

# Engineering and Appropriate Technology

## La Ingeniería y la tecnología apropiada



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# Exploramos

¿Que hacen los/las ingenieros/as?

# Exploramos

¿Para quienes los/las ingenieros/as resolveran los problemas?

# Exploramos

¿Cuales son ejemplos de impactos positivos de la ingeniería?

¿Piensas que todo el mundo aprovecha la tecnología de la misma manera (igualmente)?

# Exploramos

¿Cuales son ejemplos de impactos negativos de la ingeniería?

¿Piensas que todos/as somos afectados/as de la misma manera (igualmente) con los problemas causados por la tecnología?

# La tecnología apropiada

La tecnología apropiada es una filosofía en lo cuál:

- Creamos los diseños para fomentar el bienestar de los seres humanos Y para evitar consecuencias negativas al ambiente
- Balanceamos el propósito de la tecnología para reducir el trabajo repetitivo con la necesidad de mantener empleo (las máquinas no deben reemplazar totalmente el trabajo humano)
- Desarrollamos la tecnología de una manera participativa con la comunidad

# Ejemplo: acceso del internet

Access to highspeed internet at home:

- Sweden, Denmark, and Finland: 90%
- United States: 78%
- Puerto Rico: 27%
- World Average: 26%
- Haiti, Kenya: 10%

Based on analysis of Population and Internet Users data provided at <http://www.indexmundi.com/charts.html> >> Country Rankings

# GREAT IDEA

Our project GREAT IDEA sponsors research in AT

Graduate Research and Education for Appropriate Technology:  
Inspiring Direct Engagement and Agency ([greatidea.uprm.edu](http://greatidea.uprm.edu))

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# GREAT IDEA

GREAT IDEA currently supports research in the following topics:

- Low cost power inverters
- Active biological and chemical mechanisms in biosand filters
- Structural properties treatment methods of bamboo
- Micro-grids for rural electrification
- Biomass-burning stoves
- Using visualizations to foster public input in development projects

# Bamboo as AT

Bamboo has many advantages that align with AT:

- Fast growing source of biomass
- Aids soil conservation
- Can be cultivated and harvested sustainably and in an eco-friendly manner
- Stiffness to weight ratio is comparable to steel
- Flexible
- Can develop local economies
- Research and development can foster capacity building
- Beautiful and elegant

# Imagine Bamboo

Many innovative, functional, and majestic structures have been built from bamboo all over the world:

<http://www.inspirationgreen.com/bamboo-buildings.html>

# CAAMBOO

CAAMBOO

University of Puerto Rico

Mayagüez Campus

# Geodesic Dome

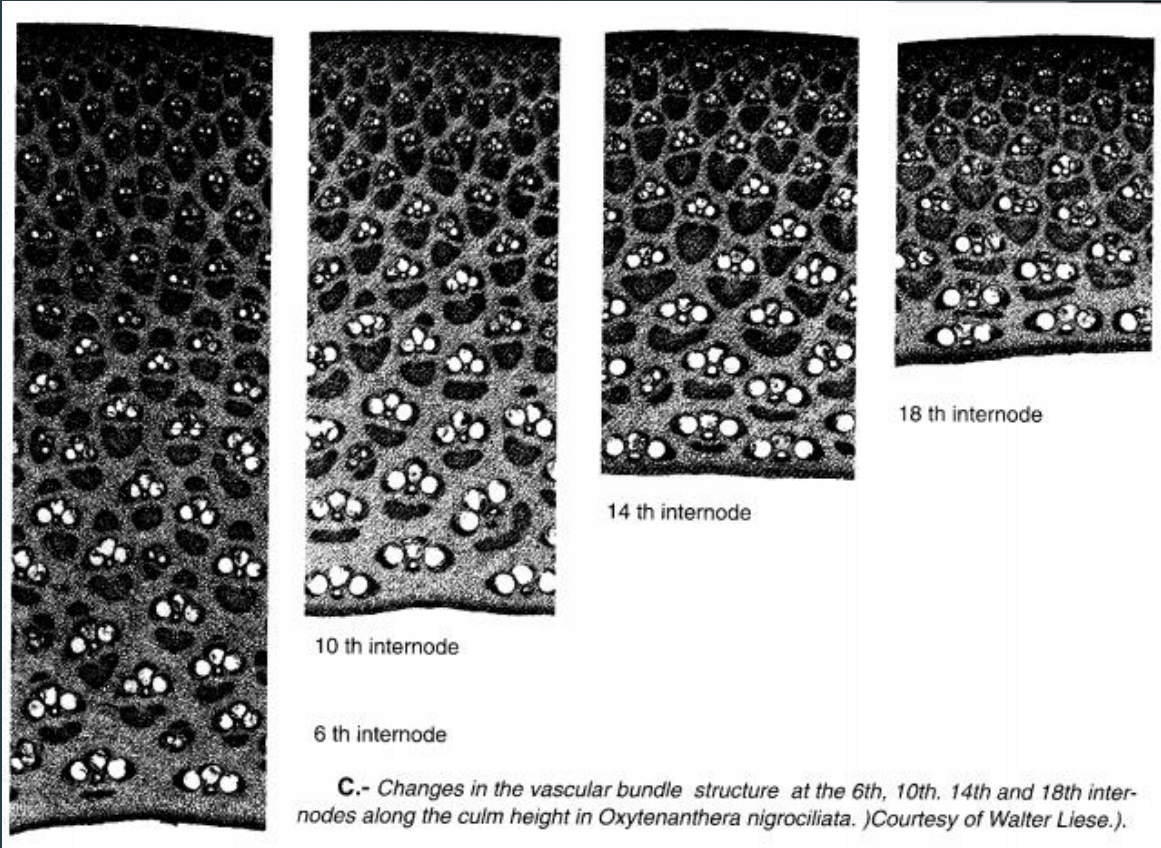


# Why use Bamboo

- ▶ Bamboos are some of the fastest-growing plants in the world, due to a unique rhizome-dependent system.
- ▶ Bamboo has a higher compressive strength than wood, brick or concrete and a tensile strength that rivals steel.
- ▶ Is a natural composite material with a high strength-to-weight ratio useful for structures.
- ▶ The structural bamboo used is *Guadua Angustifolia*

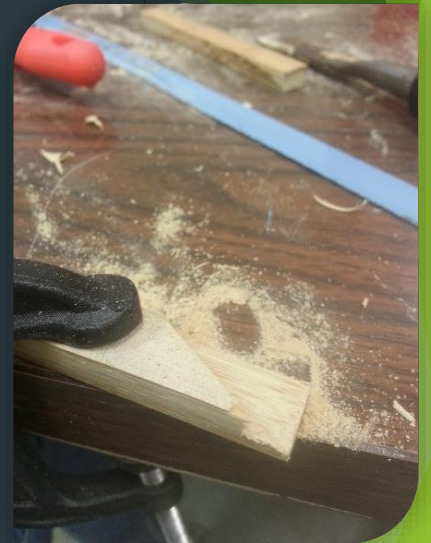
Factors of Mechanical properties include

- ▶ Density
- ▶ Age



Muchas fibras juntas hacen que sea más densa y por ende mas resistente a compresión.

# Process







# Compression Test



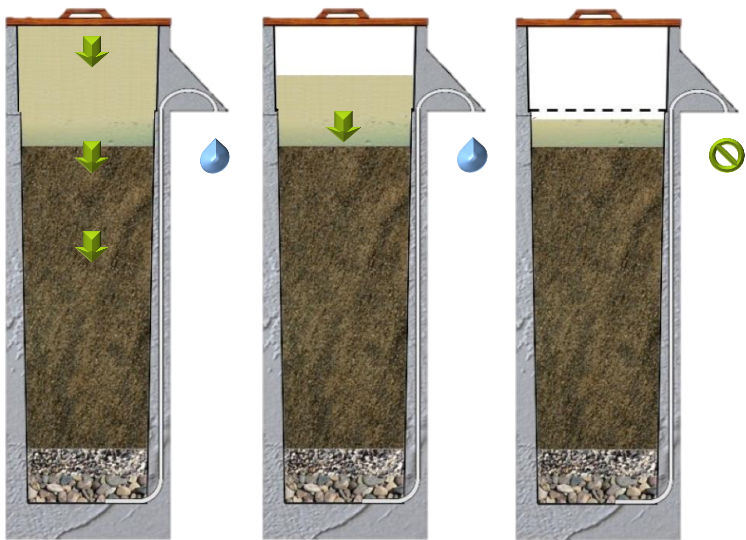
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- ▶ Department of Civil Engineering and Surveying, UPRM, for facilities use.
  - ▶ Dr. Felipe Acosta









- Adaptación del tradicional filtro lento de arena
- Diseñado por Dr. David Manz (1991)
- Implementado en más de 70 naciones
- Tecnología apropiada
  - Bajo costo
  - Disponibilidad materiales
  - Simplicidad de operación



