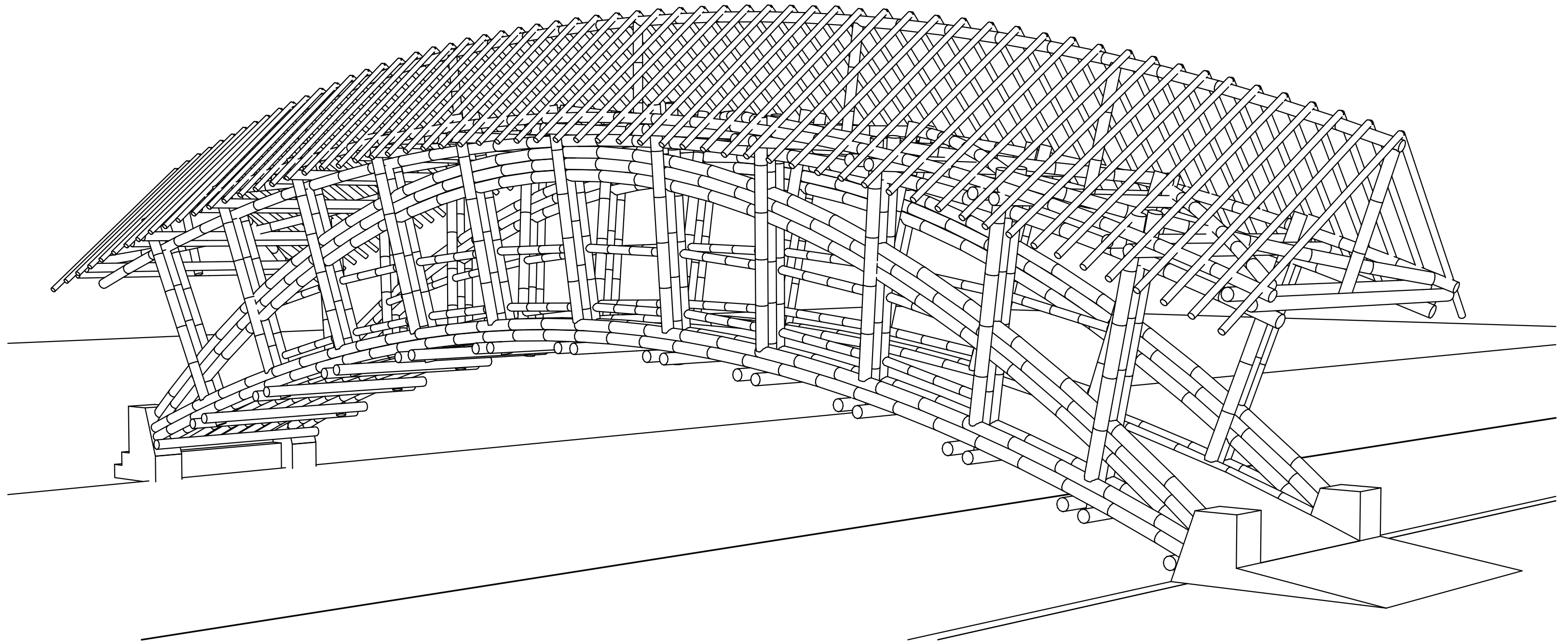


# Bamboo Bridge in Solo: A Preliminary Report

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## **INDONESIA**

latitude: 11°S-6°N

longitude: 95°-141°E

time zone: UTC+7 to +9

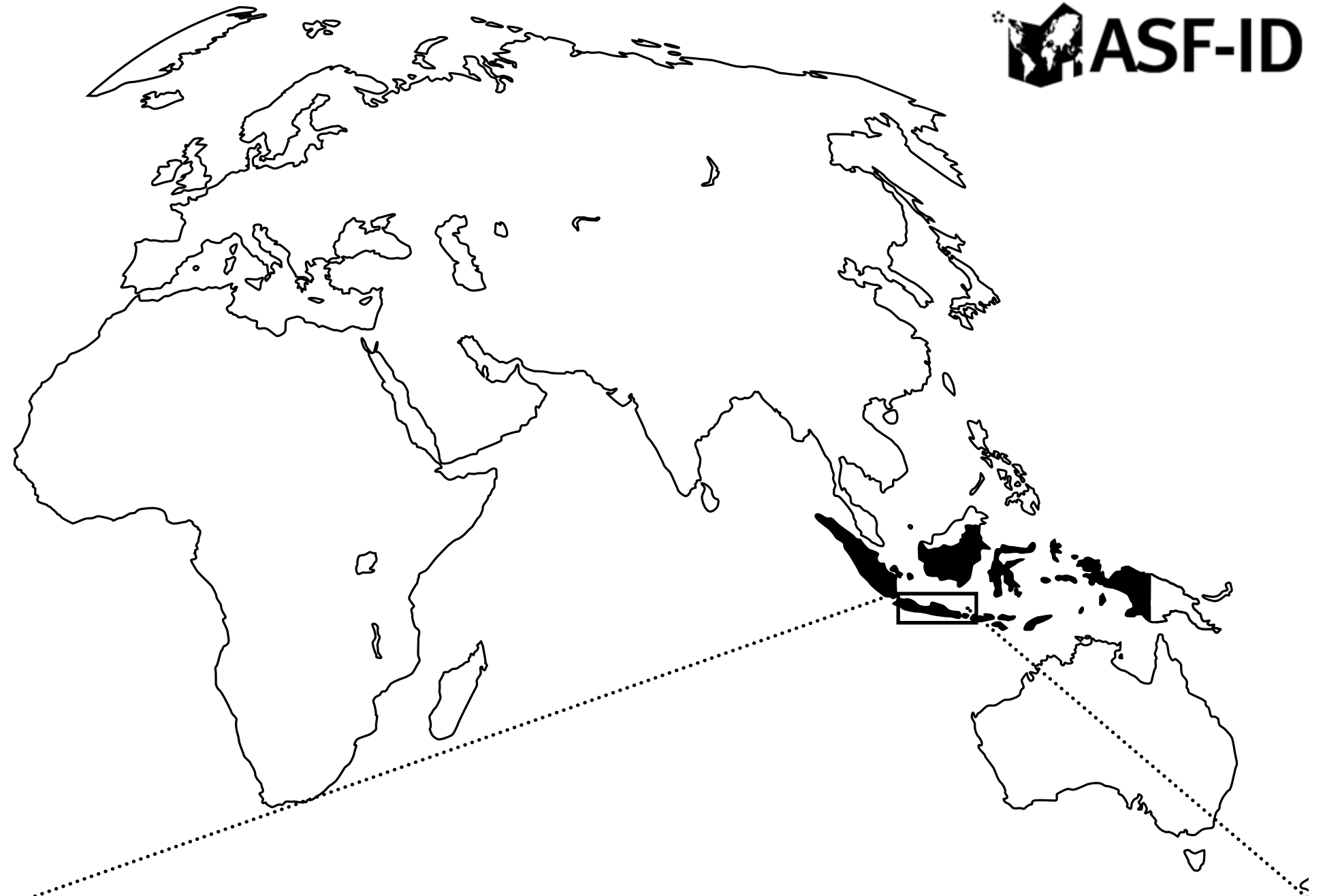
population: ca.260 mil. (54% urban)

GDP total: \$936.955 bil. (16<sup>th</sup>)

GDP/capita: \$3.620 (117<sup>th</sup>)

climate: tropical monsoon

relative humidity: 70-90%



## SOLO (SURAKARTA)

location: 7°34 S 110°49 E

elevation: 93 - 98 m

population: 503,421 (2010)

precipitation: 2.200 mm annually

day temperature: ca.31°C

night temperature: ca.21°C

motto: The Spirit of Java

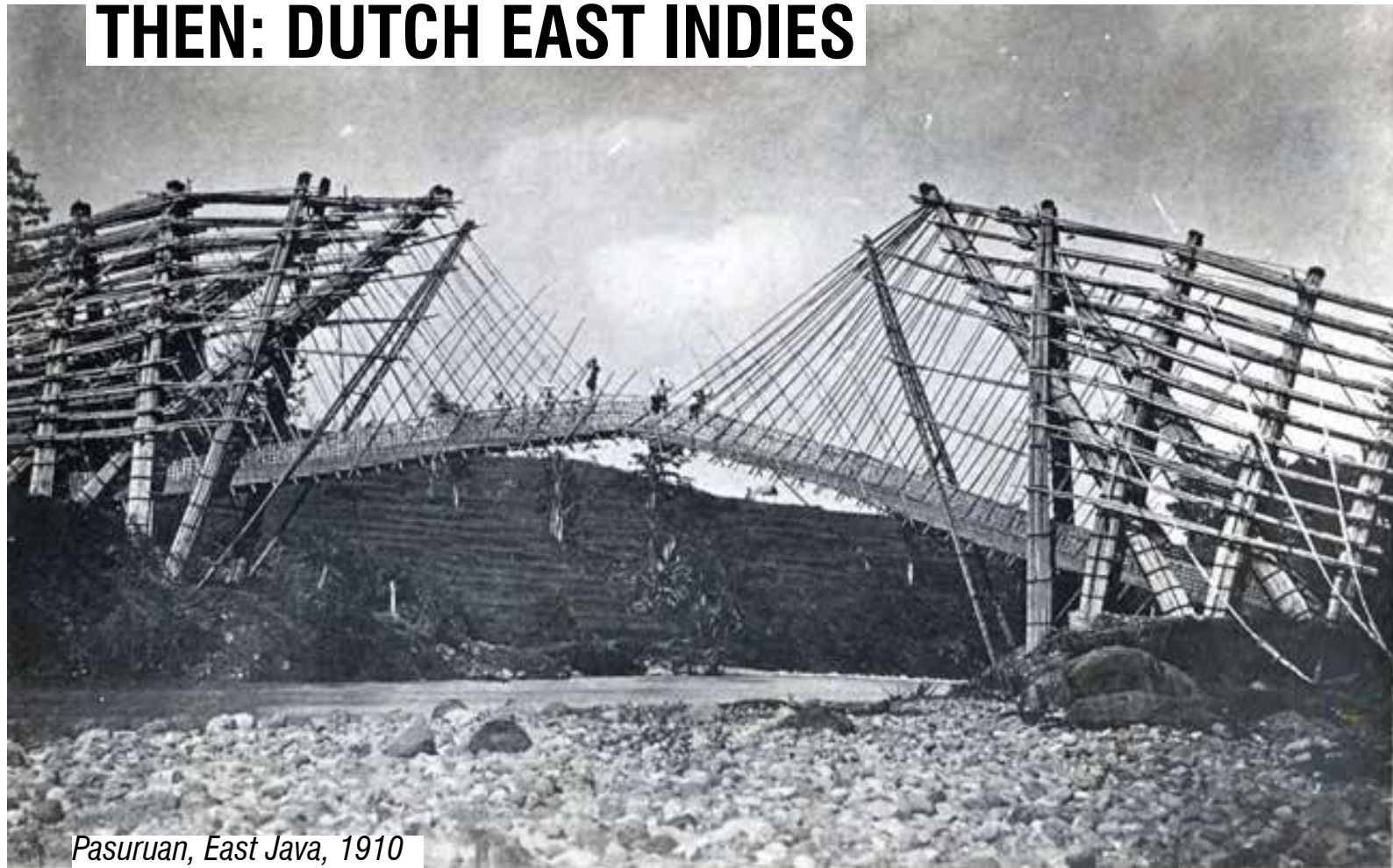




Rully,  
April 12016

2nd Bamboo Biennale, October 2016

**THEN: DUTCH EAST INDIES**

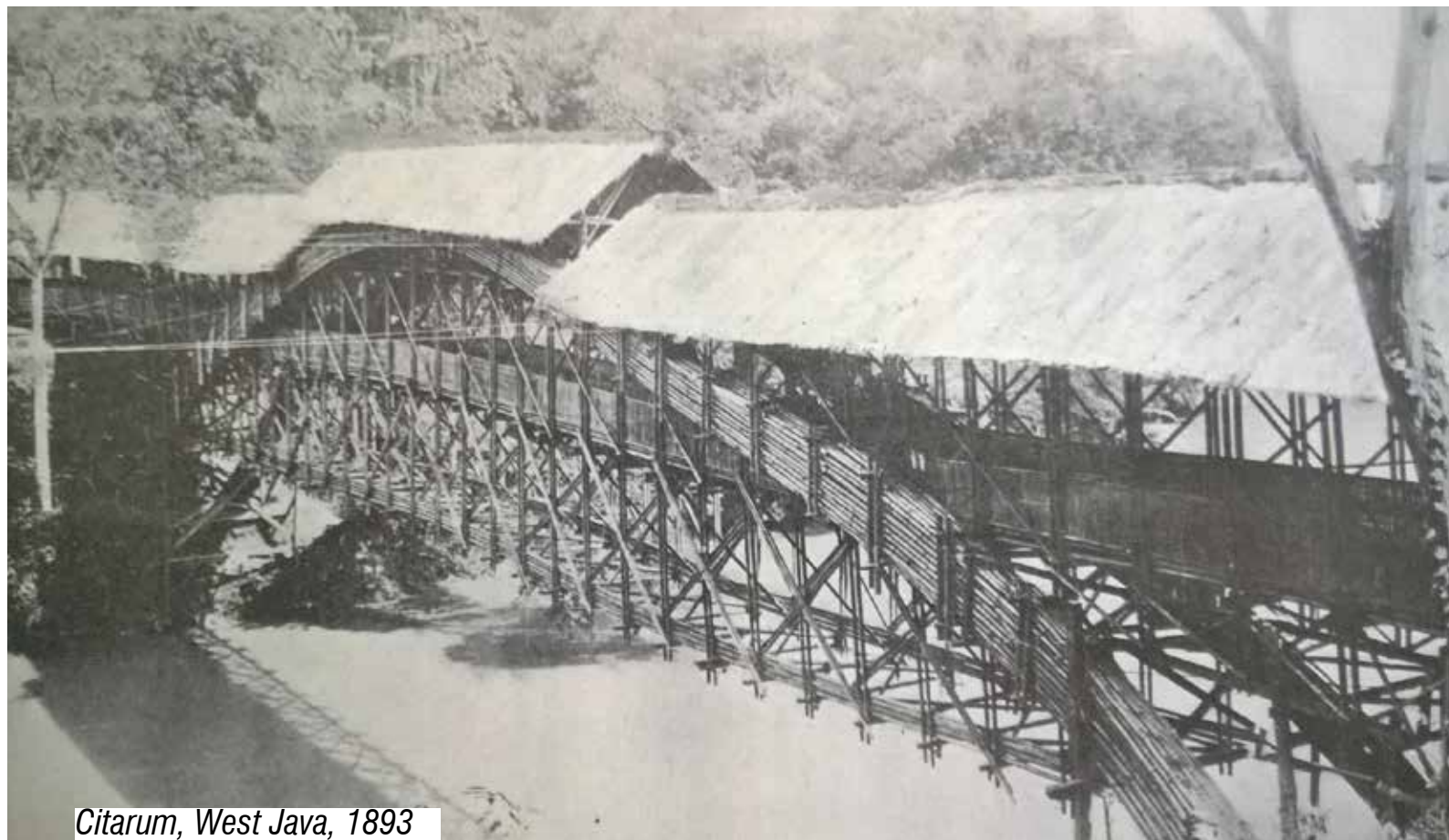


*Pasuruan, East Java, 1910*

**NOW: COLOMBIA**



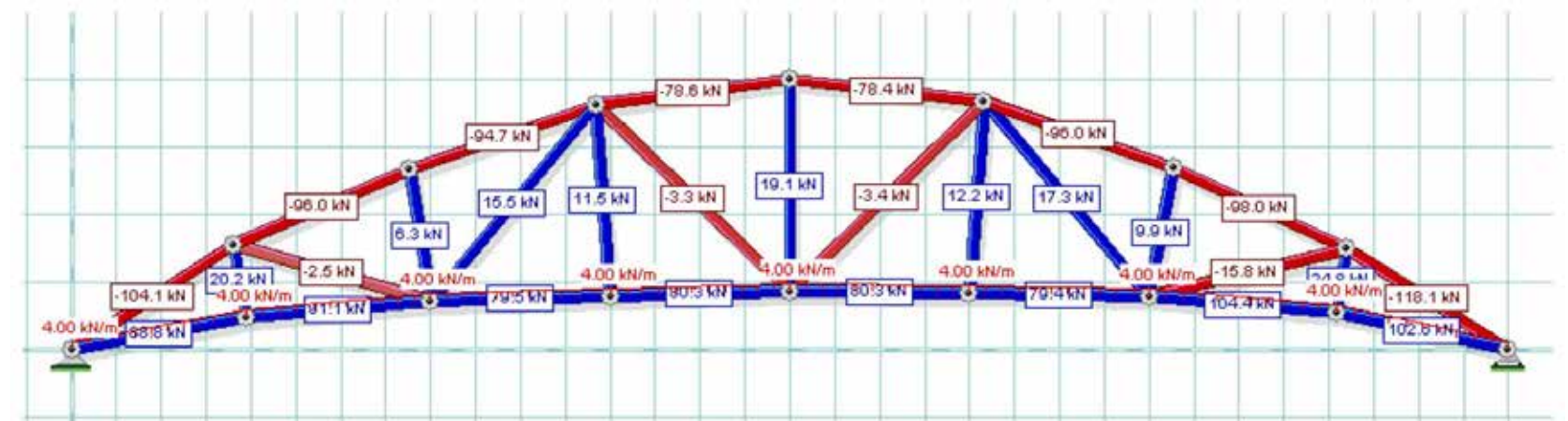
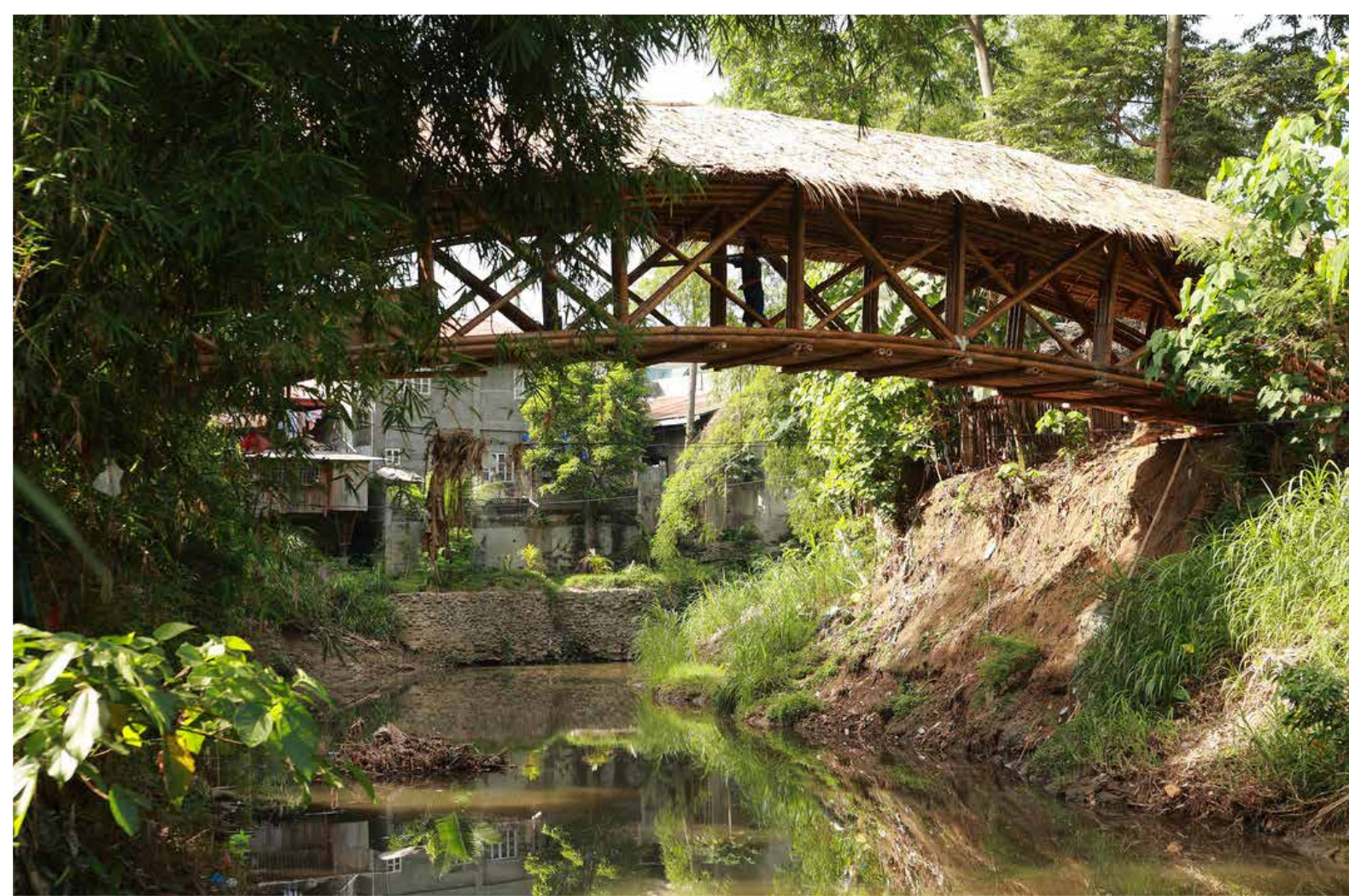
*Bogotá 2006. Architect: Simón Vélez*



*Citarum, West Java, 1893*



*Failed guadua bridge in Medellín*



Axial Forces of each member are given based on a uniform floor load of 4 kN/m. The red color indicates compression while blue members are in tension.



Photo from December 2014

## Bamboo Bridge in Davao, Philippines (2011)

Geo: 7°3'38.7" N, 125°34'8.9" E

span: 23 m pedestrian bridge

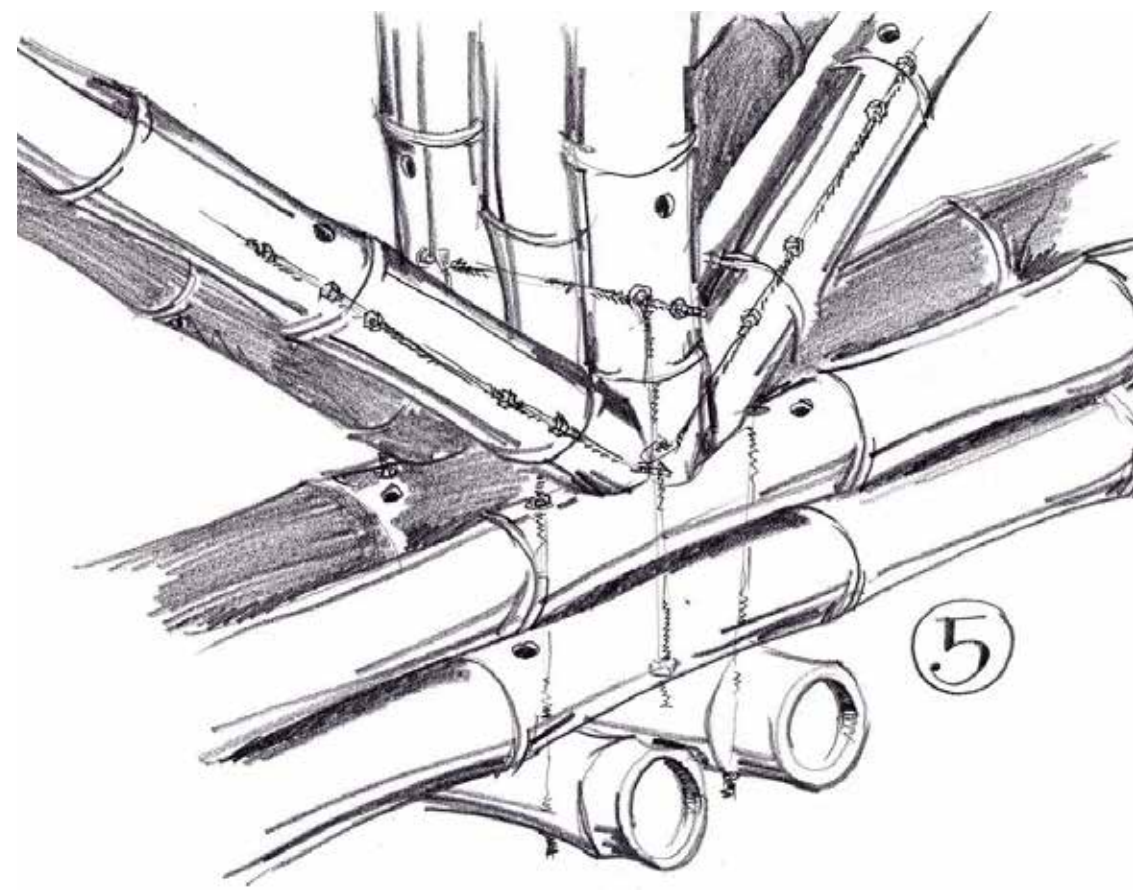
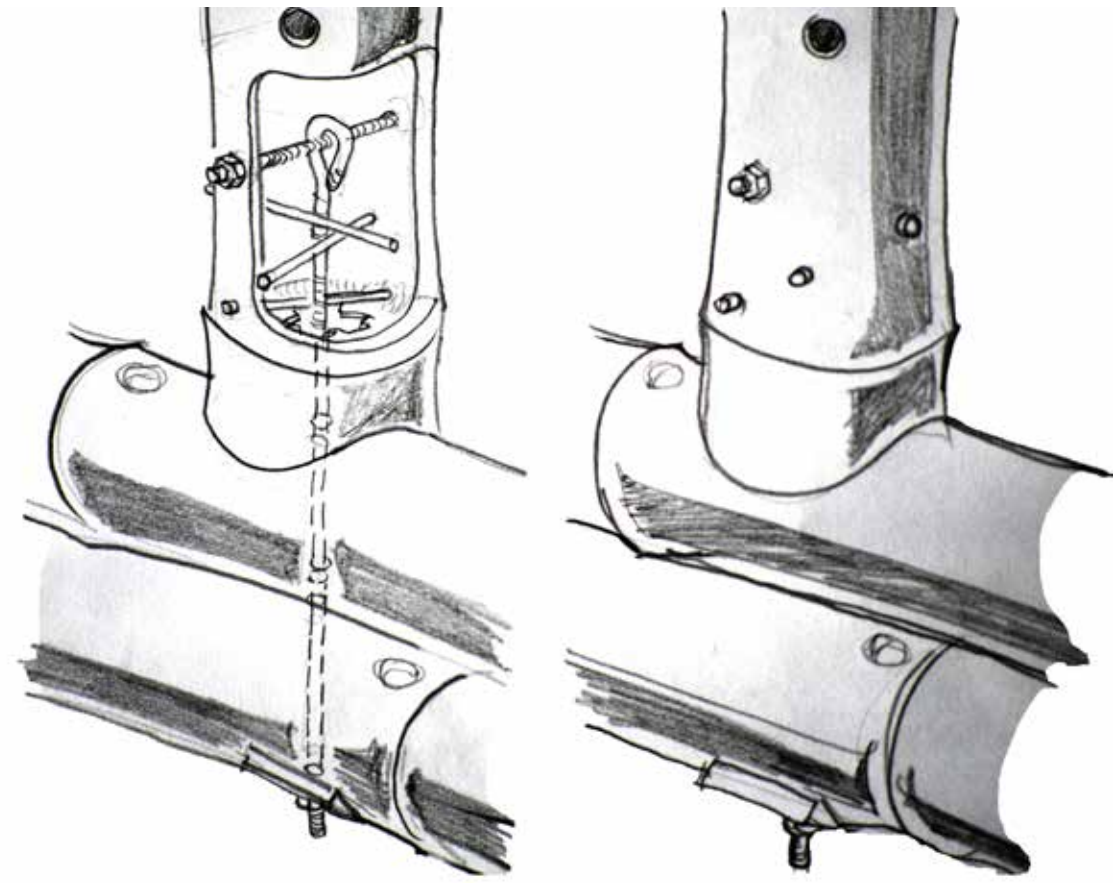
species and: D.asper, D.latiflorus, B.blumeana

diameter: ø14 cm, ø12 cm, ø10 cm, respectively

treatment: borax+boric acid

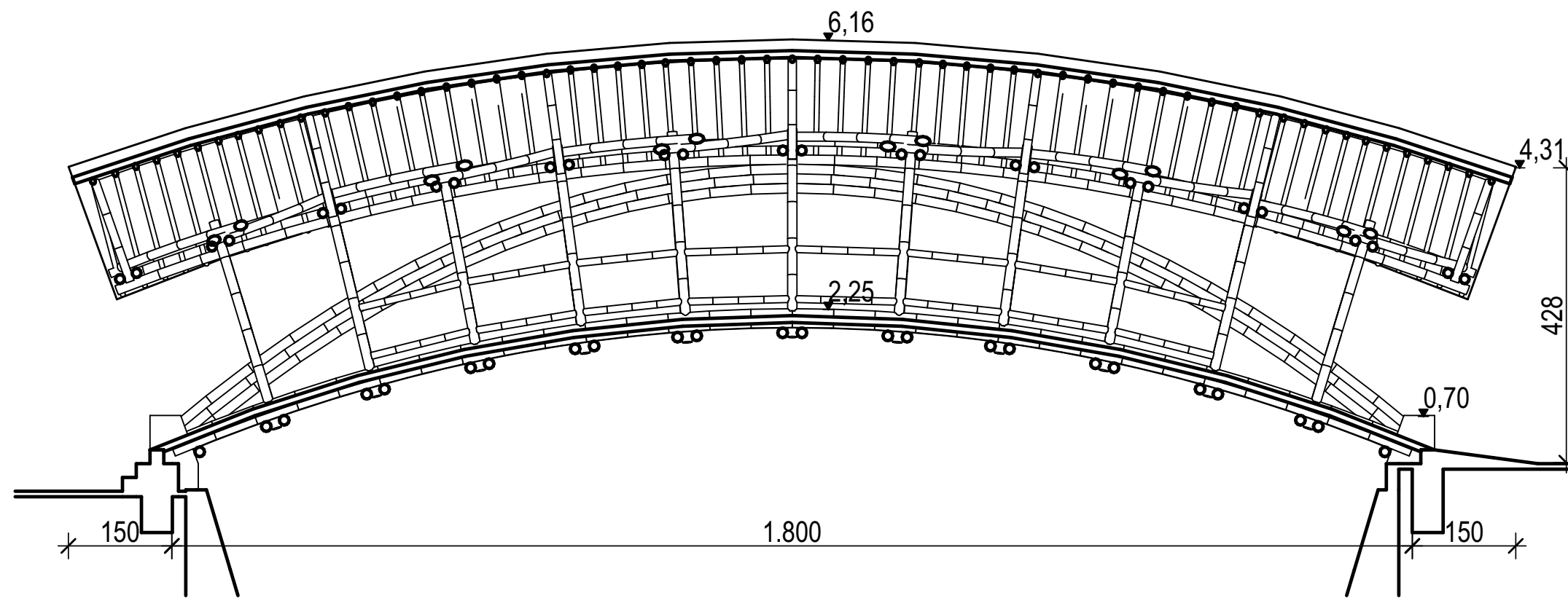
cost: USD 7.000 (community loan)

partners: Homeless People's Federation Philippines Inc., Asian Coalition for Housing Rights, University of Mindanao (Civil Eng.), University of Philippines Mindanao (Arch.)

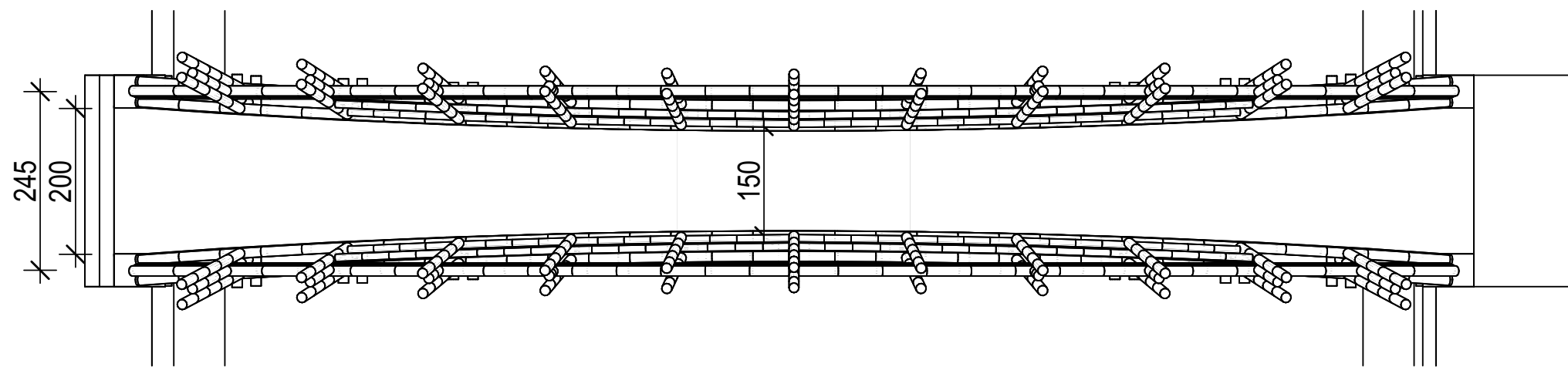


Flood on June 29<sup>th</sup> 2011





**2 SECTION**



**1 PLAN**

**Bamboo Bridge in Solo, Indonesia**  
 span: 18m pedestrian bridge  
 species and: D.asper, G.apus  
 diameters:  $\varnothing$ 14 cm,  $\varnothing$ 7 cm  
 treatment: borax+boric acid (Bambubos)  
 construction: October-January 2017  
 cost: ca.USD 10.000 (Bamboo Biennale)



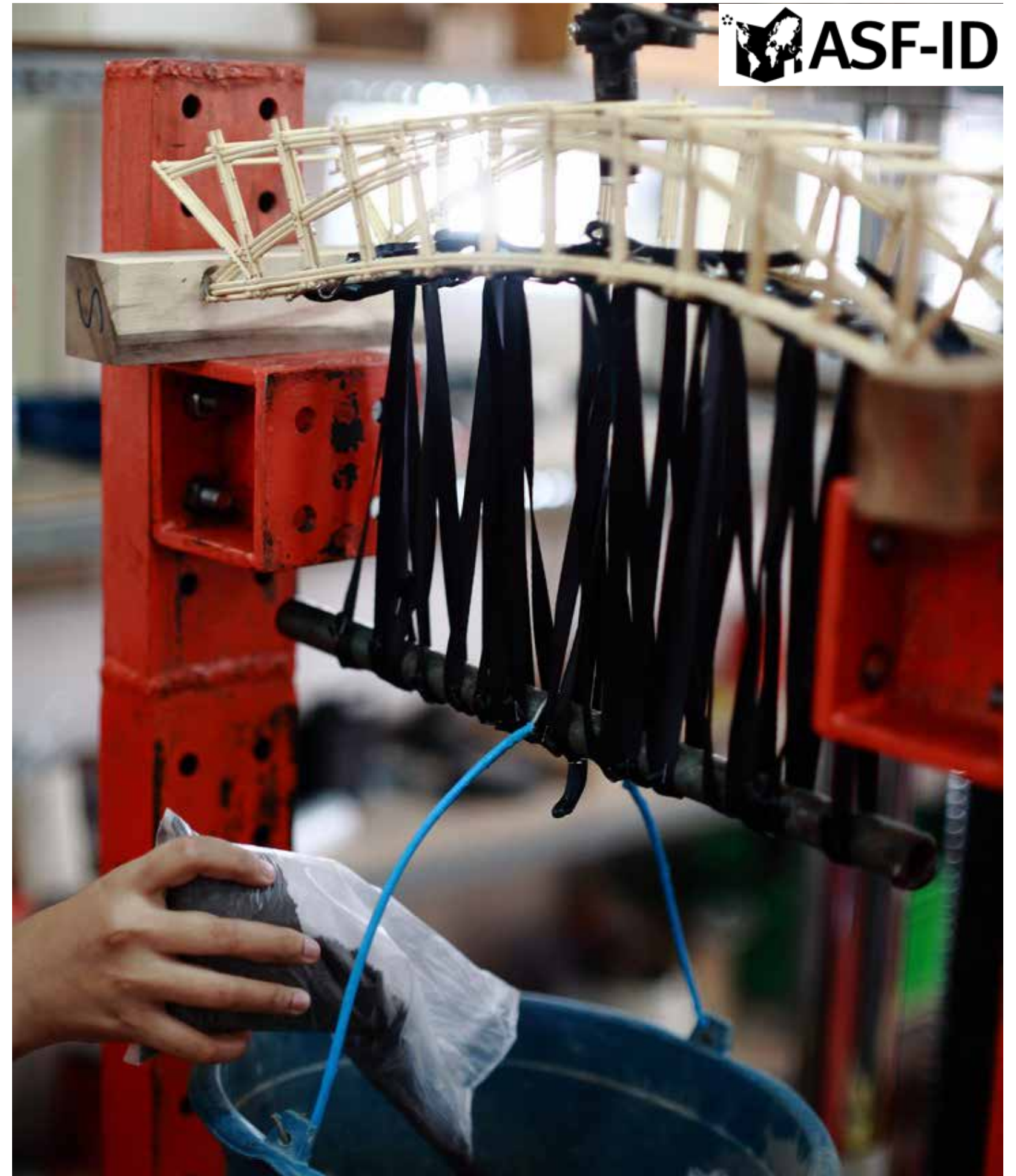




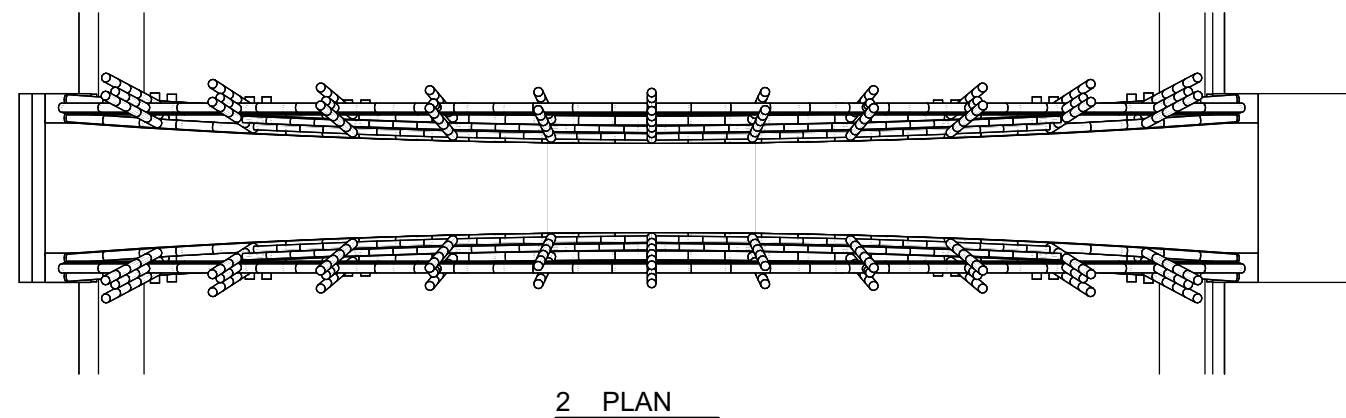
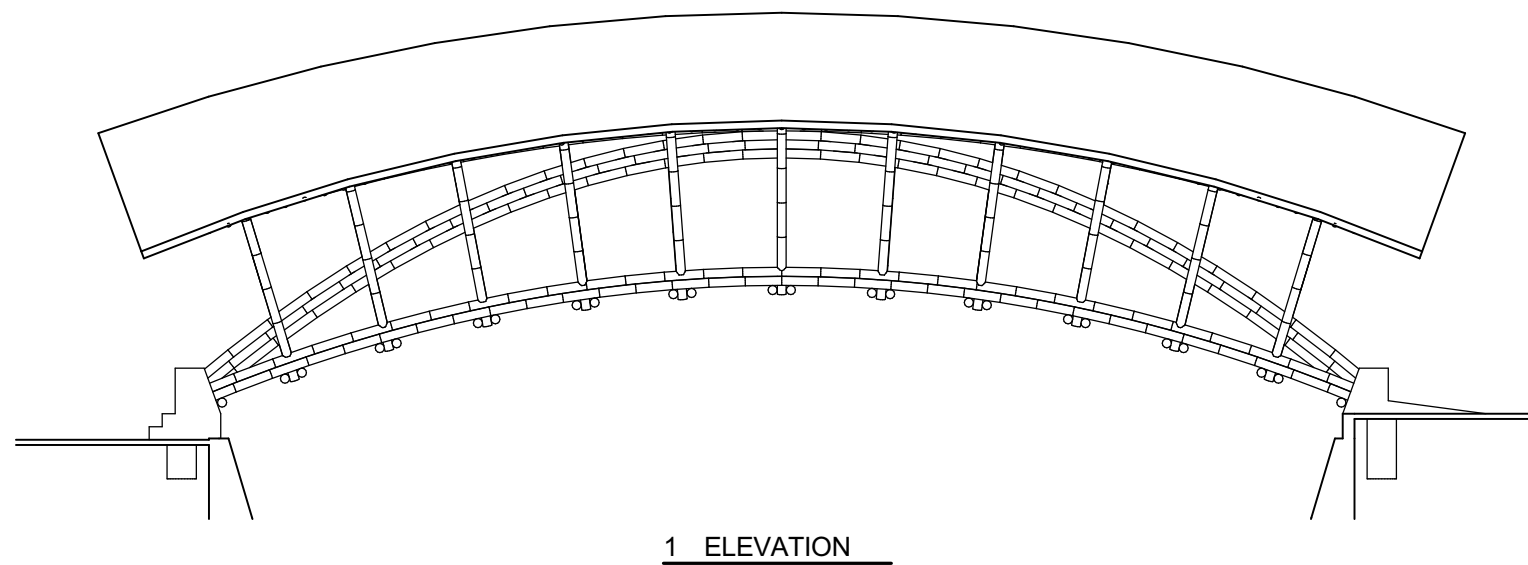
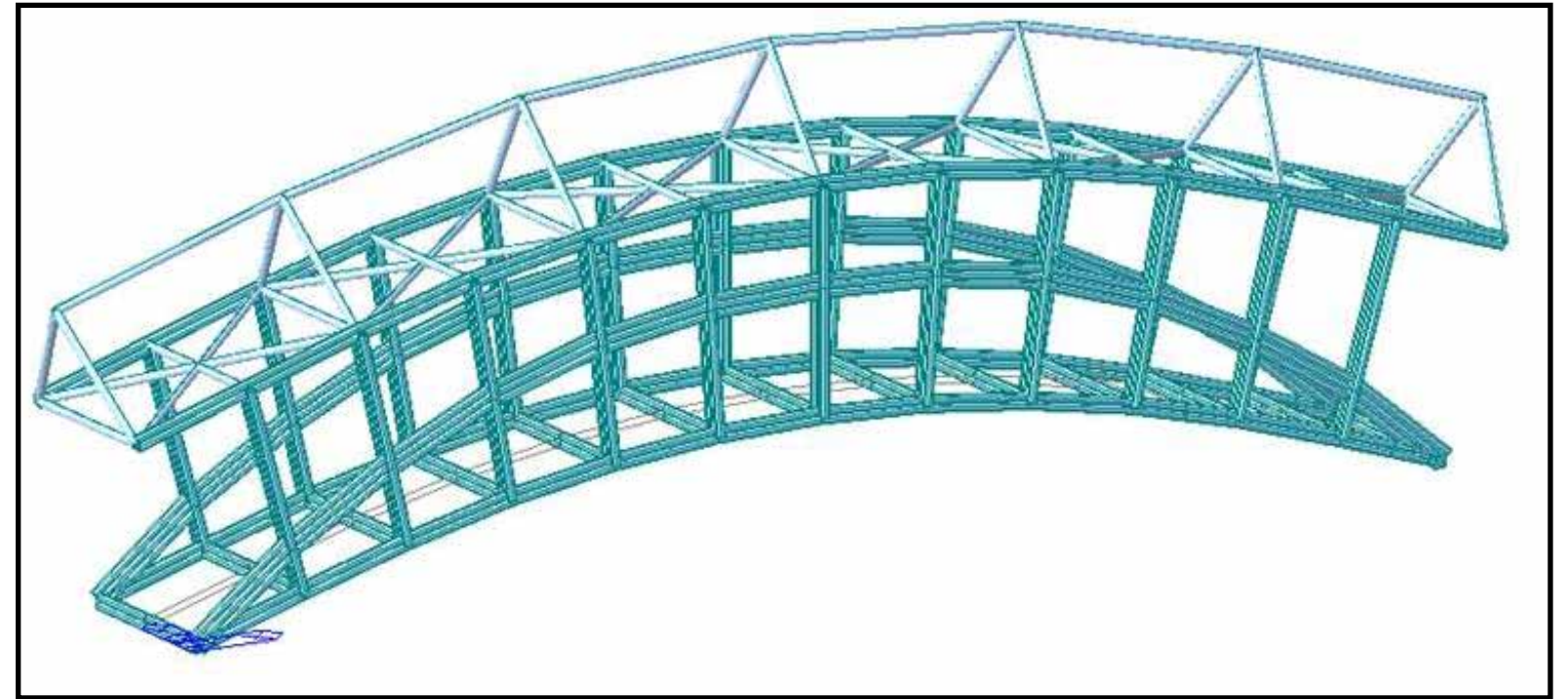
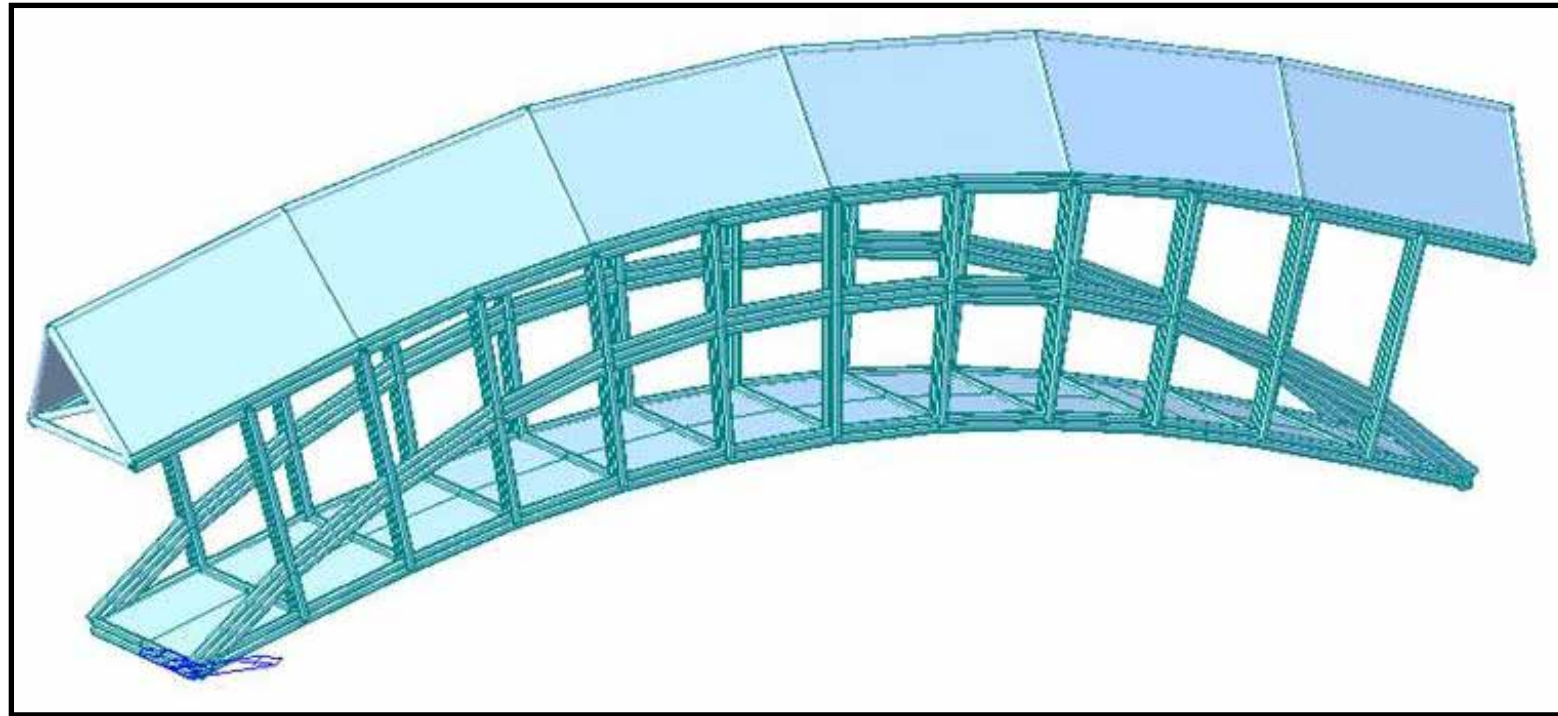
## SCALE MODEL

The scale model was tested at the Structural Engineering Laboratory at *Parahyangan Catholic University* to observe the **structural behavior** and **critical element**.

The experiment shows that failure occurred in **the joint** instead of **the element**, resulting an instability issue. Hence, the connection needs to be modified to overcome this issue.



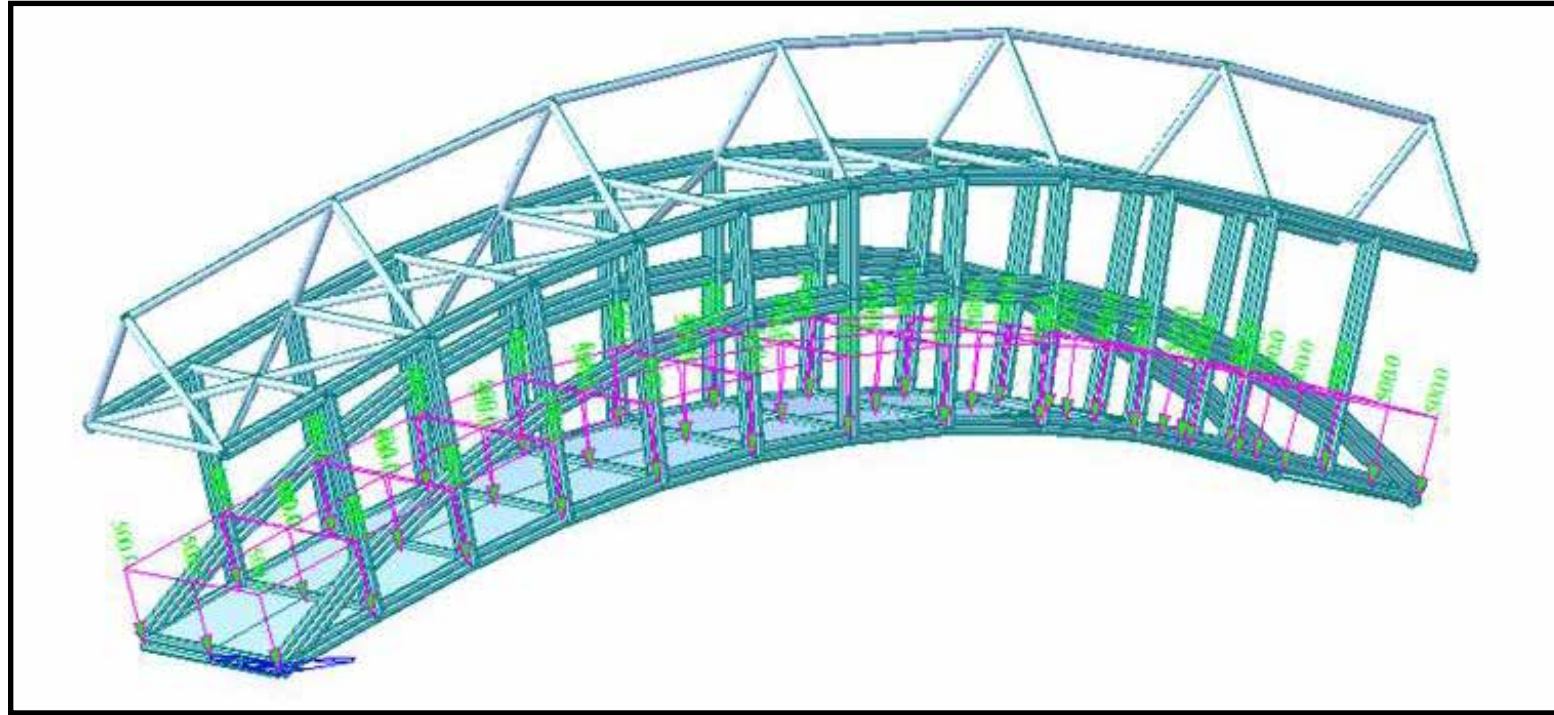
# 3D MODEL



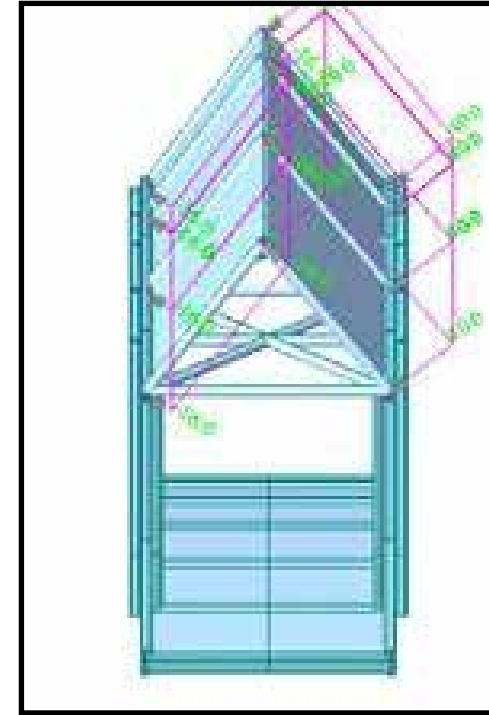
Material Property: Secondary Data  
( $E = 7.000 \text{ Mpa}$ , Dry Density =  $650 \text{ kg/m}^3$ )  
Section and Geometry: as built drawing  
3D model: Midas Civil Software

In order to validate the scale model test, to ensure that the displacement occurs still OK (*allowable displacement*).

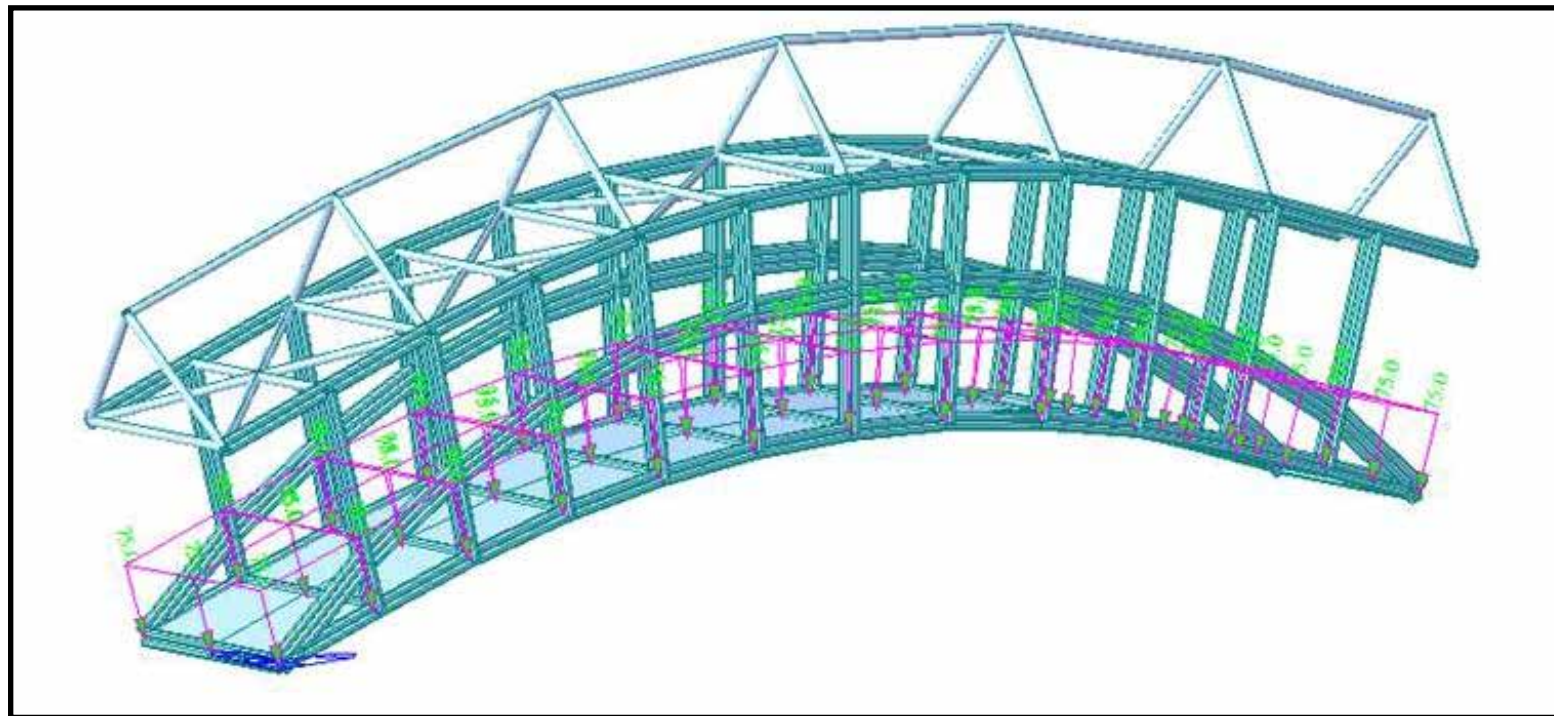
# DESIGN LOAD



Pedestrian Load ( $500 \text{ kg/m}^2$ )

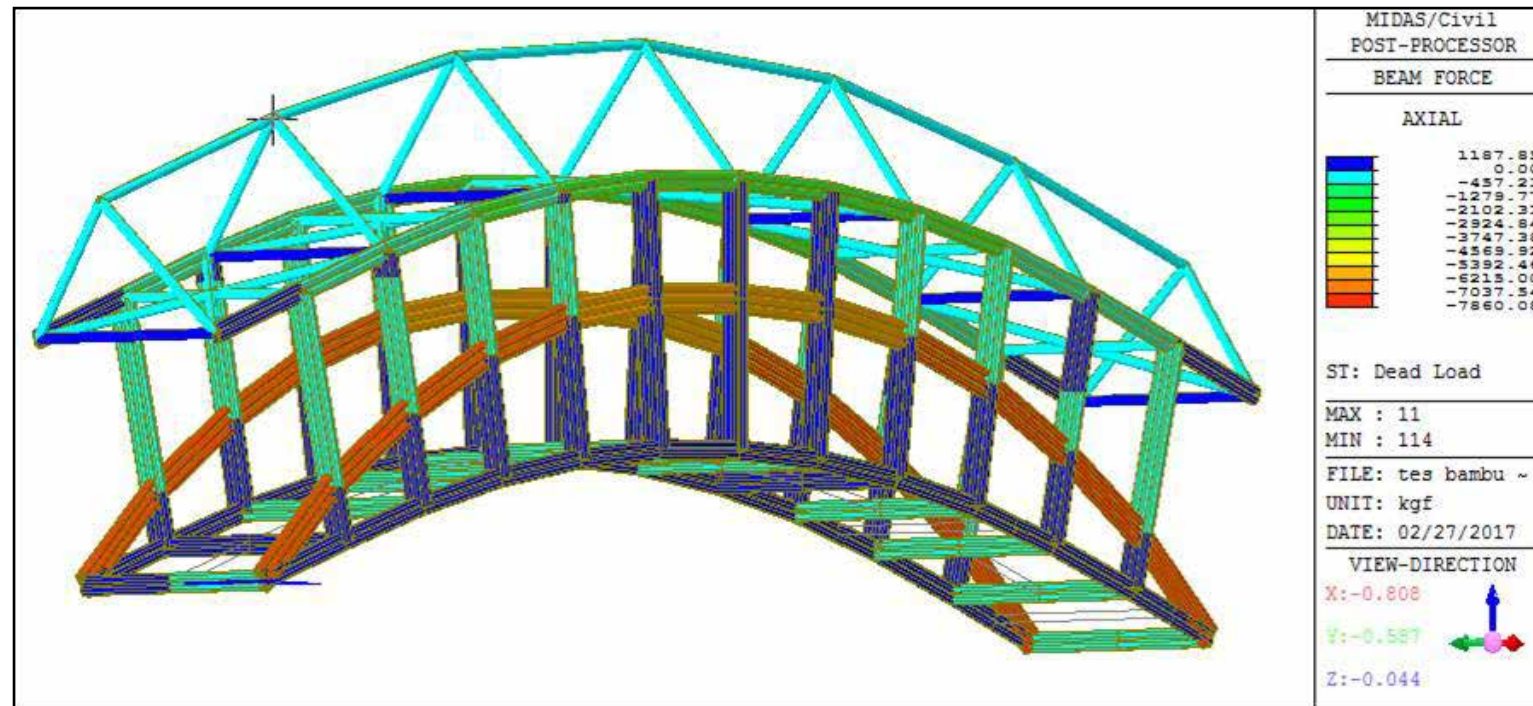


Wind Load on roof

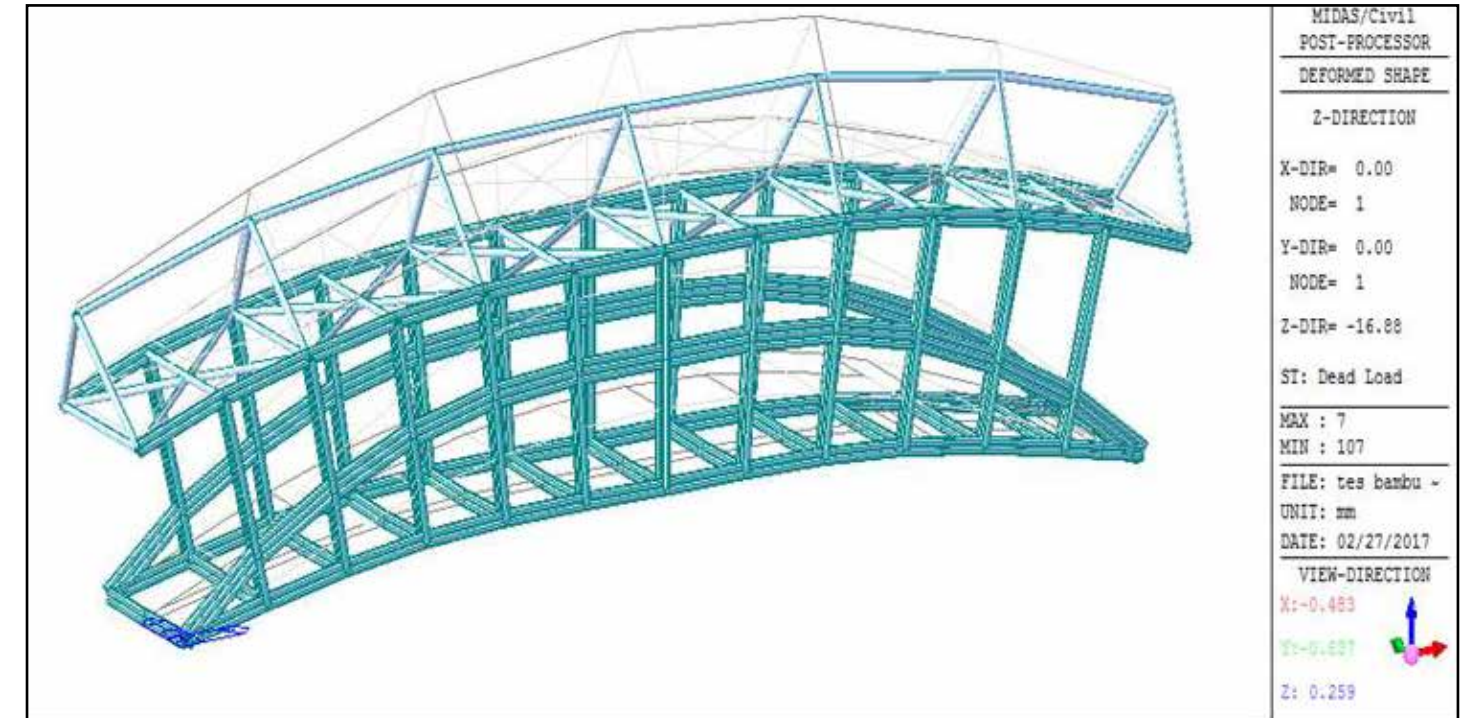


SDL ( $75 \text{ kg/m}^2$ )

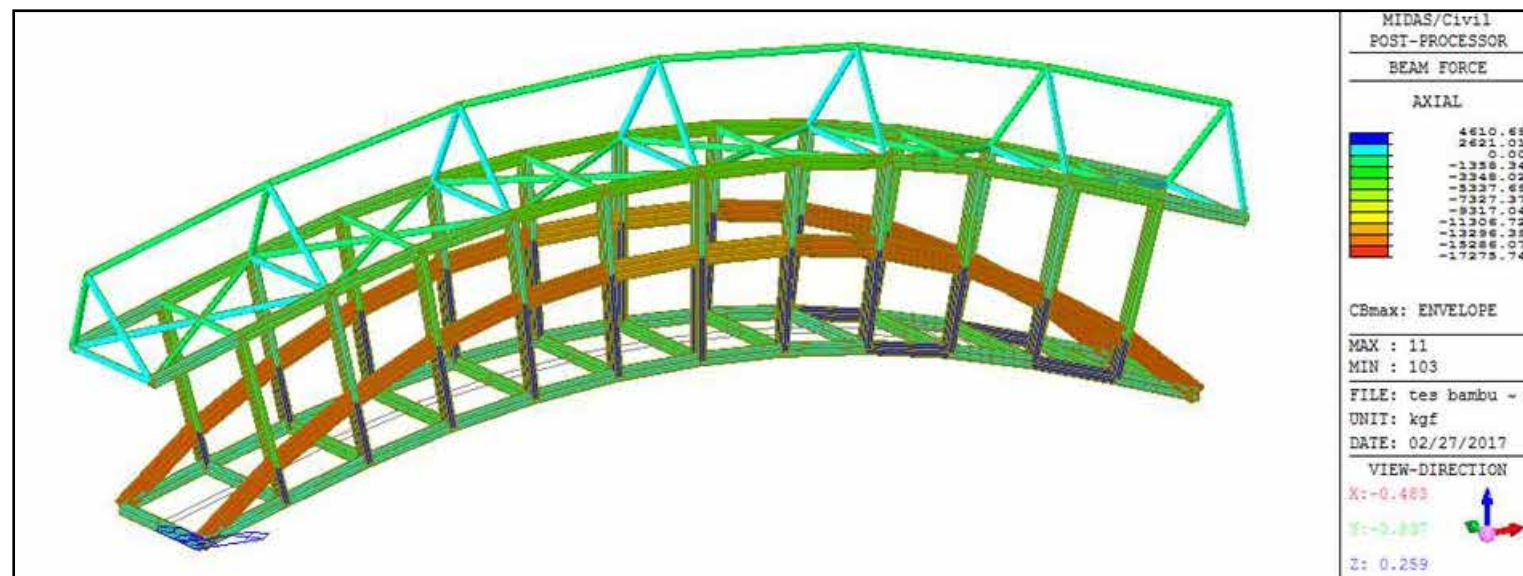
# RESULTS



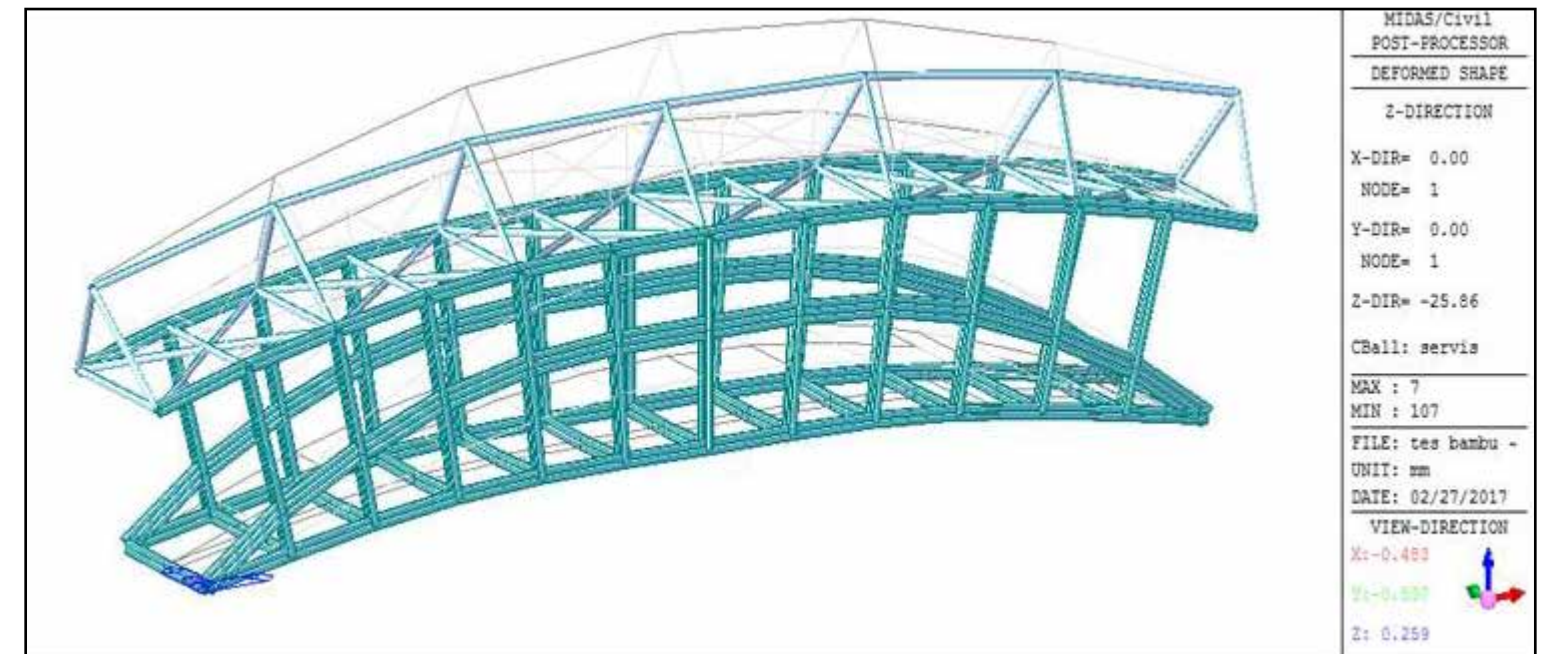
The Internal Force – Axial – Dead Load



Maximum Displacement: 16 mm (dead load)

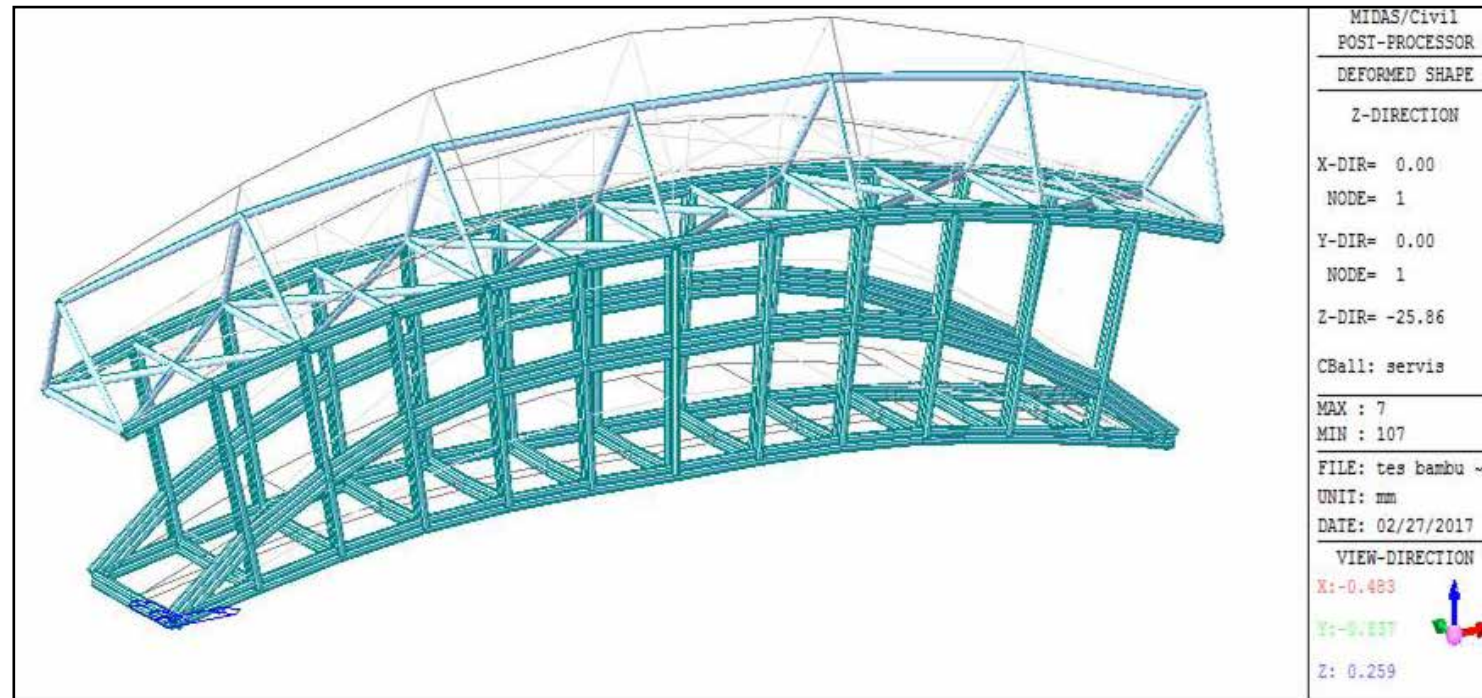


The Internal Force – Axial – Ultimate

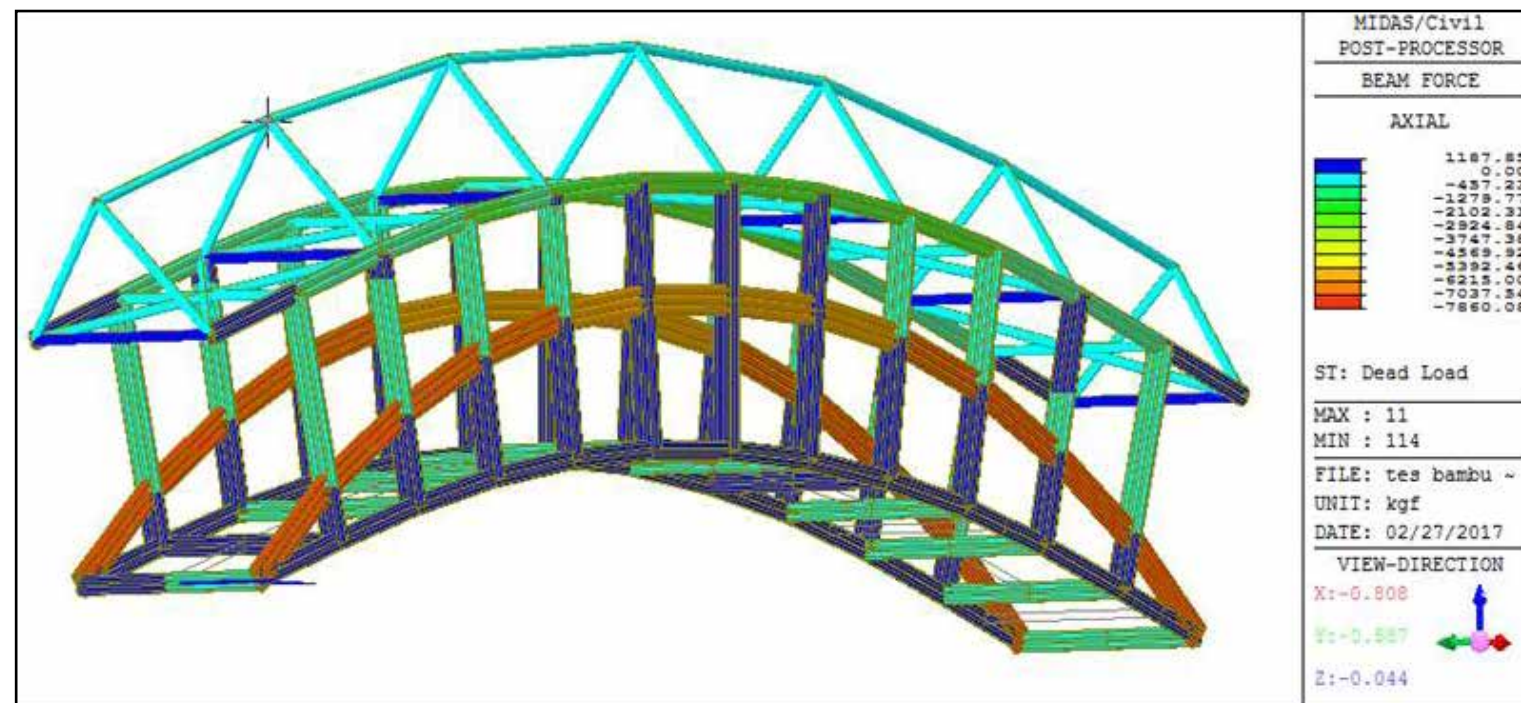


Maximum Displacement: 25 mm (service load)

# RESULTS



Maximum Displacement: 25 mm < allowable displacement: 60 mm



Maximum Displacement: 25 mm (service load)

Stress Check needs **allowable stress** of the element (axial, compression, shear, and bending)

*Bamboo's variability and the lack of proper grading methods mean that testing of members and connections will always be needed.*



photo: Sisca Pramudya

## ***GOTONG ROYONG* - PARTICIPATION**

The adjacent community of Kampung Ketandan contribute in the construction and management of the bridge through provision of lodging for carpenters and in provision of community volunteers.

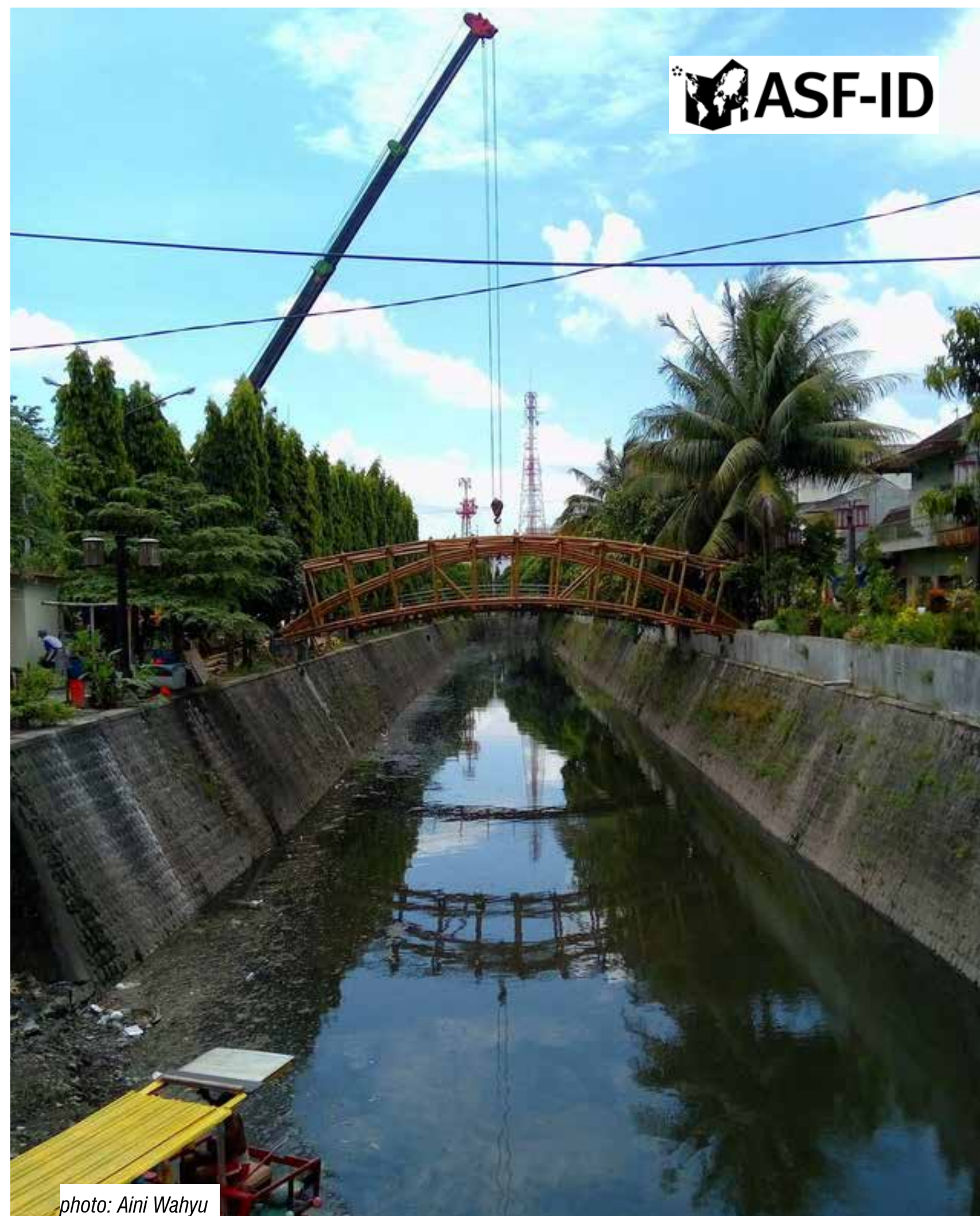
The community further agrees to guard and care for the bridge, that is first of its kind in Indonesia.



photo: timlo



photo: Aini Wahyu



ASF-ID

photo: Aini Wahyu





## Cầu tre Solo - Cam kết bền vững với tương lai

Thứ 2, 13/02/2017 2601

Các kiến trúc sư Indonesia không biên giới (ASF-ID) đã hoàn thành công trình công cộng cầu tre ở thành phố Solo, Indonesia. Công trình như là một sự cam kết với kiến trúc bền vững trong tương lai.



## Il ponte in bambù progettato da Architetti senza Frontiere in Indonesia

Sfruttando le potenzialità strutturali del bambù, il team di Architetti senza Frontiere ha progettato e realizzato un ponte pedonale in Indonesia in occasione della Biennale Bambù 2016

Diletta Bracchini 2 marzo 2017



## indonesian architects without borders construct bamboo bridge in solo, java

453 272 167 68

WORLD SOURCE

## สะพานไม้ไผ่ โดยสถาปนิกอินโดนีเซีย ดังไปทั่วโลก

13:21น. 10 กุมภาพันธ์ 2560

โครงการนี้ถูกออกแบบโดยสถาปนิกชาวอินโดนีเซีย โดยมีแนวคิดการออกแบบที่ใกล้ชิดกับธรรมชาติและอนุรักษ์สิ่งแวดล้อม



BBS · 园林景观 · 公共环境案例

### 14 印尼solo竹桥

发表于2017-2-13 0条评论 275次浏览 昆明市 +50 搜索相似帖 只看楼主



标签: solo竹桥 without borders 印尼 公共环境

英文名称: Indonesia solo Bamboo bridge

工程内容: 实景照片

位置: 印度尼西亚

设计团队: without borders

下载全套大图



دانش و فن آوری معماری

## ساخت پل بامبو توسط معماران اندونزیایی در جاوا

این پل عابر پیاده از جنس بامبو در بالای رودخانه په په کالی توسط معماران اندونزیایی طراحی و ساخته شده است.

ساخت این پروژه دوم اکتبر سال 2016 با استفاده از چوب محلی گونه ای بامبو به نام petung آغاز شد. برای ساخت این پل از همه ی مردم محلی و تجار ها کمک گرفته شد. پس از پایان ساخت پل بامبو از یک سقف سیمانی برای افزایش دوام آن استفاده شده است.

پل عابر پیاده بامبو دارای دهانه ای 18 متری و عرضی متغیر بین 1.8 و 2.3 متر می باشد و هزینه ی ساخت آن حدود 10000 دلار بوده است.







A long, covered walkway made of bamboo poles, leading towards a building in the distance. The walkway is flanked by bamboo railings and has a bamboo roof structure. The ground is a light-colored concrete or stone path. In the background, a building with a white facade and a red roof is visible, along with some greenery and a body of water on the right side.

**THANK YOU!**

write to us:  
[andrea@asf.or.id](mailto:andrea@asf.or.id)  
[altho.sagara@unpar.ac.id](mailto:altho.sagara@unpar.ac.id)