one.

**Methodology**
Joints were secured against a rigid beam with nylon rope.
A downward force was applied at 1 meter from the outside of the joint.
Load was gradually increased at intervals of 5kg and deflection was measured in millimeters.
All samples were tested until the complete failure of the connection occurred.

**Comparative Analysis**



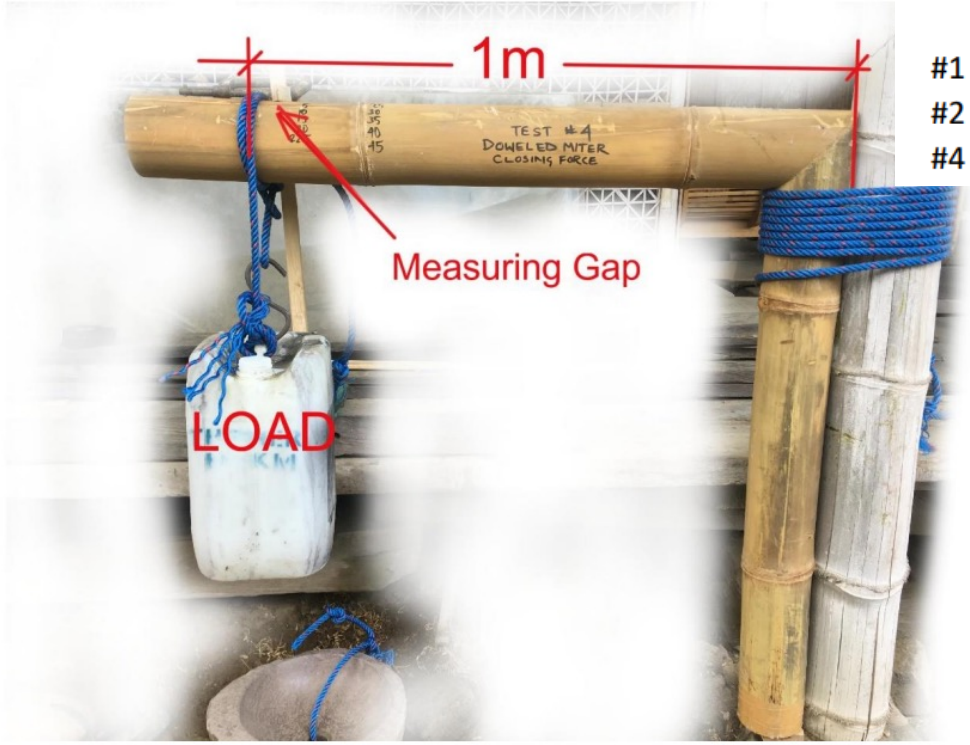


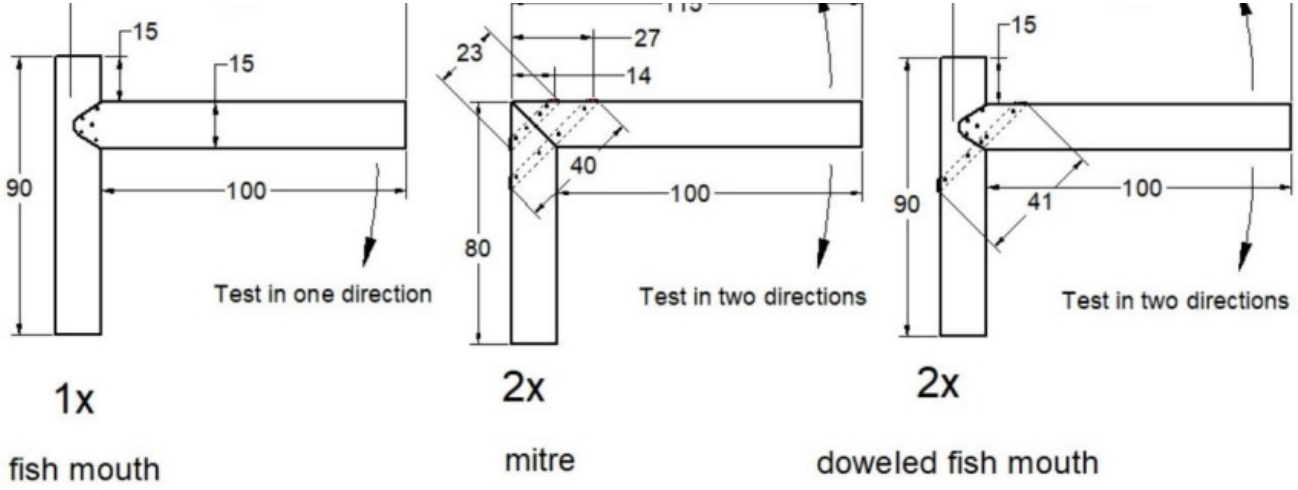



**#1 fish mouth - #2 doweled fish mouth - #3 doweled fish mouth - #4 mitered - #5 mitered**

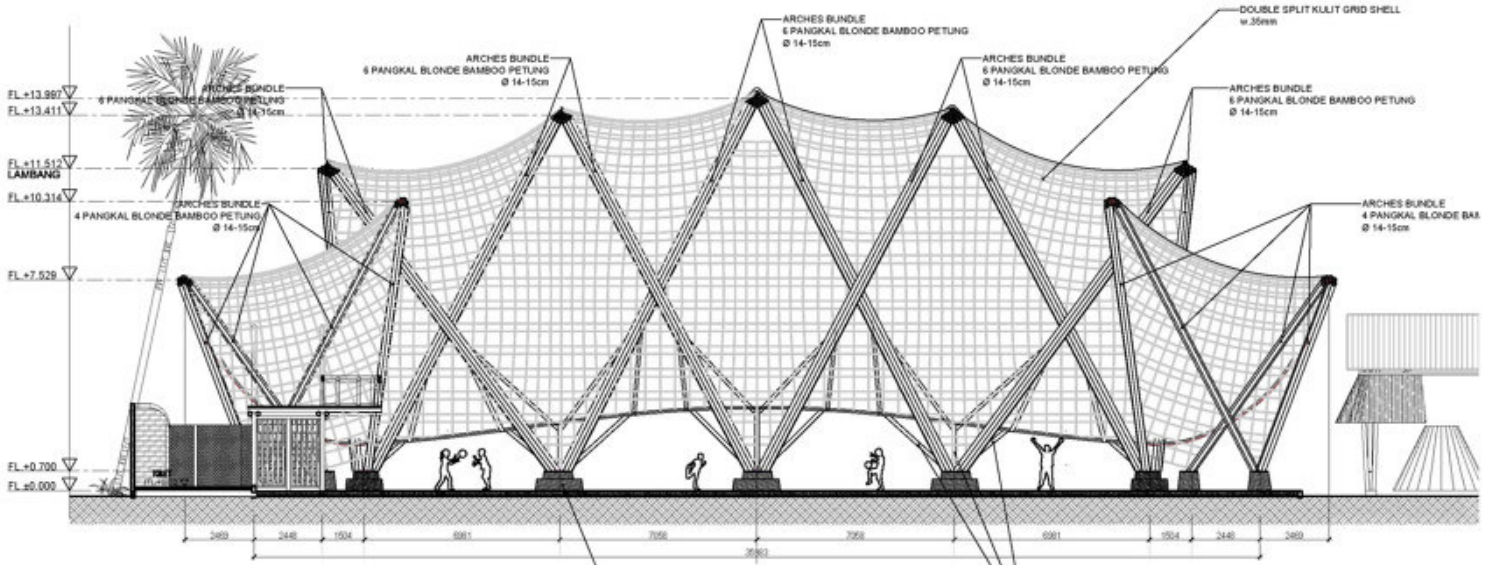
#1 and #5 had the lowest failure strength (under 20kg)
#2 had the highest failure strength (over 40kg)
#4 and #5 had the highest stiffnes (before failure)

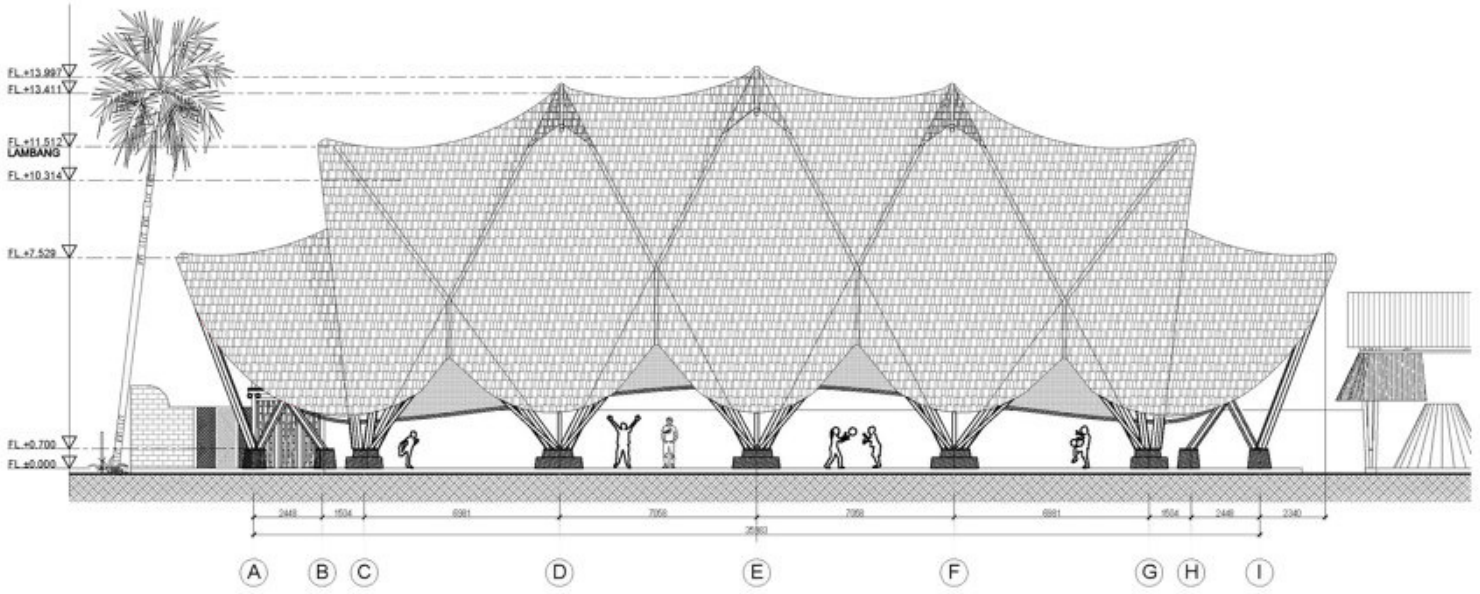
**Typical Test set-up:**



UNPRECEDENTED
The Arc at Green School


ARCHES BUNDLE
6 PANGKAL BLONDE BAMBOO PETUNG
Ø 14-15cm
DOUBLE SPLIT KULIT GRID SHELL
w.35mm
FL +13.997
FL +13.411
FL +11.512
LAMBANG
FL +10.314
FL +7.529
FL +0.700
FL ±0.000


FL +13.997
FL +13.411
FL +11.512
LAMBANG
FL +10.314
FL +7.529
FL +0.700
FL ±0.000
A
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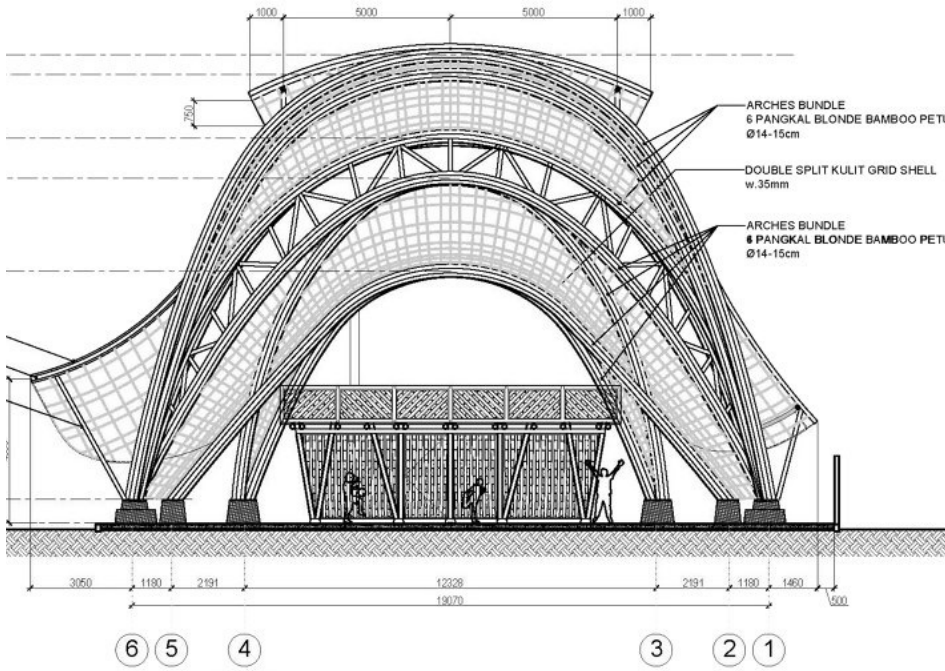
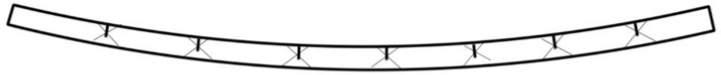

ARCHES BUNDLE
6 PANGKAL BLONDE BAMBOO PETUNG
Ø14-15cm
DOUBLE SPLIT KULIT GRID SHELL
w.35mm
ARCHES BUNDLE
6 PANGKAL BLONDE BAMBOO PETUNG
Ø14-15cm
6
5
4
3
2
1

Testing Testing 1 2 3

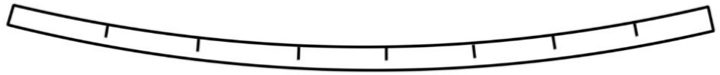
YOUNG'S MODULUS TESTING TO FAILURE on PETUNG BAMBOO POLES WITH "RUBRUB"

Tests carried out at PT Pure Bamboo by James Wolf in June 2020

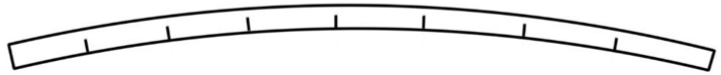
Test 1,2,3 Compression on rubrub, w/ glue and pins. Max Avg. Load: 314kg



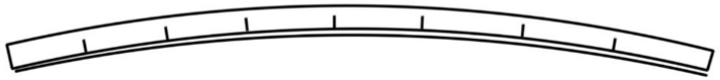
Test 3,4 Compression on rubrub, no glue and no pins. Max Avg. Load: 777kg



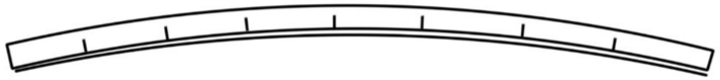
Test 8 Tension on rubrub w/ pins. Max Avg. Load: 102kg



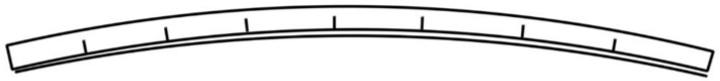
Test 6,7 Tension on rubrub w/ pins, w/ tension splits on bottom. Max Avg. Load: 158kg



Test 9,10 Tension on rubrub, w/ tension splits on bottom. Max Avg. Load: 159kg



Test 11, 12 Tension on rubrub, w/ tension splits, additional screws . Max Avg. Load: 264kg



Test 13, 14 Tension on rubrub, w/ 2 tension splits & more screws. Max Avg. Load: 483kg

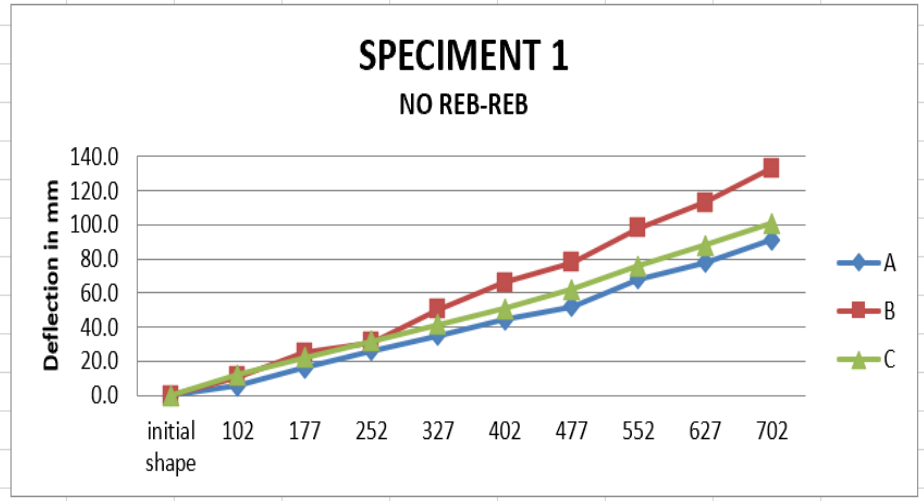
2 sets of splits side by side

SPECIMENT 1

| Test No | Load | Total load | A | B | C |
|---|---|---|---|---|---|
| initial shape | - | initial shape | 0.0 | 0.0 | 0.0 |
| 1 | 75 | 102 | 5.5 | 11.0 | 12.0 |
| 2 | 75 | 177 | 16.0 | 25.0 | 22.0 |
| 3 | 75 | 252 | 26.0 | 31.0 | 32.0 |
| 4 | 75 | 327 | 35.0 | 50.5 | 41.5 |
| 5 | 75 | 402 | 44.5 | 66.0 | 51.0 |
| 6 | 75 | 477 | 52.0 | 78.0 | 62.0 |
| 7 | 75 | 552 | 68.0 | 98.0 | 76.0 |
| 8 | 75 | 627 | 78.0 | 113.0 | 88.0 |
| 9 | 75 | 702 | 91.0 | 133.0 | 101.0 |
| 10 | 75 | 777 | CRACK | | |

BAMBOO POLE SPEC

| | | |
|---|---|---|
| D1 | 153.0 | mm |
| t1 | 31.0 | mm |
| D2 | 142.5 | mm |
| t2 | 17.7 | mm |
| D3 | 126.0 | mm |
| t3 | 9.6 | mm |
| SPAN | 6.0 | m |
| HUMIDITY | 30.0 | % |
| PART | BOTTOM HALF | |

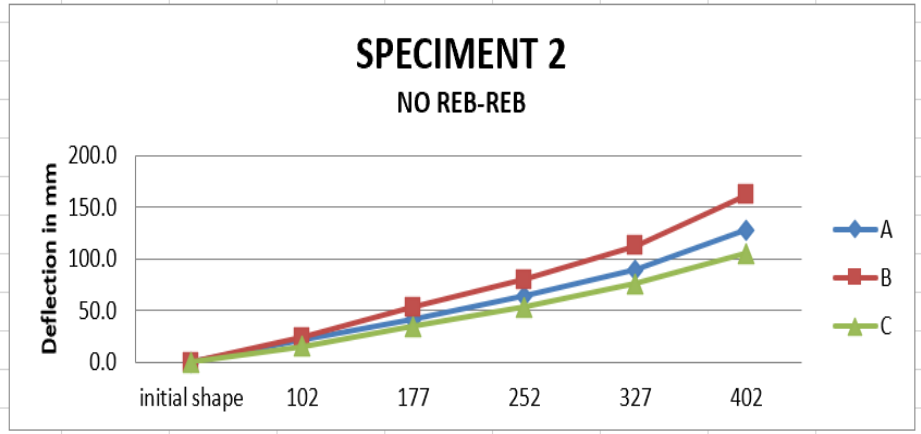



SPECIMENT 2

| Test No | Load | Total load | A | B | C |
|---|---|---|---|---|---|
| initial shape | - | initial shape | 0.0 | 0.0 | 0.0 |
| 1 | 75 | 102 | 22.0 | 24.0 | 15.0 |
| 2 | 75 | 177 | 41.0 | 53.0 | 34.5 |
| 3 | 75 | 252 | 64.0 | 80.0 | 53.0 |
| 4 | 75 | 327 | 89.0 | 112.5 | 76.0 |
| 5 | 75 | 402 | 128.0 | 162.0 | 105.0 |
| 6 | 75 | 477 | CRACK | | |

BAMBOO POLE SPEC

| | | |
|---|---|---|
| D1 | 133.6 | mm |
| t1 | 12.7 | mm |
| D2 | 139.5 | mm |
| t2 | 11.5 | mm |
| D3 | 152.0 | mm |
| t3 | 22.0 | mm |
| SPAN | 6.0 | m |
| HUMIDITY | 27.0 | % |
| PART | BOTTOM HALF | |

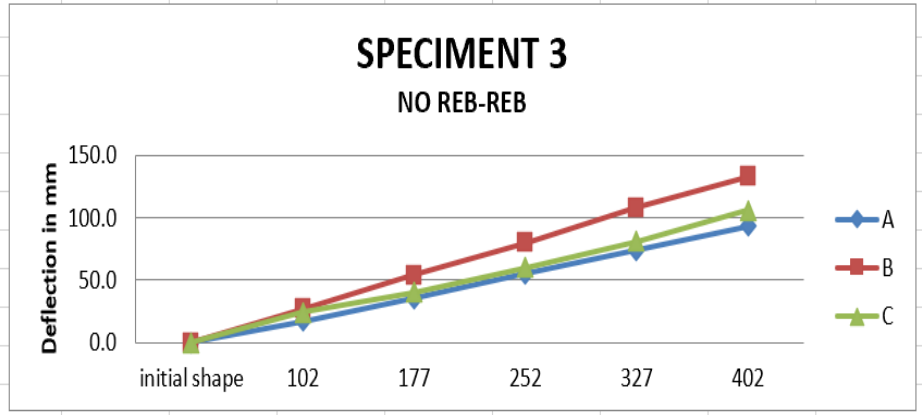


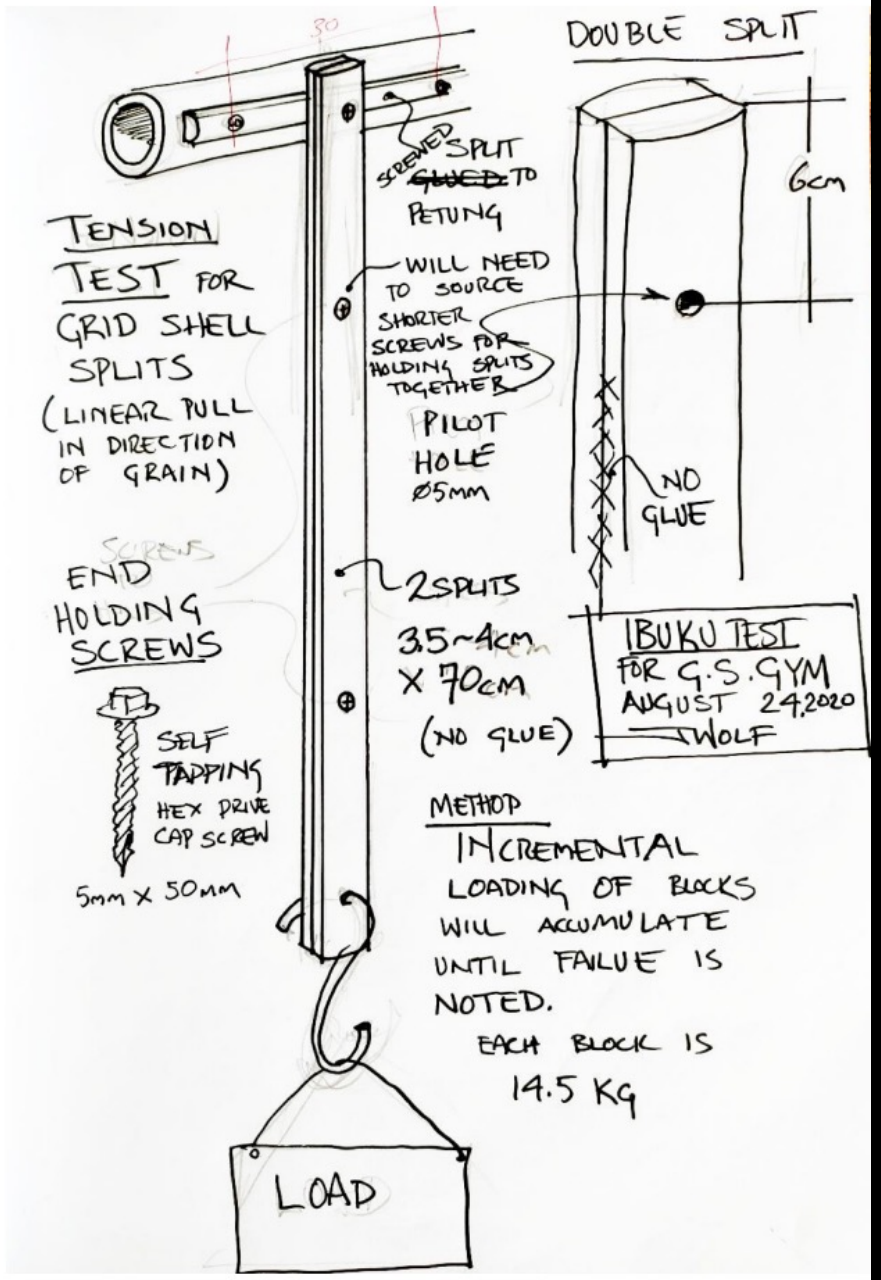

SPECIMENT 3

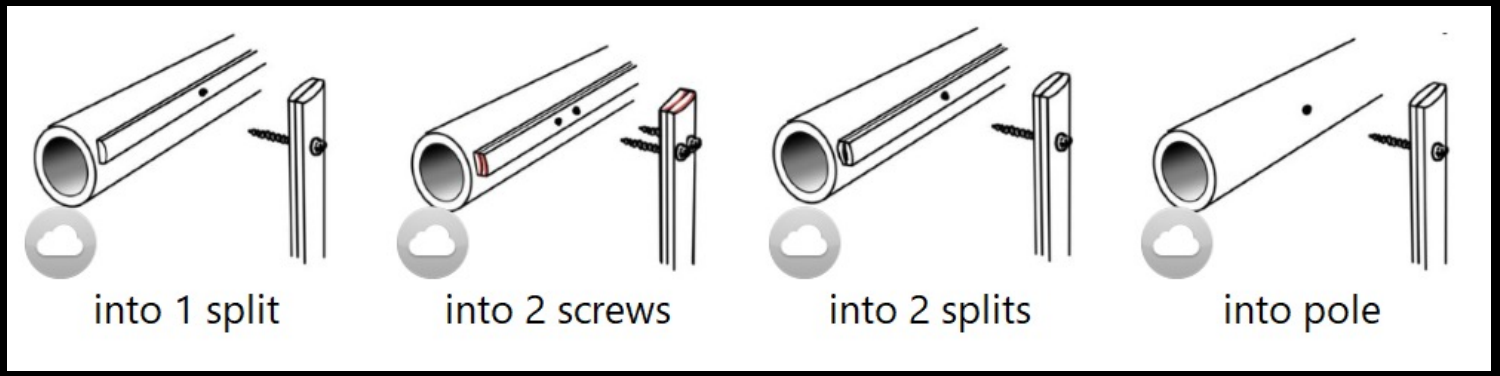
| Test No | Load | Total load | A | B | C |
|---|---|---|---|---|---|
| initial shape | - | initial shape | 0.0 | 0.0 | 0.0 |
| 1 | 75 | 102 | 17.0 | 27.0 | 24.0 |
| 2 | 75 | 177 | 35.5 | 54.0 | 40.0 |
| 3 | 75 | 252 | 55.0 | 80.0 | 60.0 |
| 4 | 75 | 327 | 74.0 | 108.0 | 81.0 |
| 5 | 75 | 402 | 93.0 | 133.0 | 106.0 |
| 6 | 75 | 477 | CRACK | | |

BAMBOO POLE SPEC

| | | |
|---|---|---|
| D1 | 152.0 | mm |
| t1 | 27.0 | mm |
| D2 | 144.6 | mm |
| t2 | 17.7 | mm |
| D3 | 126.7 | mm |
| t3 | 9.0 | mm |
| SPAN | 6.0 | m |
| HUMIDITY | 46.0 | % |
| PART | BOTTOM HALF | |



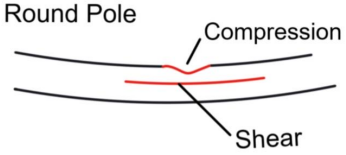



## POLE, Rubrub, Splits

## FAILURE MODE:

Full Round Pole




Shear splitting and compression failure on top at 702kg

Rubrub on Bottom

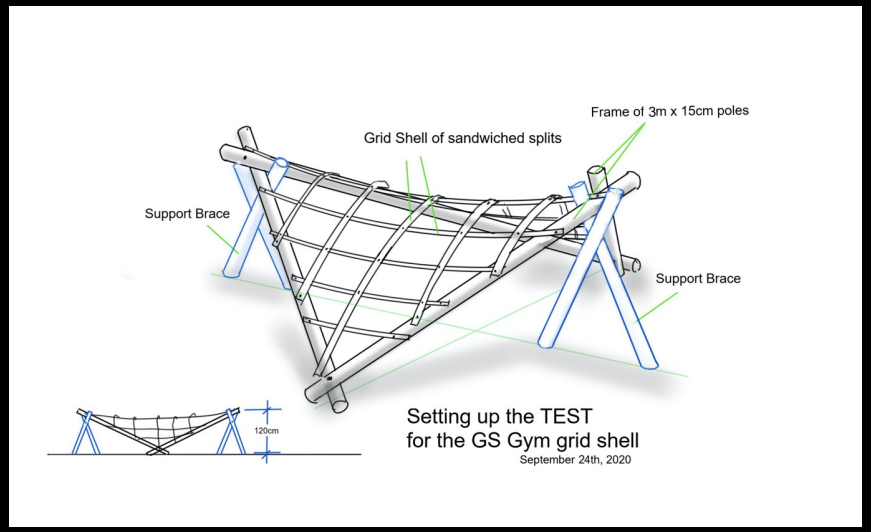
Shear followed by the bottom sections separating off and then the top strip bending at 102kg

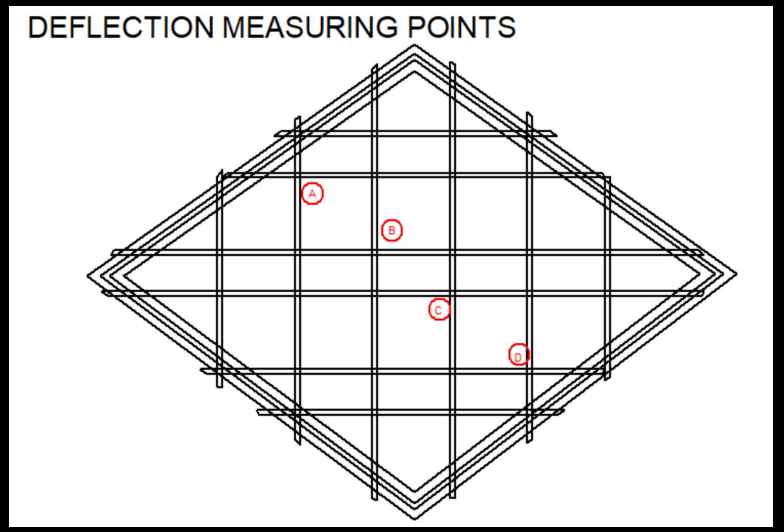
Rubrub w/ 1 Split Strip

Shear followed by lower sections levering off the split then cracking or bending of the top strip at 264kg

Rubrub w/ 2 Split Strips

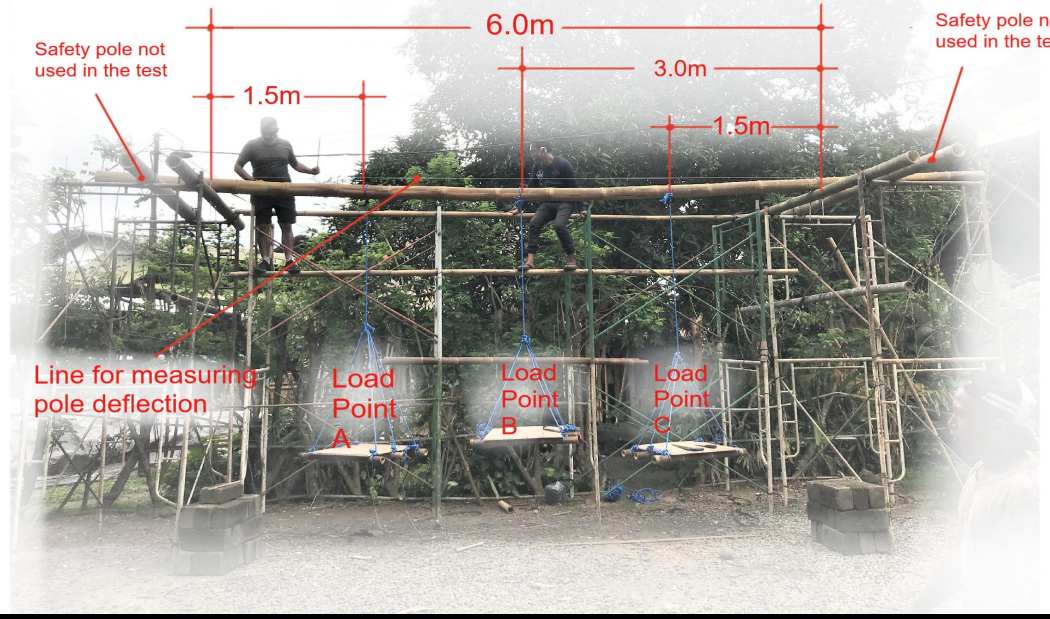
Shear happening later, splits holding the load in tension and then compression failure at the top edge at 481kg


Frame of 3m x 15cm poles
Grid Shell of sandwiched splits
Support Brace
Support Brace
120cm
Setting up the TEST
for the GS Gym grid shell
September 24th, 2020

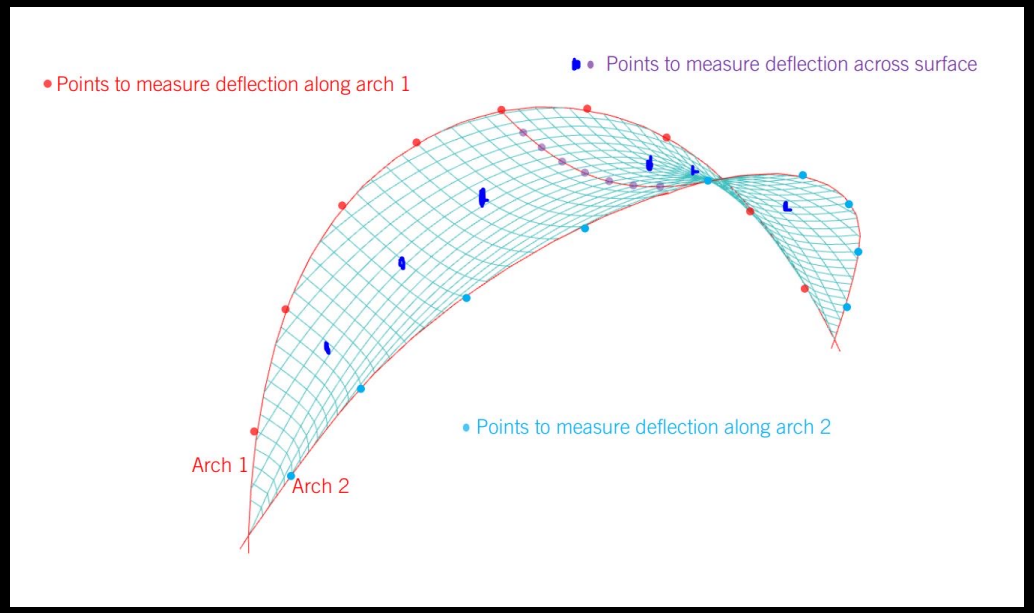

DEFLECTION MEASURING POINTS
A
B
C
D

# Youngs Modulus test on Petung Bamboo

Tests performed at PT Bamboo Pure on July 9th and 10th 2020




# Final saddle test – FULL scale



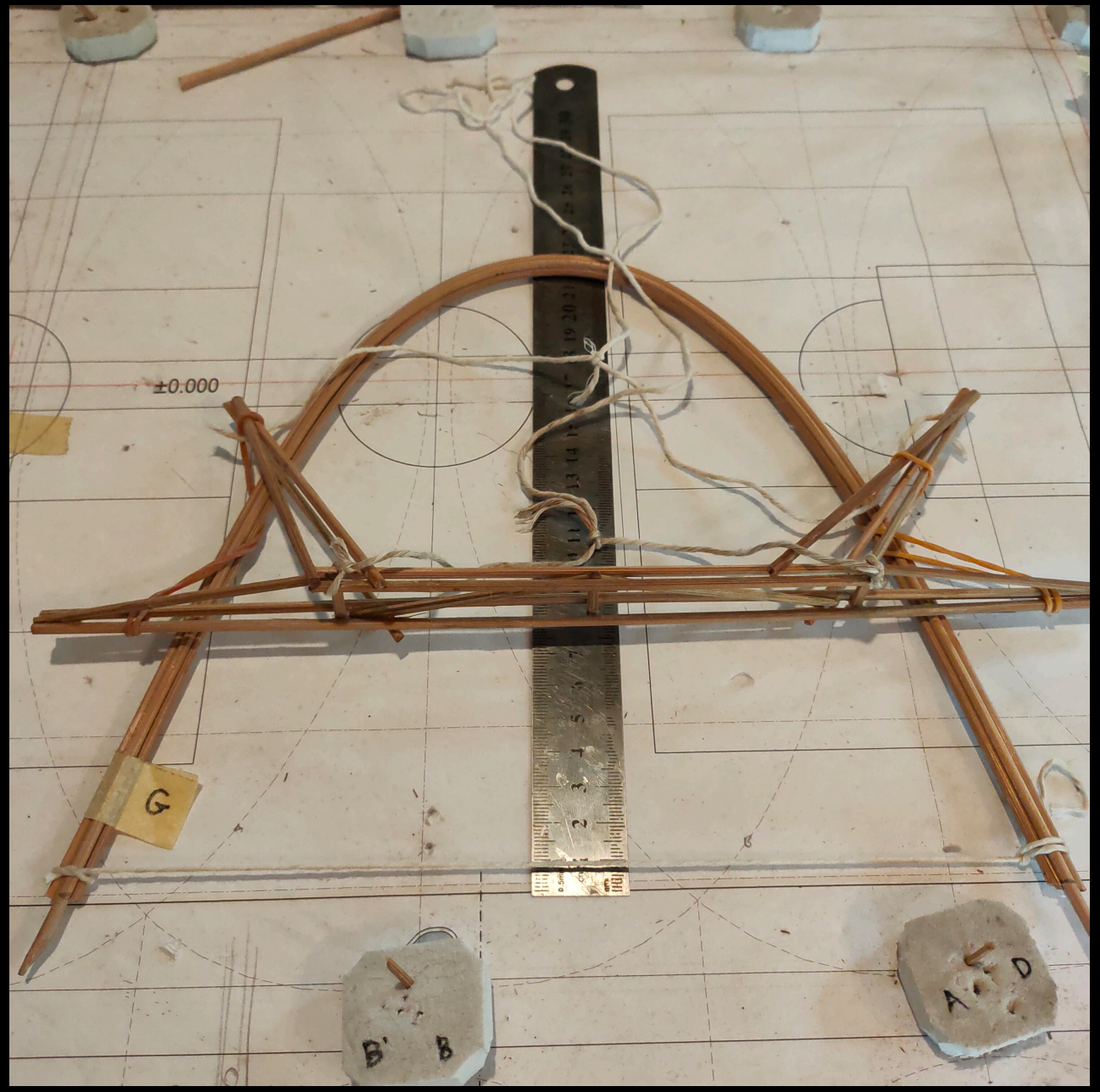

GREEN SCHOOL ARC TESTING

- Single Petung Pole
- Rebreb on Single pole in Tension
- Rebreb on Single pole in Compression
- Results of adding Supporting Splits
- Testing types of Glue available
- Screws in Split spacing
- Screws at end of Splits
- Types of Screws Testing
- Bundle of 4 Petung in Tension
- Bundle of 4 Petung in Compression
- Above with variations in number and positioning of Splits
- Grid shell at scale Testing
- Bundle of 6 Petung in Tension
- Bundle of 6 Petung in Compression
- Above with variations in number and positioning of Splits
- Full Scale arch and grid shell test

Lets DO THIS!

# Arch Assembly Sequence

Lifting Brace




DILARANG MEROKOK
JAGA KEBERSIHAN

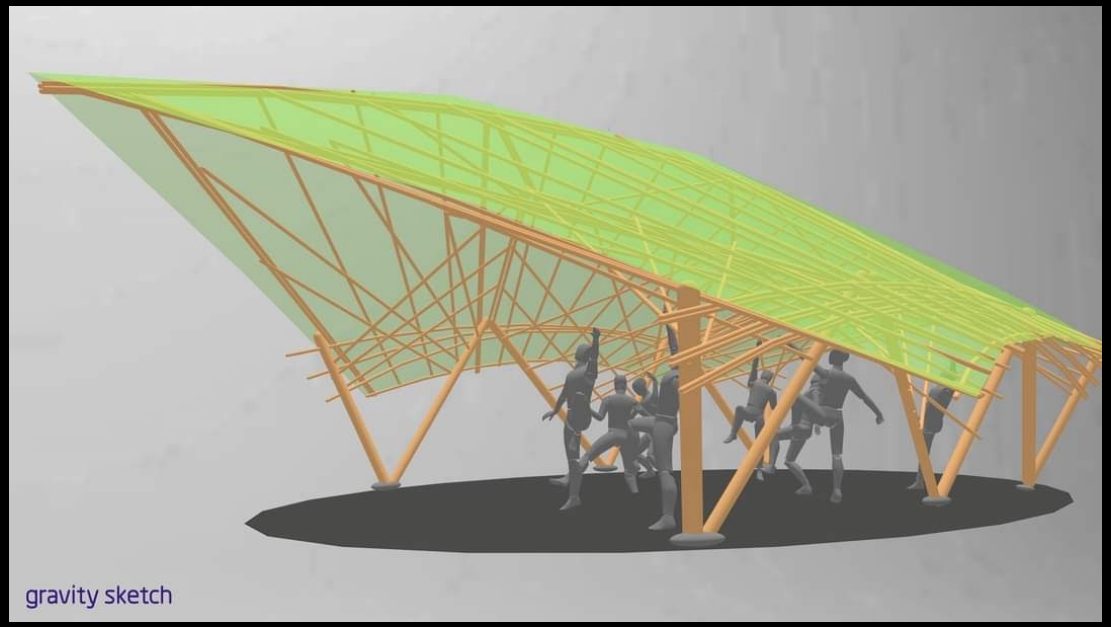
Architectural Master Prize 2021

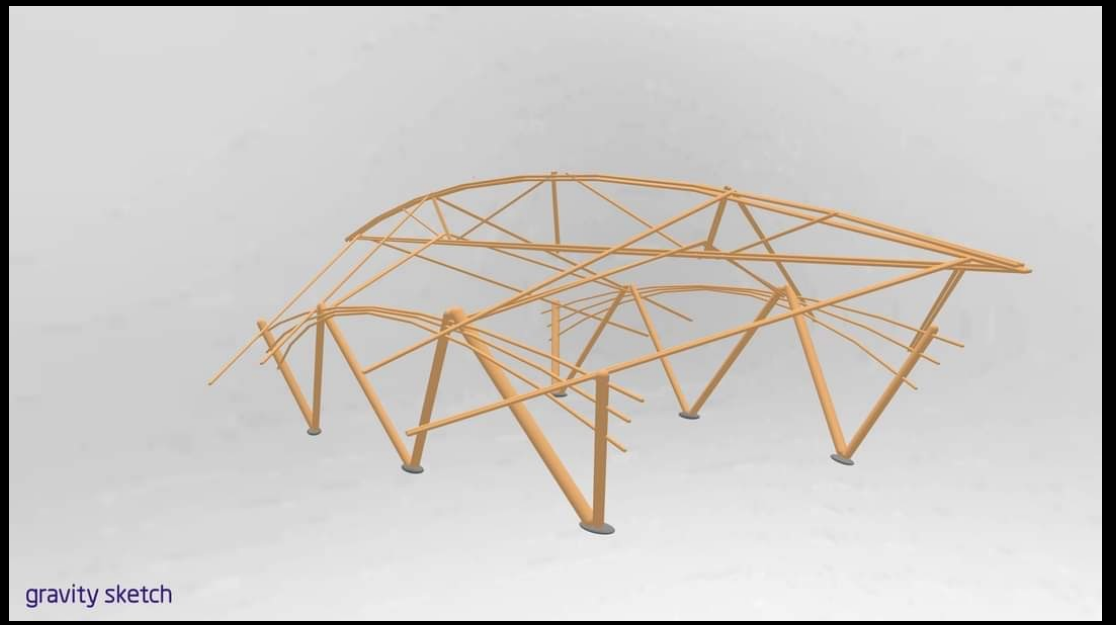
DEZEEN Peoples choice 2021

PURA VIDA!  -  Pure Life!

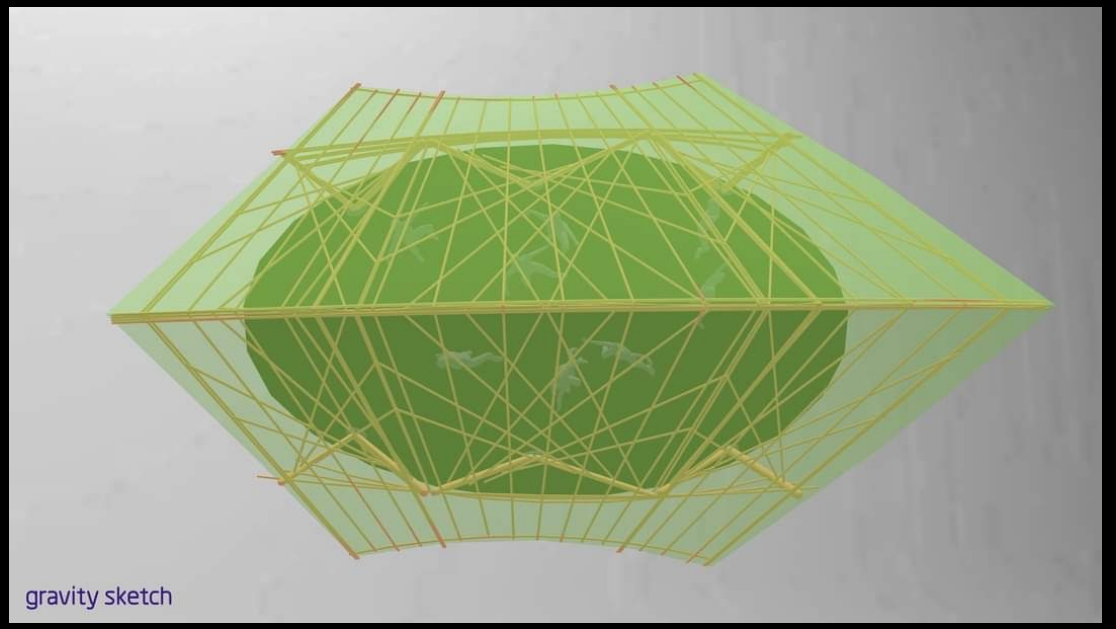

PRELIJER

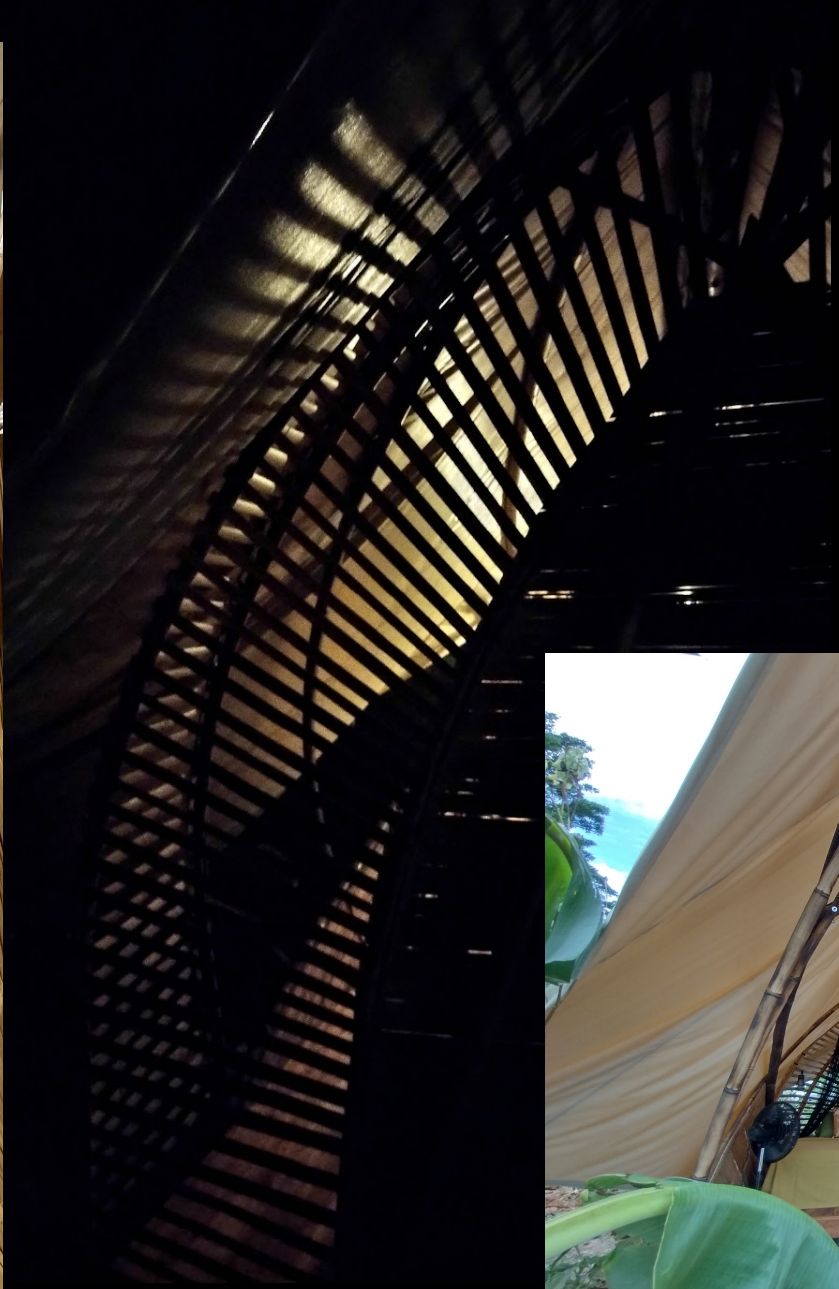


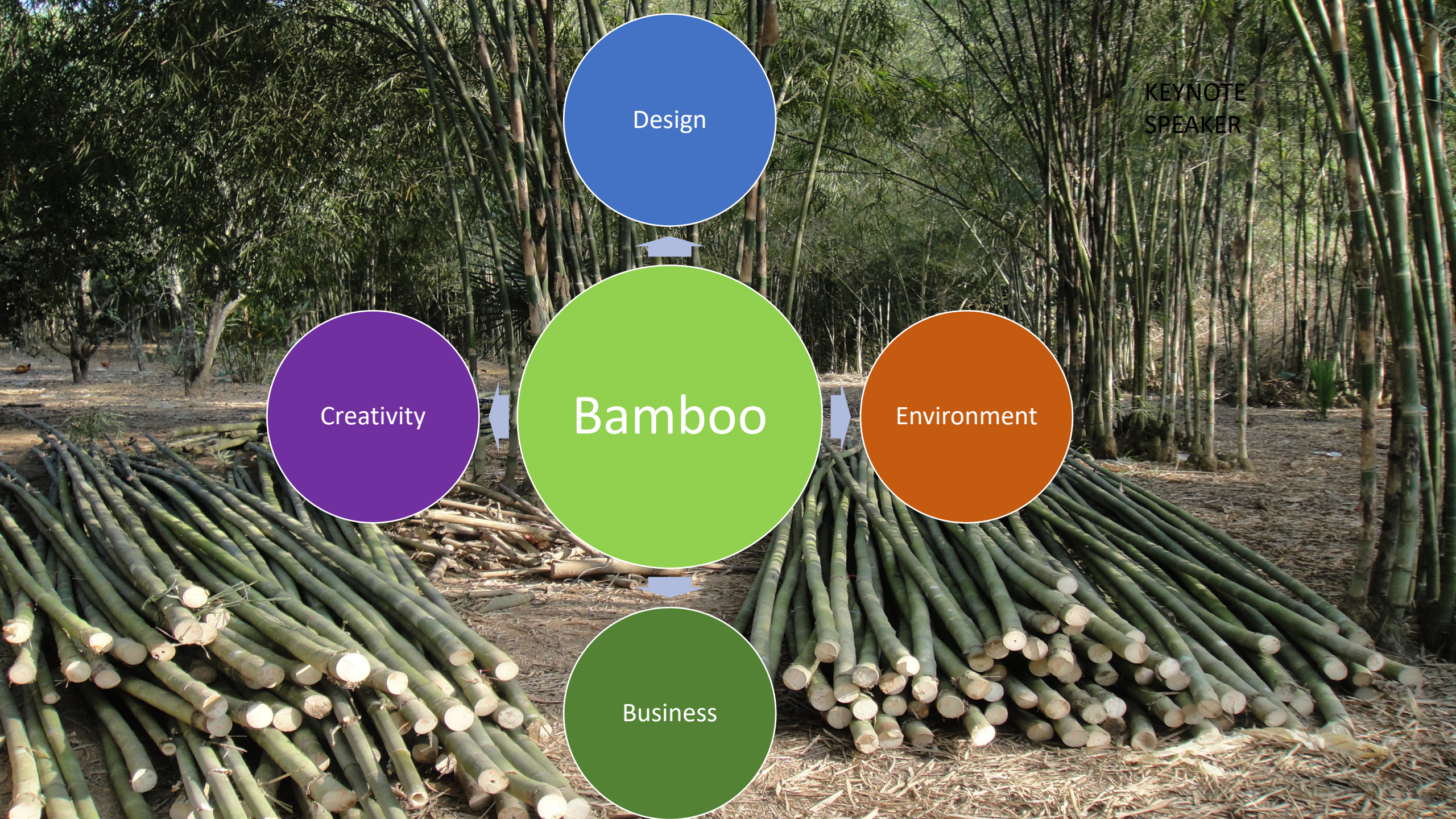

gravity sketch


gravity sketch


gravity sketch


gravity sketch






KEYNOTE
SPEAKER


**High Labor Input**

- Makes it difficult to go mainstream
- Its hard to find skilled labor
- Wages keep rising

In order to be competitive, we must refine the processes and improve manufacturing efficiency.


**Bamboo has a PR Problem**

-People have a low expectation for it
-Bamboo is  seen as the “poor man’s lumber”
-Historically, bamboo products have been of bad quality and buildings short lived

In order to elevate the status, we must do bamboo better that what's been done before.

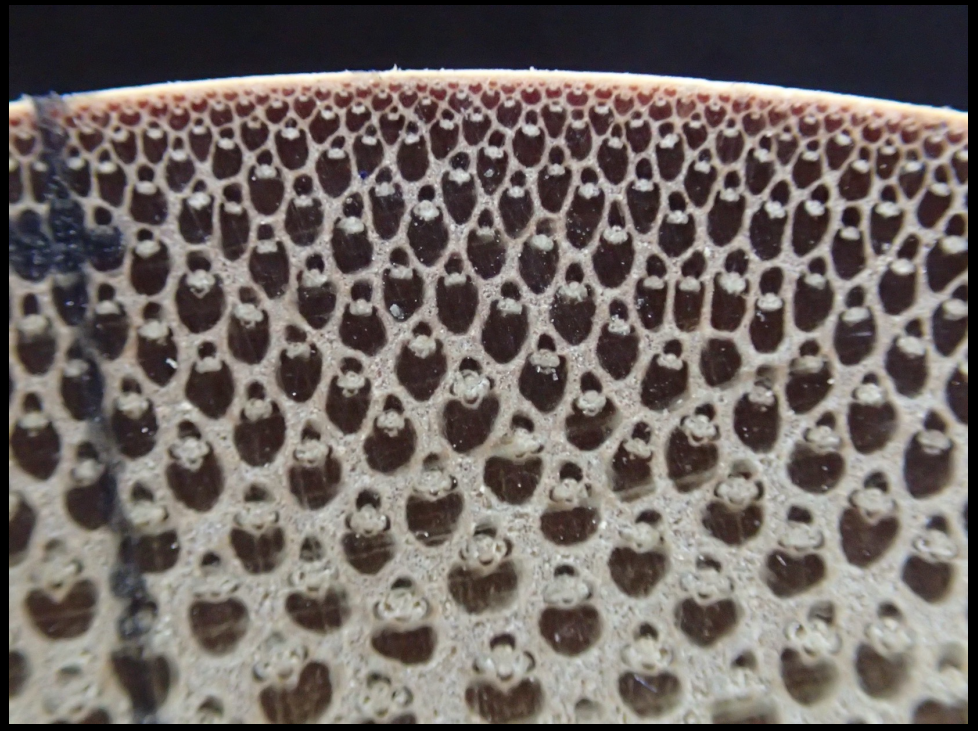

**Bamboo can be the substitute**

- Replace plastic
- Replace steel and concrete
- Reduce pollution
- Create Green Jobs
- Use bamboo for more of our needs
- Innovate NEW applications

If it can be done in bamboo then
LETS DO IT!

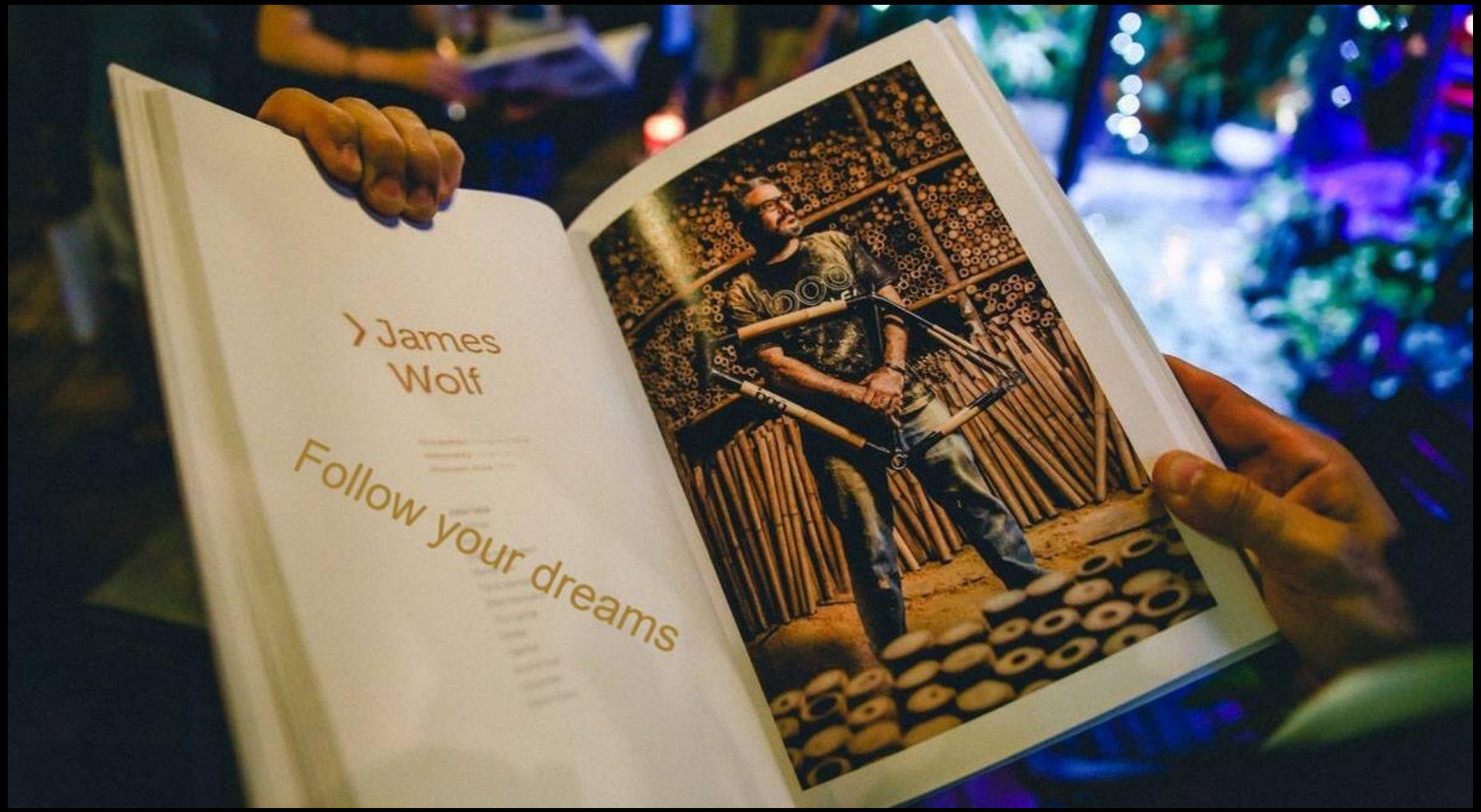
**Design By Nature**

The best natural tubing in the world has been in constant R&D for millions of years. We can learn from it and apply it to modern needs. There is so much natural technology going on in bamboo that we have  to learn from.




**High Tech Applications**

If you test and look at the engineering properties of strength to weight ratio, lateral stiffness, rotational compliance and viscoelasticity, you see that bamboo lends itself to perform as good or better than so called “high tech” materials.


James
Wolf
Follow your dreams

THANK YOU!