

# World Bamboo Congress 12<sup>th</sup> Hsinchu & Nantou, Taiwan

18-22 April 2024

## Bamboo Space Frame

Dr.-Ing. Andry Widyowijatnoko

Gilang I. Noegraha, M.Ars

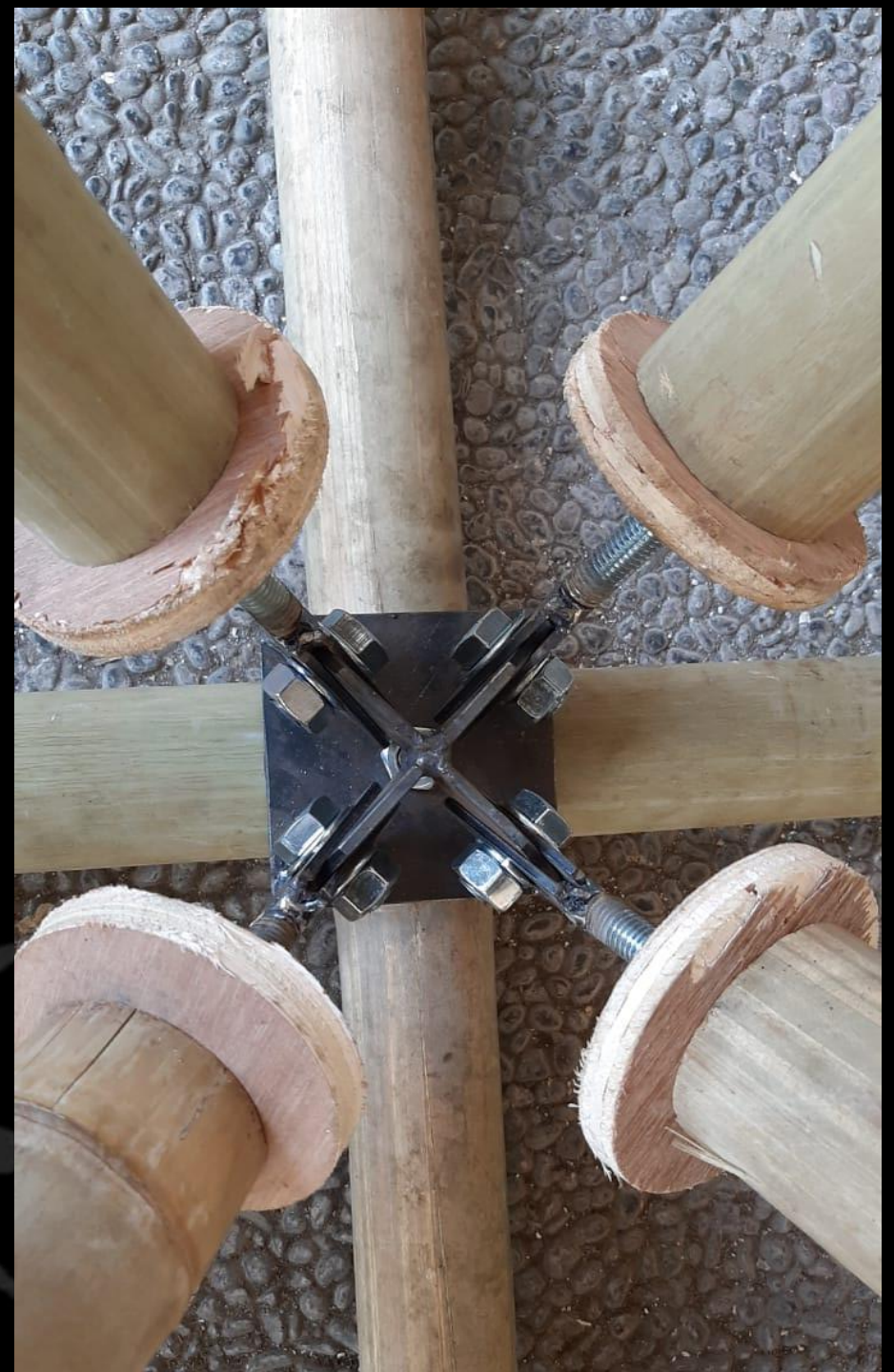
Hafsah Salamah, M.T.

bambuLoka

School of Architecture, Planning and Policy Development

Institut Teknologi Bandung

Indonesia





widyowijatnoko

https://www.asrnesia.com > bambu-menambah-nilai-se...  
**Bambu Menambah Nilai Seni Arsitektur Mo**  
23 Apr 2021 — Seminar ini menampilkan pembicara praktisi akademisi ITB, Dr.-Ing. Andry Widyowijatnoko, ST.,MT.,IAI d

https://id.scribd.com > presentation > Widyowijatnoko-...  
**Widyowijatnoko, Andry | Bamboo | Reinforc**  
Conventional vs. Substitutive Bamboo Construction: The Clas  
Andry Widyowijatnoko\* Martin Trautz\*\* \*Ph.D. Candidates\*\*

Penelusuran terkait  
permana itb

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Sebelumnya 1 2 3 4 5 6 7

Indonesia ● Pasir Endah, Kota Bandung, Jawa Barat

widyowijatnoko

**DESAIN ARSITEKTUR BERKELANJUTAN D**  
Widyowijatnoko, dll. Sesungguhnya hal ini merupakan hal positif adanya kesadaran Arsitek untuk memperhatikan lingkungan hidup ketukangan.wordpress.com >

**Ketukangan: Kesadaran Material/ Craftsma**  
Apr 08, 2015 · Andry Widyowijatnoko. Leave a comment more p  
Posted on July 18, 2014 by cungss. archdaily

sinta.ristekbrin.go.id > journals > detail >  
**SINTA - Science and Technology Index**  
A Widyowijatnoko, F Adira Indonesian Journal of Science and  
S: Optimization and Interpretation of Heat distribution in sterilizati

desainbambu.wordpress.com > bambu-plester >  
**Bambu Plester | Bamboo Sustainable Mater**  
Apr 22, 2010 · Adalah konstruksi dinding yang sudah lama ada di serta diteliti kembali oleh Bpk Andry Widyowijatnoko staf pengaj

Searches related to widyowijatnoko

andry widyowijatnoko itb andry widyowijatnoko

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**[PDF] Application of Bamboo Radial Compre**  
https://www.semanticscholar.org/paper/Application-  
Compression-Joint...  
A. Widyowijatnoko, Rakhmat Fitranto Aditra; Published 2018; i  
become popular recently by the community due to the rise of e  
for post-disaster building. Two aspects of post-disaster buildin  
performance and its recyclability. This research explore ability i

**Karya Arsitek Indonesia yang Meraih ...** Transl  
https://kememparekrango.id/ragam-ekonomi-kreatif/  
Meraih... >  
Berlokasi di Purwakarta, Jawa Barat, OBI Great Hall merupakan Indonesia, Andry Widyowijatnoko. OBI Great Hall merupakan k yang cantik. Keindahan tersebutlah yang membawa Andry Wid Amenity/Institutional Building" di Arcasia Award 2016 .

**Indonesialand: Reciprocal Tension (RECTION**  
https://www.youtube.com/watch?v=rasmrplie2s >  
Sebuah karya instalasi bambu yang disebut "Reciprocal Tensio merupakan buah pikiran dari Dr. -Ing. Andry Widyowijatnoko, :

**Better Bamboo Buildings**  
https://www.betterbamboobuildings.com >  
On our last AA course this past summer, Andry Widyowijatnoko

Web Images

Bamboo-Plas

Purworejo  
tr.wiki2.wiki  
Andry Widyow  
(ITB). Dr Müh

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Bandung

For business  
Metrika

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# bamboo construction classification

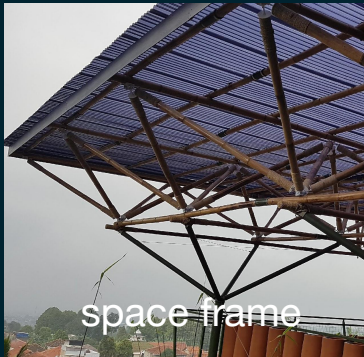
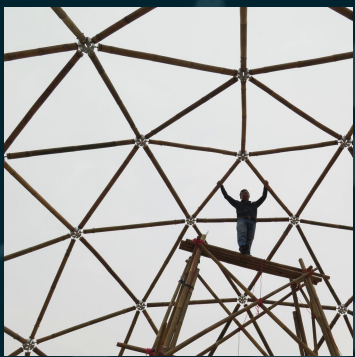
substitutive conventional	pole 	split 	+ concrete 	laminated 
	engineered traditional			+ plaster 

\*Andry Widyowijatnoko, Traditional and Innovative Joints in Bamboo Construction



# projects

substitutive



space frame



tensegrity



reciprocal



barcom



conventional

engineered



full culm





# bamboo pole structure

## non-substitutive conventional

**traditional**  
**bulk active:**  
post and lintel

**engineered**  
**vector active:**  
truss with  
eccentricities in force  
transfer  
  
**form active:**  
arch structure  
thrust lattice

**fish-mouth joint**

**fish-mouth joint**

**lashing+dowel**

**bolted joint**

VS

## substitutive

**vector active:**  
**space truss**  
geodesic dome  
tensegrity  
  
**bulk active:**  
reciprocal frame  
rection  
  
**form active:**  
tensile structure

**advanced joints**





established space  
structure from metal

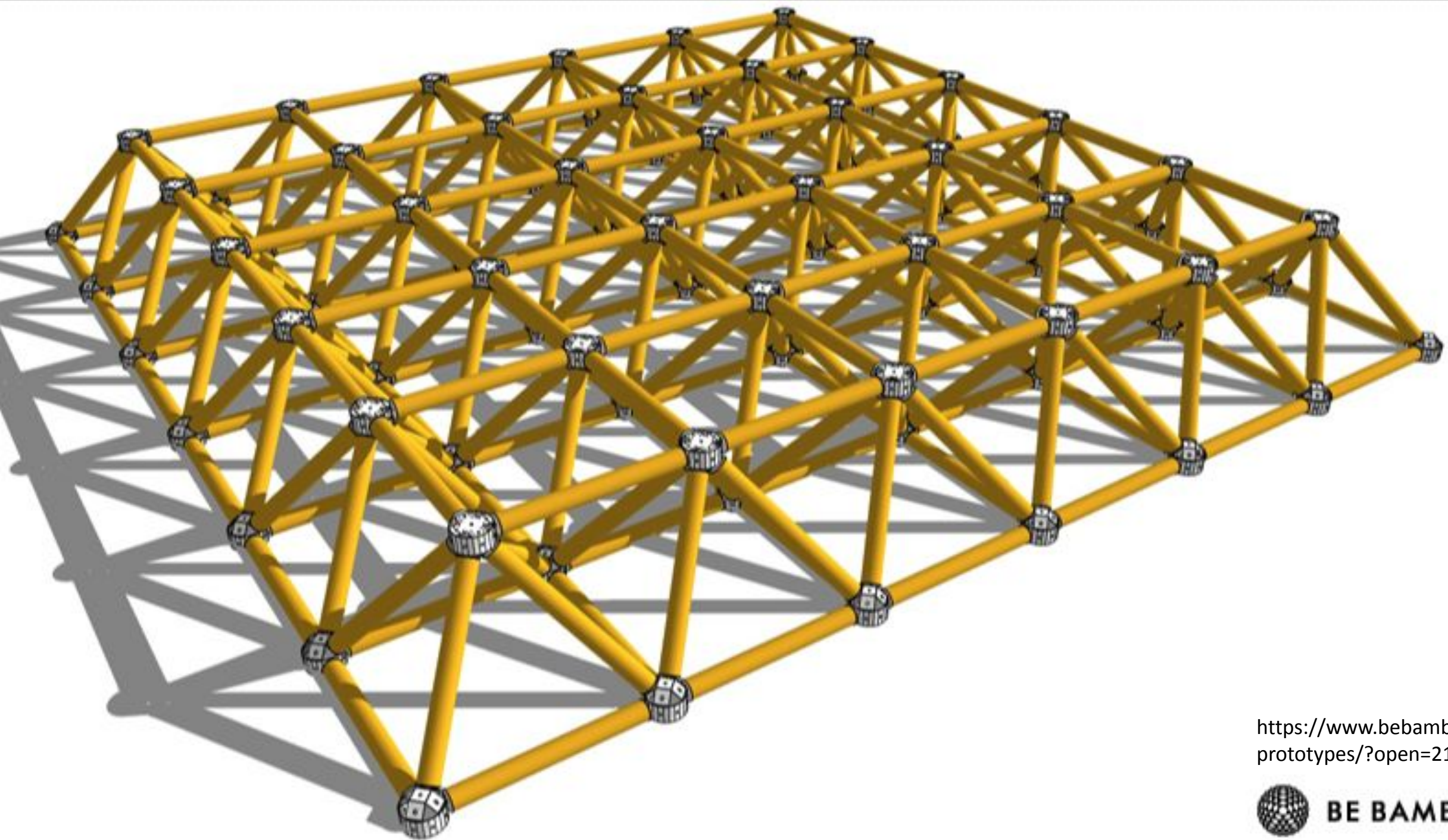


substitutive bamboo construction



bamboo  
space truss





<https://www.bebamboo.eu/prototypes/?open=21>







The tetrahedron made by  
the bamboo course in  
summer term 2003, RWTH  
Aachen, Germany

[https://bambus.rwth-aachen.de/eng/fr\\_raumfachwerk.html](https://bambus.rwth-aachen.de/eng/fr_raumfachwerk.html)





amana-key -  
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verão

<http://amima-arquitetura.com.br/projetos/institucional/amana-key-saladeauladeverao>





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- Mostly three-dimensional frame
  - Avoiding eccentricity in force transfer
    - Using steel connector
    - Poles under tension or compression







## Bamboo Connections

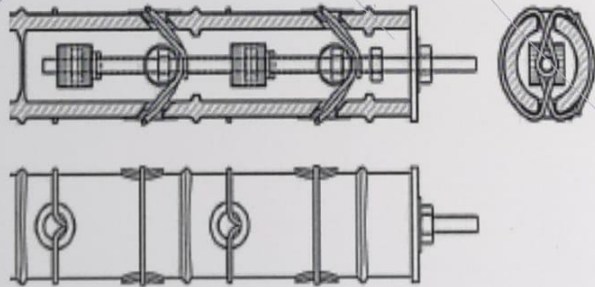
- Mostly three-dimensional frame
- Avoiding eccentricity in force transfer
  - Using steel connector
- Poles under tension or compression





Andry Widyowijatnoko

# TRADITIONAL AND INNOVATIVE JOINTS IN BAMBOO CONSTRUCTION



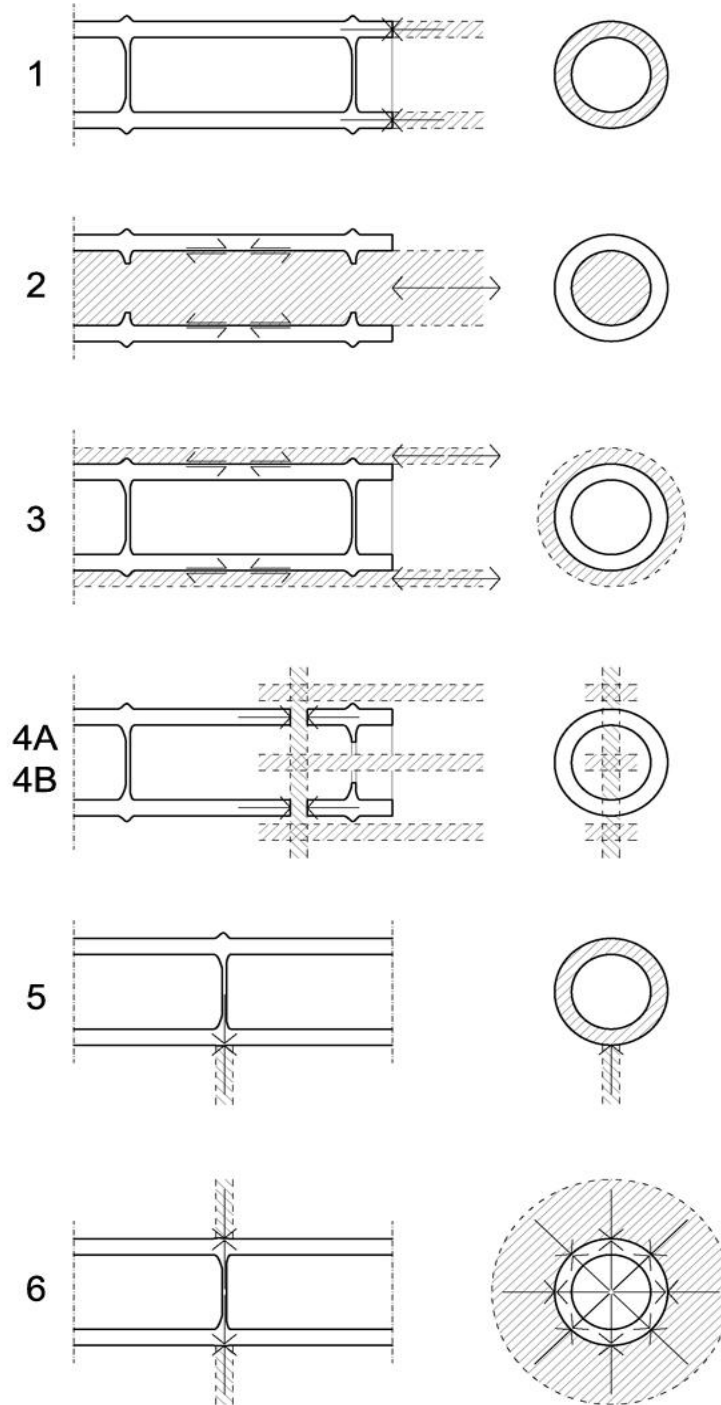
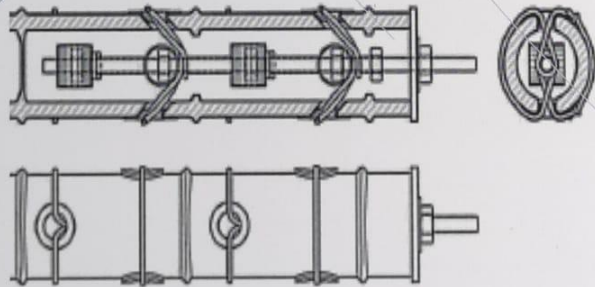
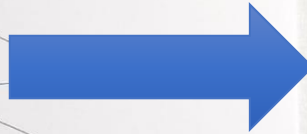
## Bamboo Connections

[https://www.researchgate.net/publication/362271850\\_Traditional\\_and\\_Innovative\\_Joints\\_in\\_Bamboo\\_Construction](https://www.researchgate.net/publication/362271850_Traditional_and_Innovative_Joints_in_Bamboo_Construction)



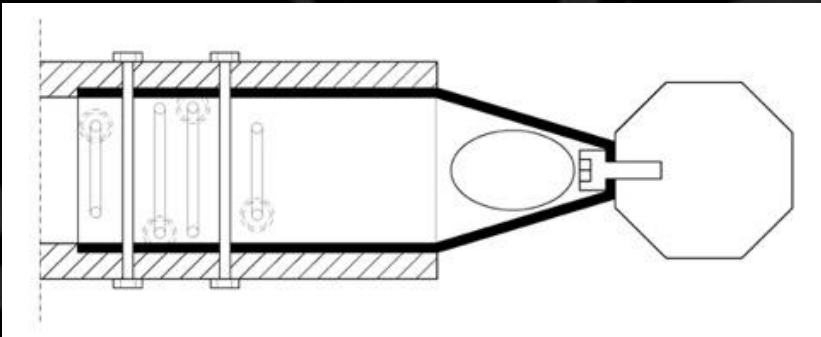
Andry Widyowijatnoko

# TRADITIONAL AND INNOVATIVE JOINTS IN BAMBOO CONSTRUCTION



1. Transferring compression through contact to the whole section
2. Transferring force through friction on the inner surface or compression to the diaphragm
3. Transferring force through friction on the outer surface
4. Transferring force through bearing stress and shear to the bamboo wall from perpendicular element connected from inside (4A) or outside (4B)
5. Transferring force perpendicular to the fibers
6. Transferring force perpendicular to the fibers to the center of the pole

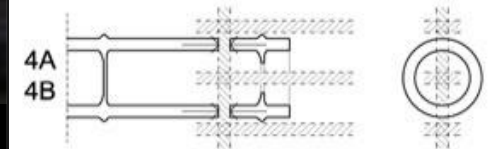




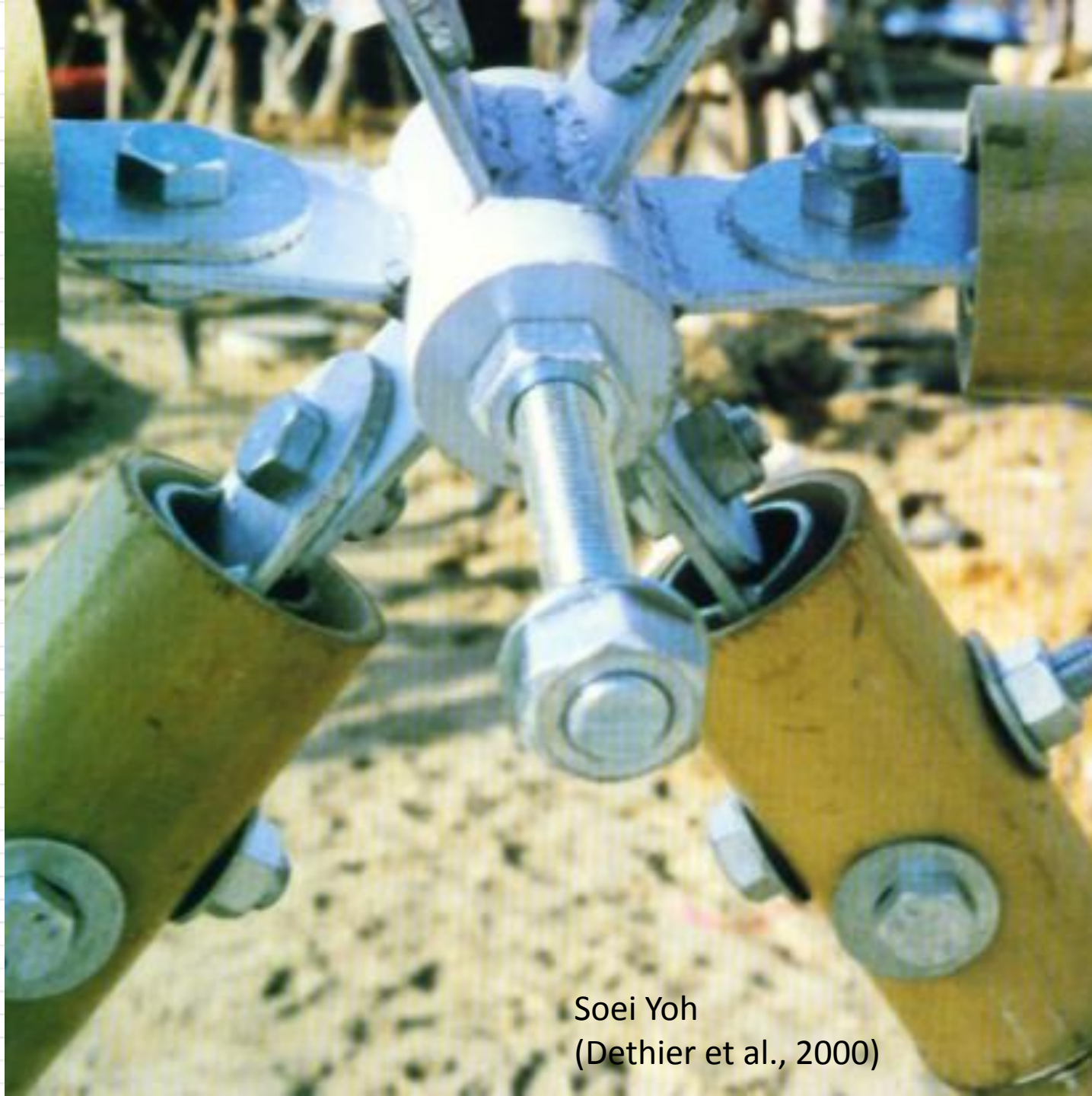
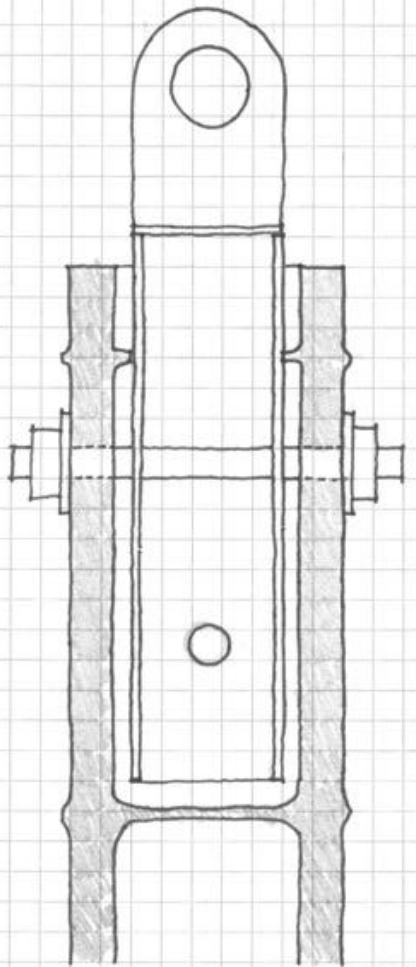
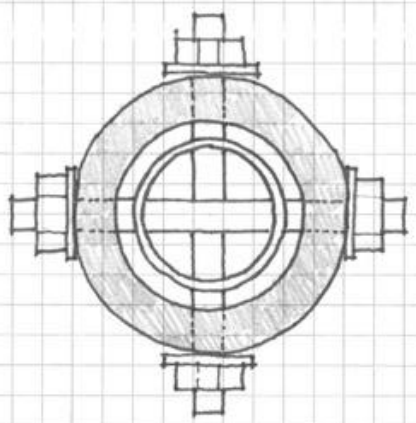
Obermann and Laude, 2004



bamboo joint for space truss

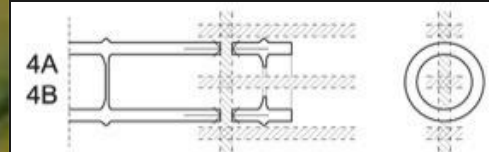






bamboo joint for  
space truss

Soei Yoh  
(Dethier et al., 2000)





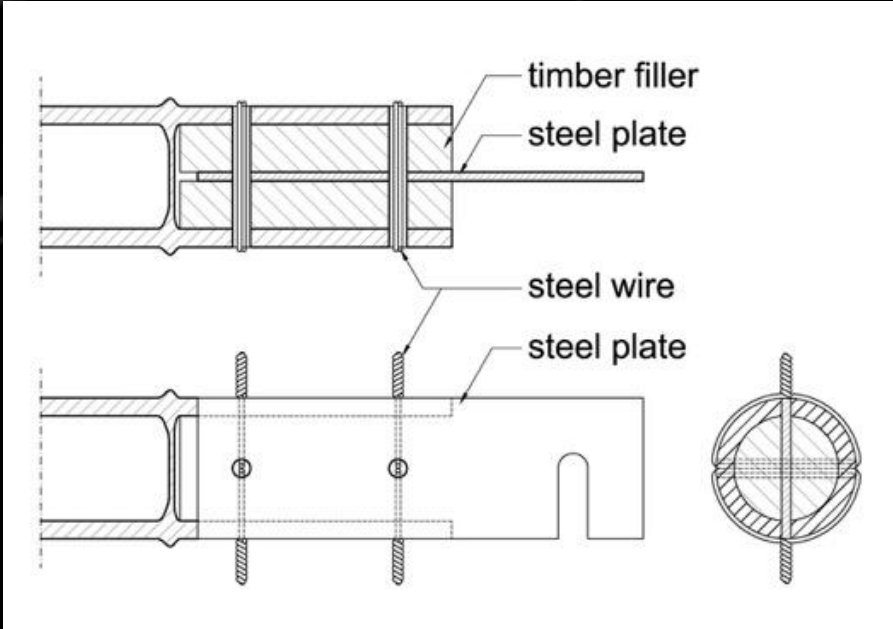
The use of lacing wire tool to attach steel plate in the end of round wood (right)



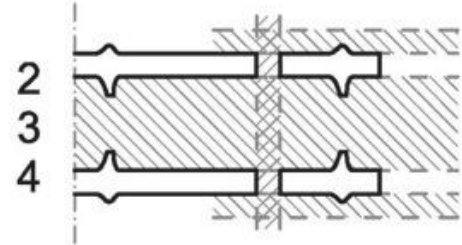
bamboo joint by Renzo Piano (left above)

<https://bambus.rwth-aachen.de/eng/reports/connect/bolt/bolt.html>


bamboo joint using lacing wire tool (left below)



bamboo joint for space truss

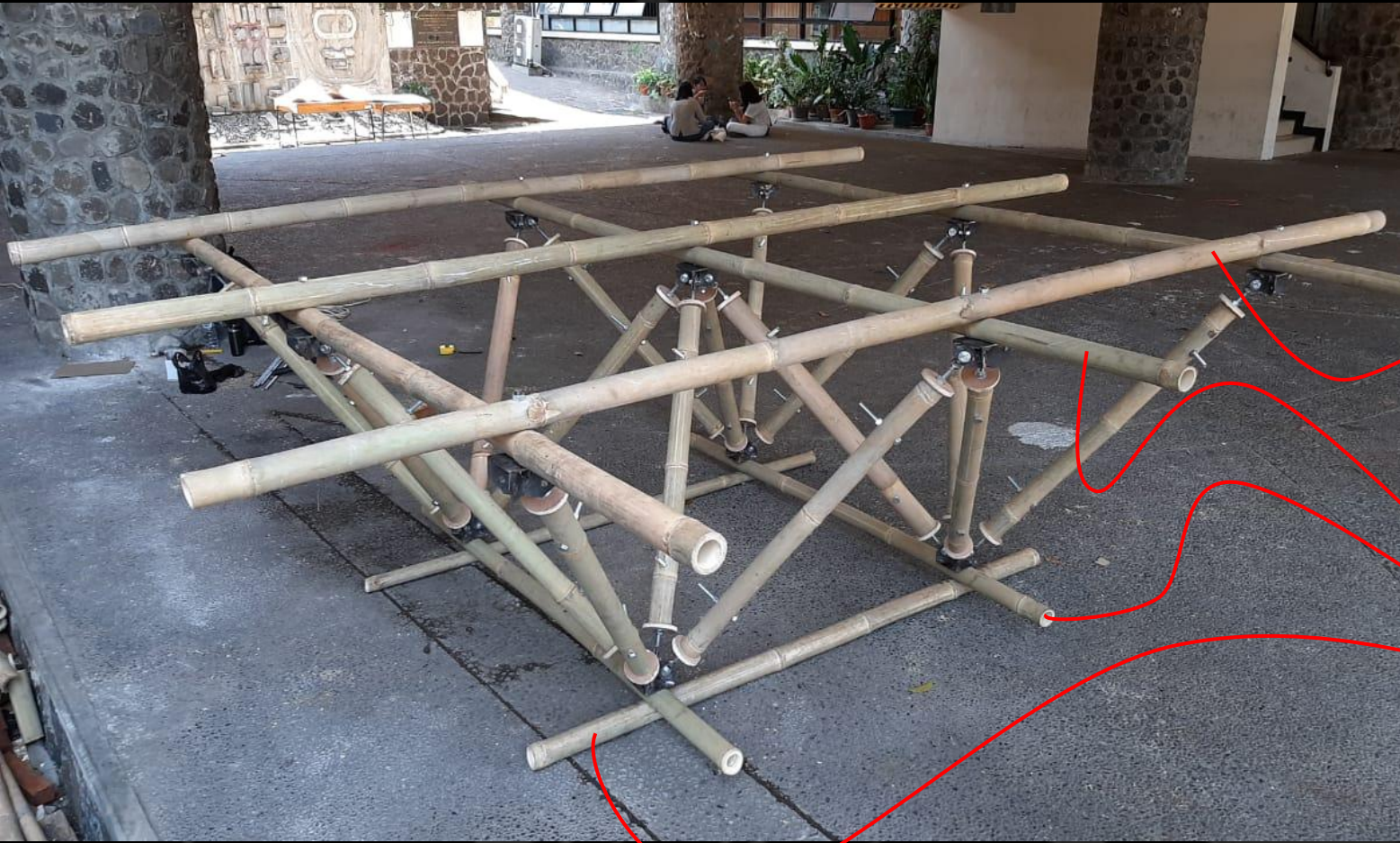




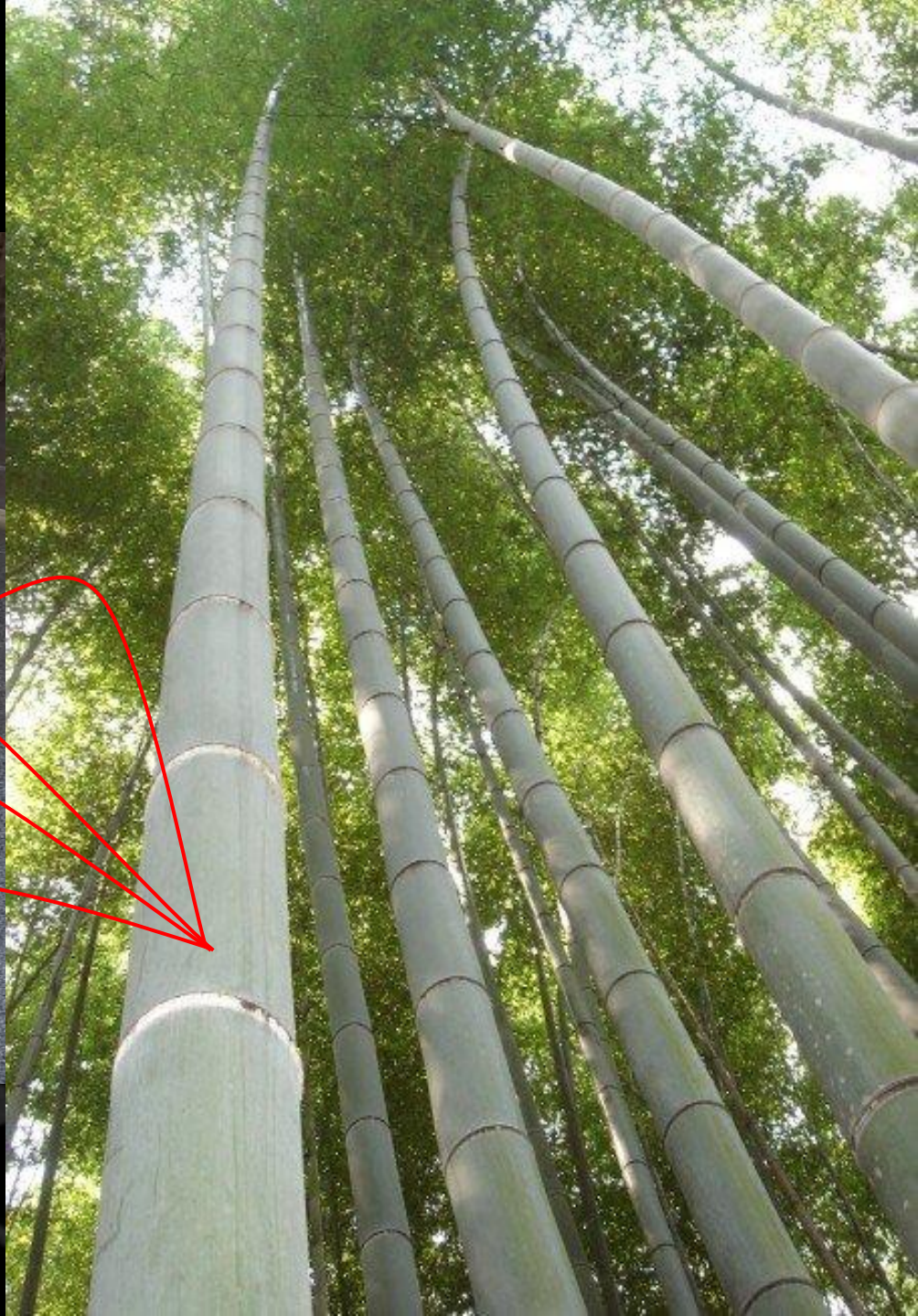


new concept of bamboo space frame

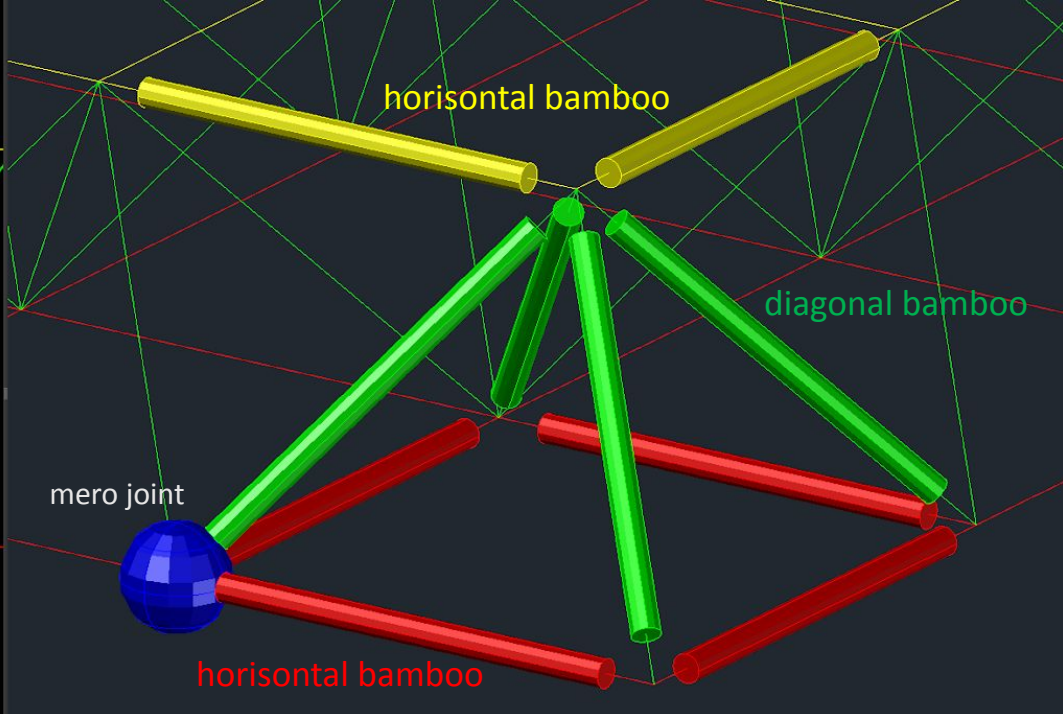
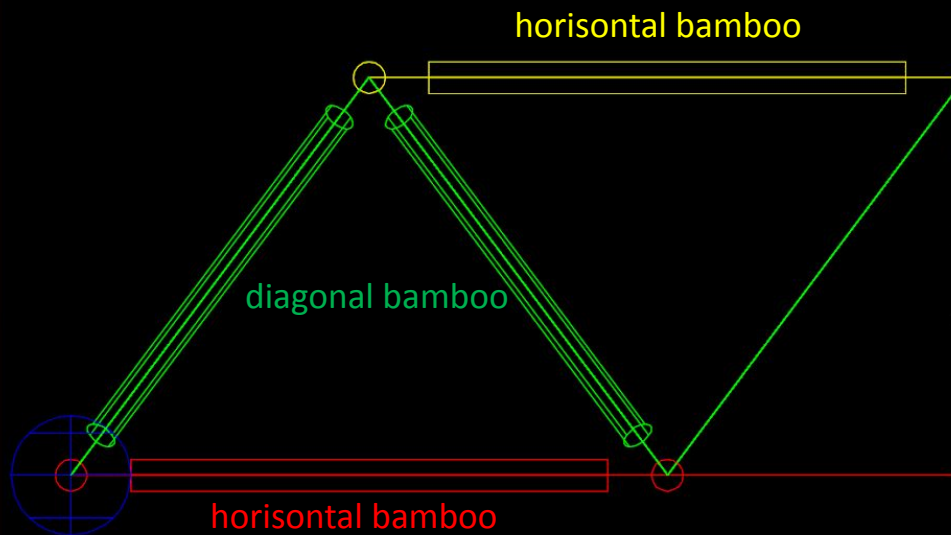
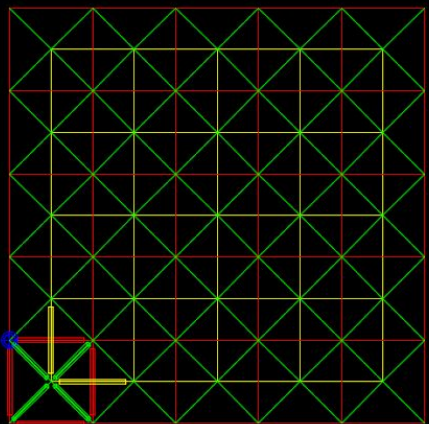




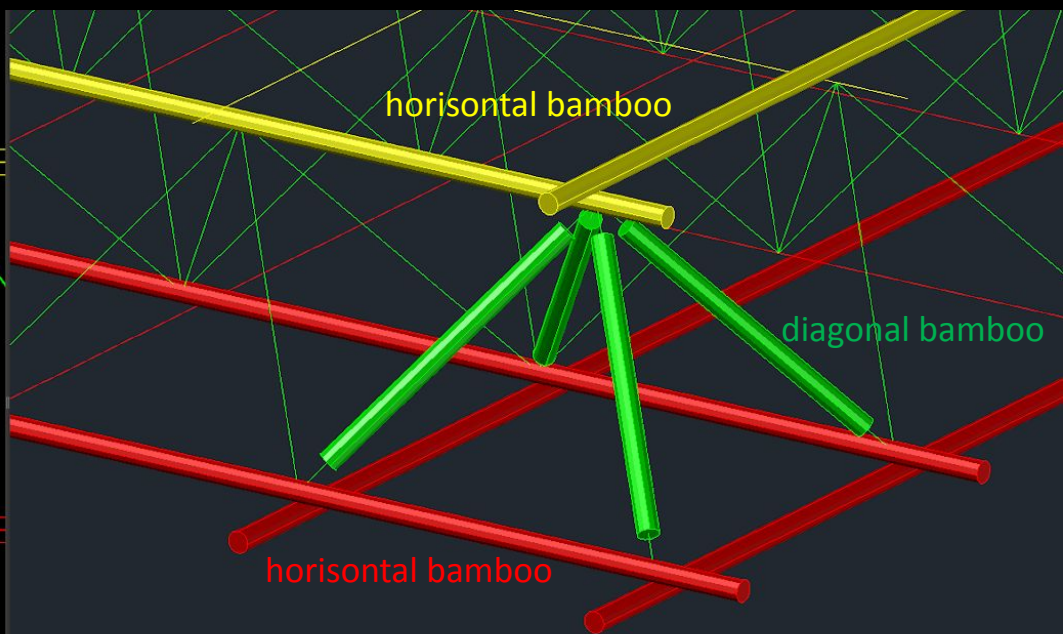
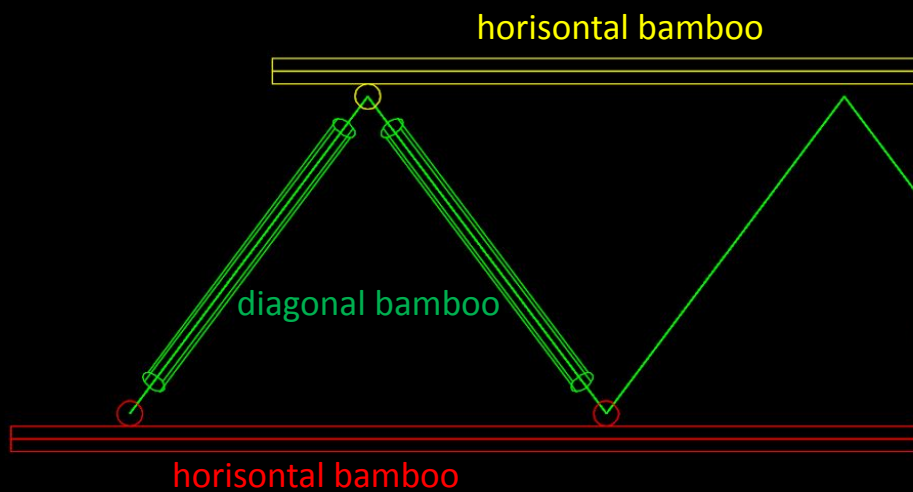
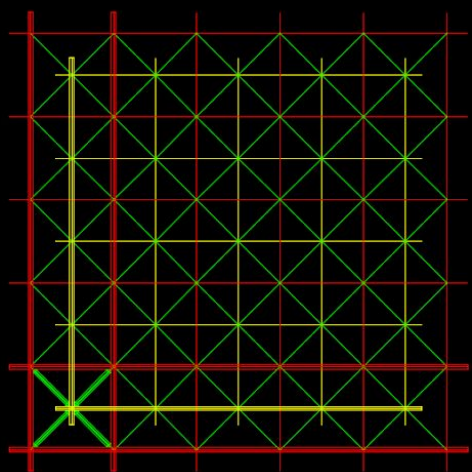
bamboo space frame







bamboo space frame  
without vs with  
eccentricity in force transfer















bamboo space frame application  
Budi Faisal's Garage

002A  
002B





































space frame  
budi faisal's garage  
bandung





space frame  
budi faisal's garage  
bandung













BALAJAR

A11







terima kasih, jazzakallah, danke, bedankt,  
dank u, thank you, selamat po, muchas  
gracias, obrigado, kyei zu tin ba de, arigato,  
dhanyabad, cảm ơn bạn

**xiéxié**

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griya awi  
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