


**INTRODUCTION
OF
STRUCTURAL BAMBOO
AND
BAMBOO SCAFFOLDING**

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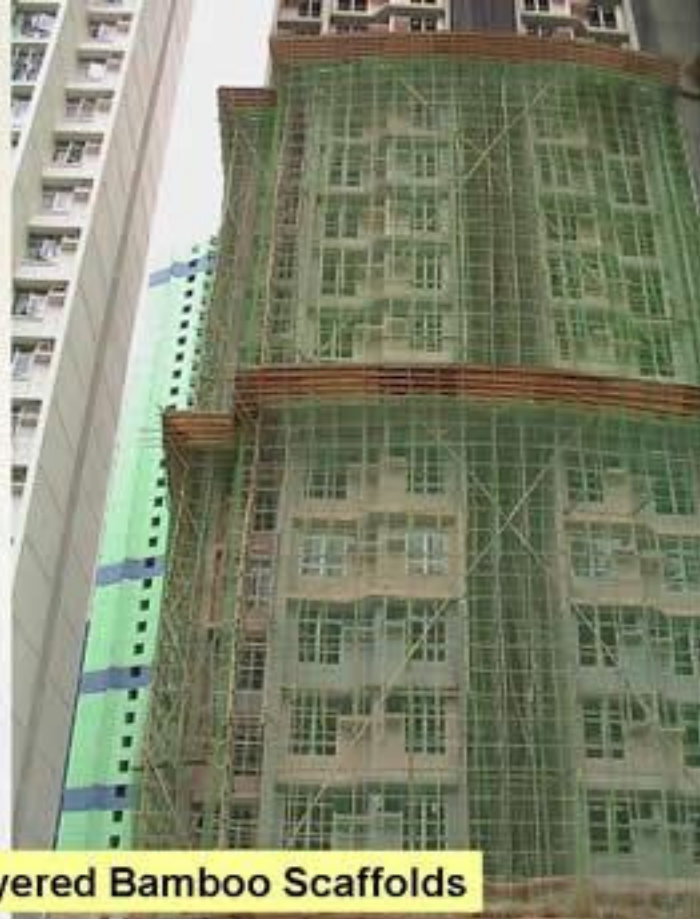




Single Layered Bamboo Scaffolds

Double Layered Bamboo Scaffolds





Double Layered Bamboo Scaffolds





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Double Layered Bamboo Scaffolds



Research and development project

- ***RCATISE***

Research Centre for Advanced Technology in Structural Engineering of The Hong Kong Polytechnic University, Hong Kong

- ***INBAR***

The International Network for Bamboo and Rattan, Beijing.



Scope of work

- General technical information of structural bamboo
- Dissemination of established bamboo scaffolding technology
 - *Design Guide*
 - *Erection Manual*
- Development of engineered bamboo scaffolding systems



Erection manual

- Typical bamboo scaffolds
 - Single layered scaffolds
 - Double layered scaffolds
 - Truss-out scaffolds
 - Cantilever scaffolds (or Signage scaffolds)
 - Platform scaffolds
 - Civil engineering scaffolds
- Typical configuration of bamboo scaffolds



Design guide

- Mechanical properties of structural bamboo
- Column buckling
- Bamboo connections
- Basic configurations of bamboo scaffolds
- Design principles of bamboo scaffolds



Bamboo Scaffolds

Temporary structures

Vertical supports

Lateral supports, putlogs

Diagonal bracings, transoms

Bamboo scaffolds are built around permanent structures which are under construction.

Which are supporting which ?



Bamboo Scaffolds

Overall instability

Posts are restrained from standards, ledgers and transoms.

Where are the supports ?

Vertical and lateral supports as well as diagonal bracings are required to prevent overall instability.

Axial member buckling

Bamboo posts

positional or lateral restraints

Bamboo columns buckled within restraints.



Bamboo Scaffolds

Structural performance

Slender members assembled on site with plastic knots manually to form slender structures.

Critical to overall instability and member buckling

*Structural forms with high redundancy
Effective load re-distribution within the system*

Other common modes of failure

Flexural failure in ledgers / Slippage in knots



Bamboo Scaffolds

Structural performance

Sensitive to boundary conditions, restraints and initial imperfections.

Non-linear analyses checking against large deformation are required, especially in self-standing scaffolds.

Standardization in structural forms, member sizes and restraint arrangements.



Bamboo Scaffolds

Practical considerations

Moisture content, member size and age.

Out-of-plumb in systems, and out-of-straightness in members.

Long term effects – weathering, decay, cracking due to dryness and UV lights.

Damage to structural forms. *How rigid and reliable are the lateral supports ?*

