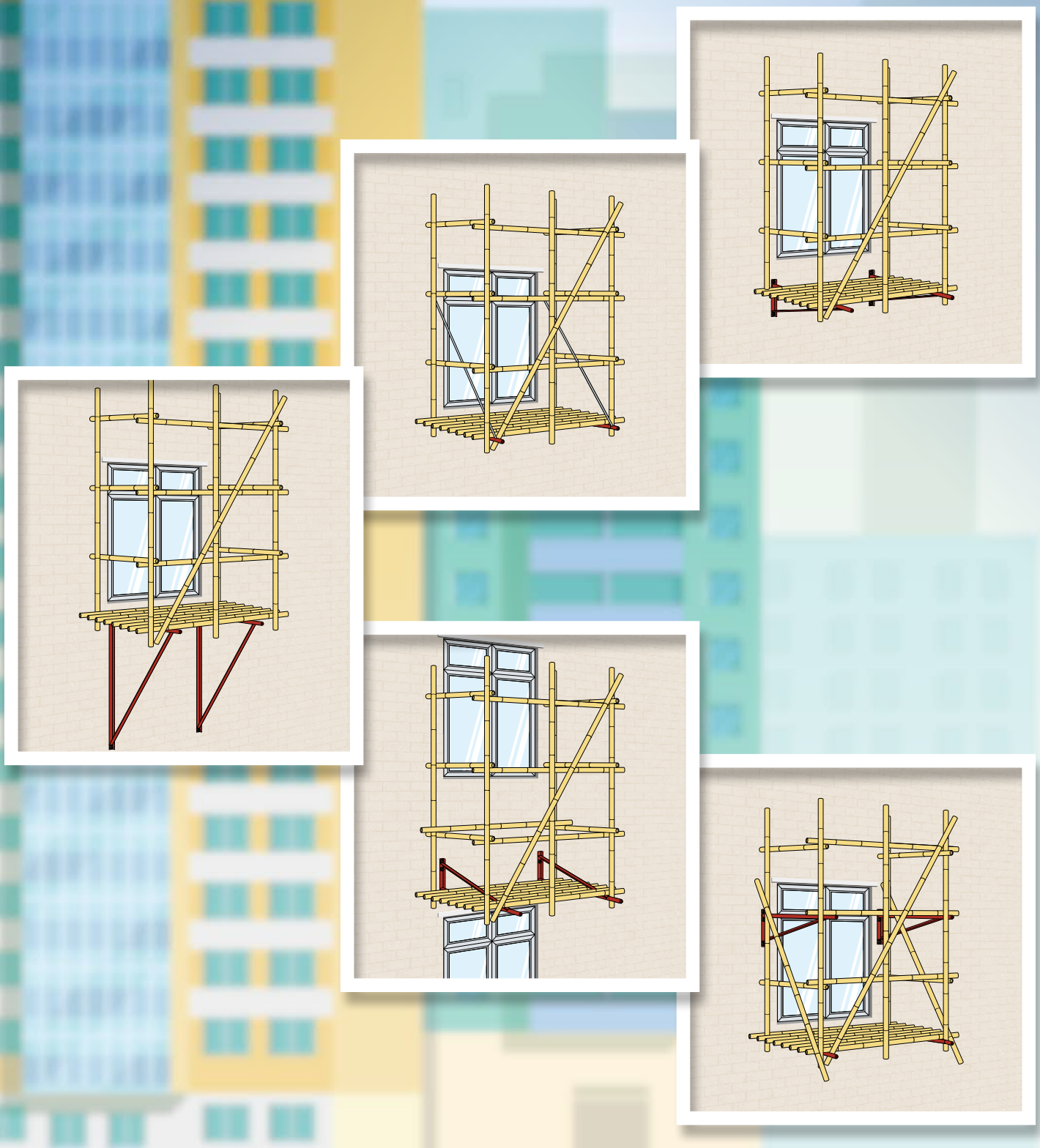
Guide on Construction and Work Safety of Truss-out Bamboo Scaffolds



Labour Department

This Guide is published by the Occupational Safety and Health Branch
Labour Department

First edition August 2023

This Guide is issued free of charge and can be obtained from the offices of the Occupational Safety and Health Branch or downloaded from the Labour Department's website at https://www.labour.gov.hk/eng/public/content2_8.htm. For enquiries on addresses and telephone numbers of the offices, please visit the Labour Department's website at https://www.labour.gov.hk/eng/tele/osh.htm or call 2559 2297.

Publications and Media-
Occupational Safety

Addresses and Telephone
Numbers of the Offices

Table of Contents

1. FOREWORD

1.1 Fall of person from height is a common type of industrial accident and one of the major causes of work fatalities. Since working at height is involved in the repair and maintenance of facilities on external walls of buildings, such as repair and replacement of split-type air-conditioners, replacement of window panes and refurbishment of water pipes, contractors must effectively manage the risk of fall from height. In this regard, contractors must provide suitable working platforms/equipment for the workers to use.

1.2 The Labour Department has noticed that truss-out bamboo scaffolds are most commonly used in the trade as working platforms/means for external repair and maintenance work. The structural safety of truss-out bamboo scaffolds depends on many factors, such as the structural strength of external walls, whether the external walls have sufficient supporting surfaces, the material strength of bamboo members, and the craftsmanship of scaffolders. The Labour Department has published various safety publications on truss-out bamboo scaffolds so that duty holders understand the relevant risks and the safety principles to be adopted. Apart from complying with these safety publications on truss-out bamboo scaffolds and this Guide, duty holders are also required to comply with other codes of practice and guidelines on bamboo scaffolds and working at height, including the "Code of Practice for Bamboo Scaffolding Safety" for the qualifications of competent persons and the requirements on scaffolding materials, as well as the "Guidance Notes on Classification and Use of Safety Belts and their Anchorage Systems" for the requirements on attachment devices. Besides, when considering the use of truss-out bamboo scaffolds, duty holders should also seek the advice of professional personnel including professional engineers to design the scaffolds according to the nature of work and the environment and characteristics of workplaces.

1.3 Common truss-out bamboo scaffolds are supported by vertically mounted metal brackets each fixed with 3 anchor bolts at the bottom ("common truss-out bamboo scaffolds") (Figure 1). Although common truss-out bamboo scaffolds can be used on most buildings, the Labour Department has noticed that recent designs of some buildings, such as bay windows, large window panes, louver covers or metal claddings, might result in insufficient concrete on the external walls for the erection of common truss-out bamboo scaffolds. As a result, workers in the trade may have used other methods to erect truss-out bamboo scaffolds different from the common type by using at least 3 anchor bolts to install each metal bracket and in accordance with the principles of structural mechanics ("special truss-out bamboo scaffolds").

1.4 Having considered the views of the trade on the erection of truss-out bamboo scaffolds, the Labour Department has consolidated the relevant safety publications and compiled this Guide. The purposes are to summarise the safety principles for truss-out bamboo scaffolds and to provide duty holders with the safety principles and information on special truss-out bamboo scaffolds.

Figure 1 – Common truss-out bamboo scaffold

2. USE OF THIS GUIDE

2.1 This Guide consolidates the basic requirements for the construction of truss-out bamboo scaffolds and the safety principles for carrying out related scaffolding work, with details given in section 3. Besides, in special situations where common truss-out bamboo scaffolds cannot be used, such as external walls built with bay windows, large glass panes, louver covers or metal claddings, leaving inadequate concrete surfaces on the external wall for the erection of common truss-out bamboo scaffolds, duty holders may refer to section 4 for the additional requirements for special truss-out bamboo scaffolds.

3. BASIC SAFETY REQUIREMENTS ON TRUSS-OUT BAMBOO SCAFFOLDS

In the course of designing truss-out bamboo scaffolds (including common and special truss-out bamboo scaffolds), professional engineers should consider different factors such as the vertical self-weight of the scaffolds, the working loads imposed on the scaffolds and the loads resulting from wind forces to ensure that the scaffolds are stable and do not affect the structural safety of the buildings. Besides, contractors are also required to comply with the following basic requirements regarding the structural elements for the installation of metal brackets, the metal brackets themselves, anchor bolts, etc.

3.1 Requirements on Structural Elements for the Installation of Metal Brackets

3.1.1 Truss-out bamboo scaffolds shall be installed on the structural elements of buildings, such as solid external concrete walls. The structural elements shall be of good construction, intact and free from obvious cracks, and can safely support the loadings from the scaffolds, including the weights of workers and materials, wind loads and working loads. The strength of the structural elements shall not be less than $25N/mm^2$. If cantilevered slab structural elements of buildings are used by the contractors to support the truss-out bamboo scaffolds, professional engineers must fully consider the bearing capacity and structural safety of such structural elements when designing the scaffolds. Contractors shall not use non-structural elements such as exterior decoration or plastering of buildings for securing anchor bolts or installing metal brackets.

3.2 Requirements on Metal Brackets

3.2.1 Metal brackets for supporting truss-out bamboo scaffolds should consist of equal angles and circular hollow sections of suitable sizes. The metal brackets should be galvanised or painted with 2 layers of red lead primer. Figures 2 to 4 show the I-shaped and T-shaped metal brackets with 3 anchor bolt holes commonly used in the trade. (Note: All dimensions in Figures 2 to 4 are in mm)

3.2.2 Every metal bracket supporting the truss-out bamboo scaffold must be fixed with 3 or more anchor bolts. The horizontal distance between two adjacent metal brackets should not be greater than 1.3m to ensure the load-bearing capacity and stability of the scaffold.

3.2.3 Contractors may also use metal brackets with 4 anchor bolt holes (Figure 5). When installing this type of bracket, other than the top anchor bolt that must be installed, workers may use 2 of the 3 holes below to install the anchor bolts according to the site situations. The extra hole in the brackets provides alternative locations for the installation of anchor bolts in case the worker while drilling the concrete to install the anchor bolts hits the reinforcement bars. Besides, the distance between the topmost hole and the horizontal member of the metal bracket is longer (circled in red in Figure 5) to make it easier for workers to drill holes on the concrete. (Note: All dimensions in Figure 5 are in mm)

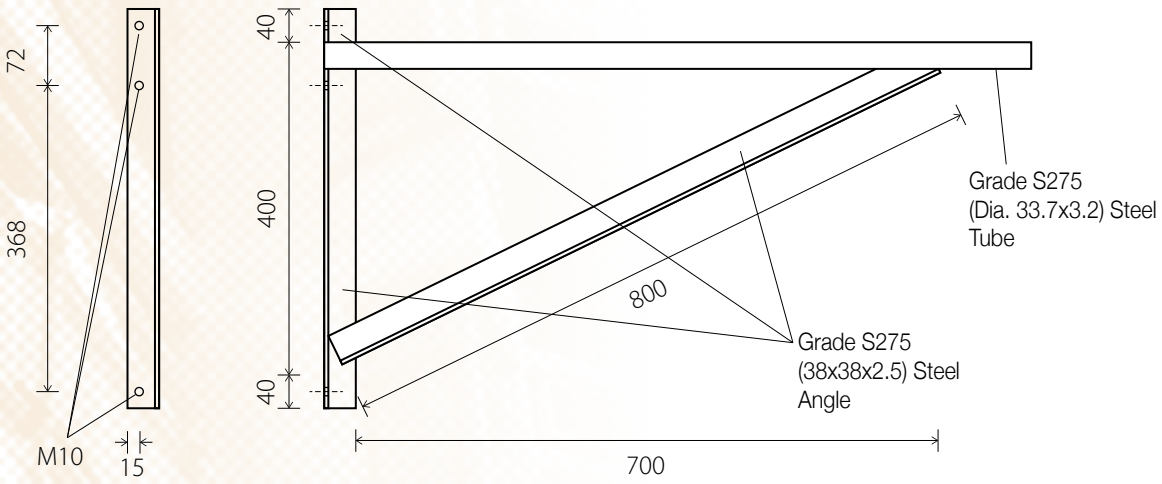


Figure 2 – I-shaped metal bracket
(Extracted from "Guidelines on Safety Enhancement of and Notification Arrangement for Truss-out Bamboo Scaffolds" published by the Construction Industry Council)

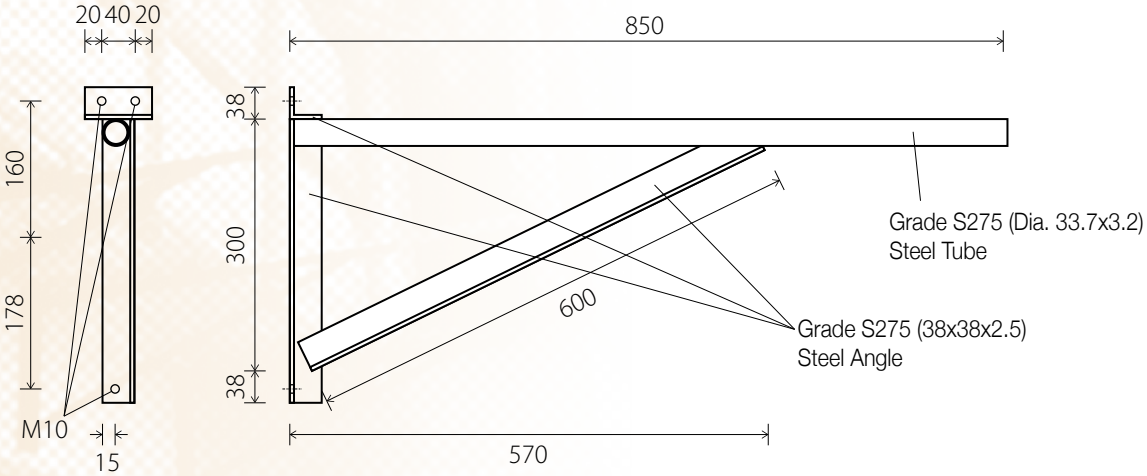


Figure 3 – T-shaped metal bracket
(Extracted from "Guidelines on Safety Enhancement of and Notification Arrangement for Truss-out Bamboo Scaffolds" published by the Construction Industry Council)

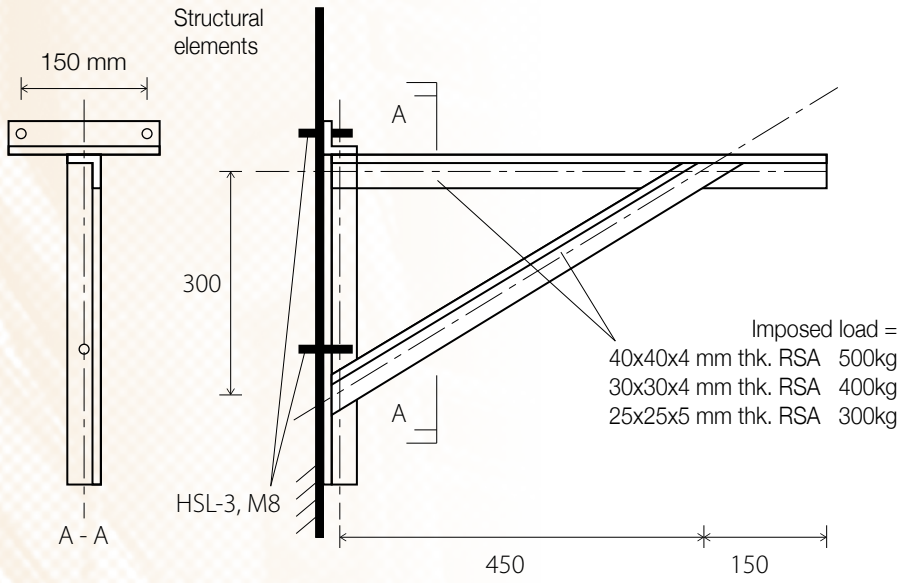


Figure 4 – T-shaped metal bracket
(Extracted from "Guidelines on the Design and Construction of Bamboo Scaffolds"
published by the Buildings Department)

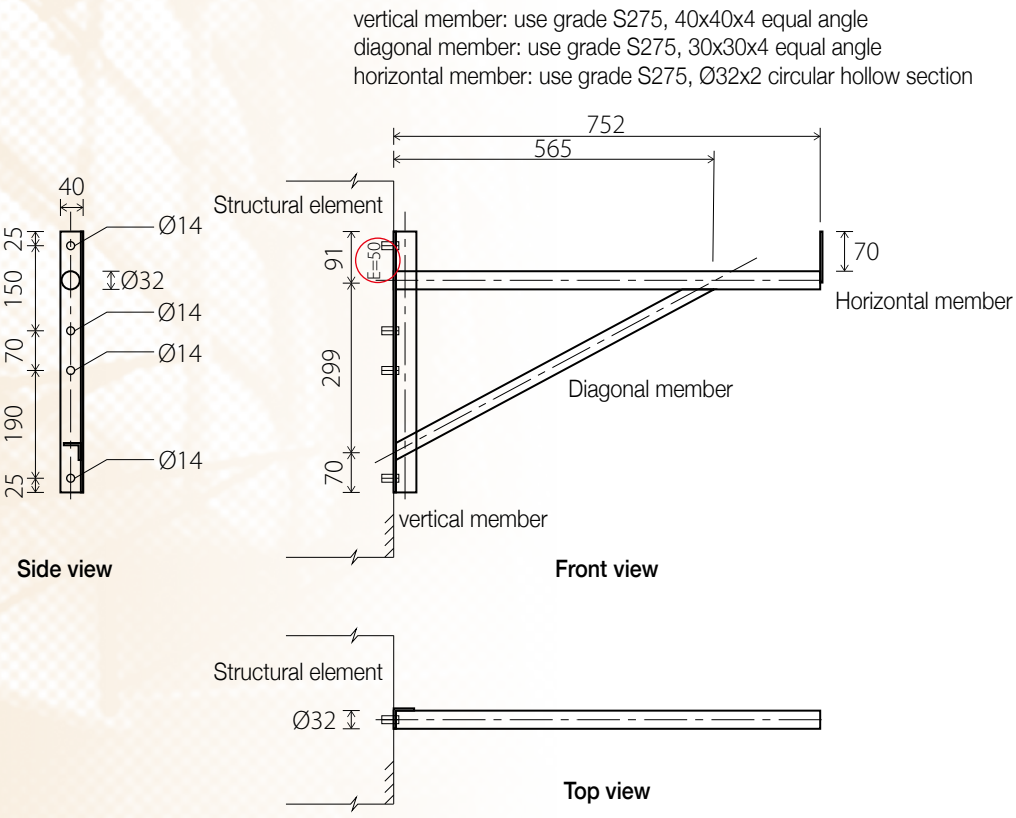


Figure 5 – Metal bracket with 4 holes
(Information provided by the Occupational Safety and Health Council)

3.3 Additional Members

3.3.1 In addition to metal brackets, contractors should also use additional members such as putlogs or bracings when necessary. The putlogs and bracings shall be erected on the structural elements of buildings to ensure the structural safety of the scaffolds.

3.3.2 The vertical distance between putlogs should not be greater than 3m. A putlog should consist of a metal tie and a strut such as bamboo strut. The metal tie should be made of a mild steel bar of at least 6mm diameter with a minimum elongation of 15% and a yield strength of 250N/mm^2, or a bundle of steel wires or other devices (such as metal brackets) with equivalent tensile capacity and mechanical properties properly anchored to the structural elements.

3.4 Requirements on Anchor Bolts

3.4.1 Anchor bolts (such as sleeve anchors or drop-in anchors) for installing metal brackets should have a tensile strength greater than 7kN.

3.4.2 The holes for installing anchor bolts should be drilled in solid structural elements. The diameters and depths of the holes should match the sizes of the anchor bolts. The distance between the holes and the edge of the wall as well as the distance between the holes shall also meet the requirements of the manufacturers of the anchor bolts. Contractors should not use holes filled with plastic or other materials.

3.4.3 Anchor bolts should be suitably tightened with adequate embedment depth. The installation details and procedures for anchor bolts should be strictly in accordance with the manufacturer's recommendations, especially the torque required to tighten the anchor bolts when installing sleeve anchors. The external walls of some buildings may be made of mud bricks or sand bricks which are not suitable for the use of sleeve anchors or drop-in anchors. In this case, contractors should seek the advice of a professional engineer before choosing the anchoring methods.

3.5 Safety Requirements on Erection, Addition, Alteration, Dismantling and Use of Truss-out Bamboo Scaffolds

3.5.1 Truss-out bamboo scaffolds should be designed by a professional engineer, and shall be erected, substantially added, altered or dismantled by trained workmen under the immediate supervision of a competent person. The supervision work should be conducted under safe conditions and the competent person shall not himself engage in any scaffolding work.

3.5.2 Contractors should properly plan and develop scaffolding work procedures. When erecting truss-out bamboo scaffolds, load bearing members should be installed before non-load bearing ones. Provision of temporary supports such as rakers should also be considered to ensure that workers work under safe conditions. Conversely, non-load bearing members should be dismantled first and the scaffold, especially its putlogs and bracings, should be inspected prior to dismantling.

3.5.3 Contractors should minimise as far as possible the number of workers on the scaffolds as well as the weight of materials and the time they are placed on the scaffolds.

3.5.4 Truss-out bamboo scaffolds shall be provided with suitable working platforms, guard-rails, toe-boards and safe access to and egress from the scaffolds. Contractors are also required to take appropriate precautions, such as fencing the area below and around the scaffolds to prevent the fall of objects from height.

3.5.5 Truss-out bamboo scaffolds shall be inspected by a competent person before being taken into use for the first time, at regular intervals not exceeding 14 days immediately preceding each use, after substantial addition or partial dismantling, or after any exposure to situations likely to have affected their strength or stability or to have displaced any part (such as adverse weather conditions), with a report made by the competent person in the prescribed Form 5 containing a statement to the effect that the scaffolds are in safe working order.

3.5.6 Contractors should be aware of the weather forecasts issued by the Hong Kong Observatory and keep monitoring the changes in weather conditions in order to make appropriate work arrangements. When severe weather warnings such as tropical cyclone warnings or the Strong Monsoon Signal are issued by the Hong Kong Observatory, the erection, addition, alteration and dismantling of and working on scaffolds should be stopped and appropriate emergency measures should be adopted, including securing the scaffolds and their members as well as removing the canvas/nylon nets and materials on the scaffolds.

3.5.7 After the completion of work, contractors should dismantle the truss-out bamboo scaffolds as soon as possible to avoid increasing the risk of the scaffolds falling due to lack of maintenance and inspection.

3.6 Safety Belts and Their Anchorage Systems

3.6.1 Contractors must provide workers with full-body safety harnesses and anchorage systems (such as lanyards, independent lifelines and fall arrestors) which conform to international or national standards for the erection, addition, alteration or dismantling of or working on truss-out bamboo scaffolds. Contractors must also ensure that workers wear their safety harnesses properly, with the lanyards attached to secure anchorages such as cast-in anchors (Figure 6), eyebolts (Figures 7 and 8) or fall arrestors connected to independent lifelines fastened to secure anchorages, before commencing the erection, addition, alteration or dismantling of or working on truss-out bamboo scaffolds.

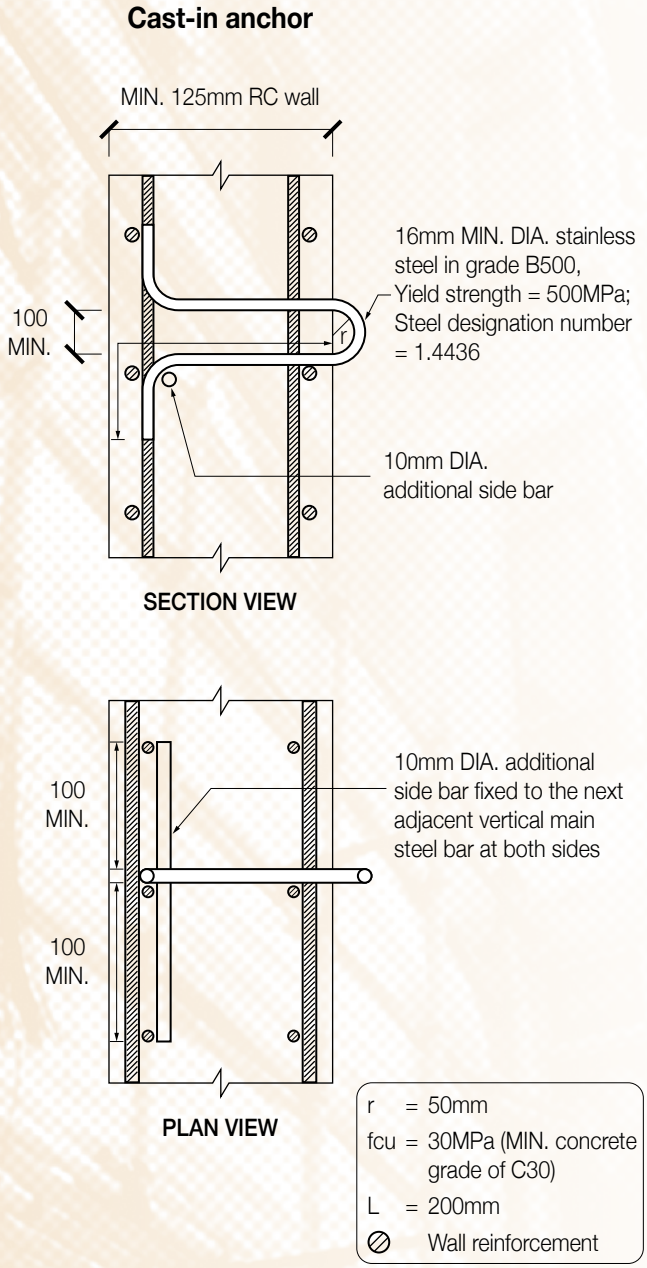


Figure 6 - Example of cast-in anchor
(Extracted from "Guidelines on The Design, Installation and Maintenance of Cast-in Anchors at External Walls of New Buildings" published by the Construction Industry Council)

Figure 7 – Worker using an eyebolt

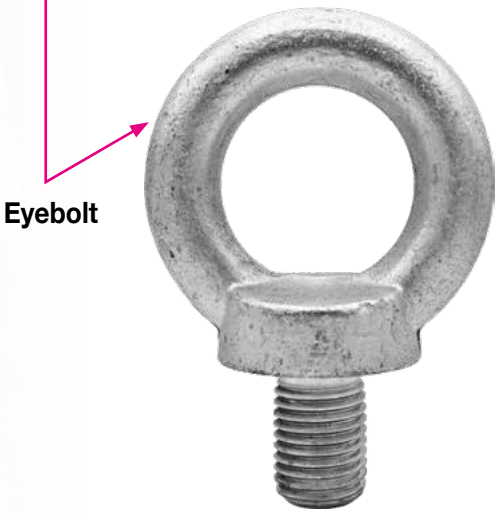


Figure 8 – Example of eyebolt

3.6.2 All anchorages should be able to withstand a minimum pull-out force of 6kN and be inspected and tested before use. The inspections and tests should be conducted by a professional structural or mechanical engineer. A person who has received training and is awarded the accredited "Certification of Competence in the Selection, Installation, Use, Inspection and Testing of Anchor Devices and Cast-in Anchors for Attachment of Personal Fall Protection Equipment for Truss-out Bamboo Scaffolds" ("ACCP") from the Occupational Safety and Health Council ("OSHC") can also carry out inspections and tests on the relevant eyebolts or cast-in anchors.

3.6.3 When it is impracticable to provide fixed anchorages due to restrictions of the site environment, contractors may use transportable temporary anchor devices conforming to BS EN 795:2012 or equivalent international/ national standards (Figure 9). The transportable temporary anchor devices should be installed and checked and their use supervised by a person who has completed the "Certificate Course in Safety at Work for Repair, Maintenance, Alteration and Addition Works" ("DOCC") organised by OSHC, or a person with proper training provided by suppliers/other organisations.

Figure 9 – Example of transportable temporary anchor device

3.6.4 Contractors should not use window frames, railings, temporary supports, water pipes, gas pipes, drainage pipes or any parts of the bamboo scaffolds as anchorages for lanyards or independent lifelines because these structures or devices are not designed to withstand the sudden shock or impact force caused by the fall of workers. Besides, when installing and using lanyards or independent lifelines, contractors should not allow them to be placed on sharp edges. If this is unavoidable, they should be protected by suitable packing.

3.6.5 Anchorages for lanyards or independent lifelines are important devices to protect workers' lives. Without suitable anchorages, workers may fall from height during scaffolding work, resulting in deaths or serious accidents. Building owners/occupiers/owners' corporations/property management companies etc. should endeavour to co-operate with the contractors and provide assistance to facilitate their work where practicable, including allowing the contractors to install/erect anchorages (such as eyebolts/transportable temporary anchor devices) on external walls or indoor private or public areas, so that workers can fasten their full-body safety harnesses to carry out the work safely and avoid falling from height.

3.6.6 Contractors should conduct thorough examinations to the safety harnesses regularly at periods not exceeding 12 months and in accordance with the manufacturer's instructions. When the safety harnesses are not in regular use for 6 months, they should be re-examined before use.

3.6.7 Safety harnesses and their anchorage systems should be properly used by workers. Safety harnesses, lanyards and independent lifelines should only be used for fall arresting purposes and should not be used for other purposes such as lifting materials. Each independent lifeline should be used by only one person.

4. SPECIAL TRUSS-OUT BAMBOO SCAFFOLDS

If the designs of the external walls of buildings allow contractors to erect common truss-out bamboo scaffolds safely, such method should be used for the external wall work. Although common truss-out bamboo scaffolds can be used on most buildings, the Labour Department has noticed that recent designs of some buildings might result in insufficient concrete on the external walls for the erection of common truss-out bamboo scaffolds. For example, protruding bay windows and louvers covering split-type air-conditioners at external walls would render the distance of the concrete too far or the concrete too thin for installing anchor bolts. Under such circumstances, contractors may consider using special truss-out bamboo scaffolds as suitable working platforms/means for carrying out repair and maintenance of facilities at external walls.

4.1 Safety Principles for Erection of Special Truss-out Bamboo Scaffolds

4.1.1 When considering the use of special truss-out bamboo scaffolds, contractors should pay attention to safety while erecting the scaffolds (such as means of access to and egress from the external walls of buildings when installing metal brackets, and the weight of metal brackets and their load bearing capacity during erection), whether the concrete structural elements for the installation of anchor bolts have sufficient strength and bearing capacity, whether there are cracks in the concrete structural elements, etc.

4.1.2 Apart from the requirements mentioned below, contractors erecting special truss-out bamboo scaffolds should also comply with all other requirements in this Guide (including section 3 on common truss-out bamboo scaffolds) and refer to those set out in the relevant publications listed in Appendix I, such as the "Guidelines on the Design and Construction of Bamboo Scaffolds" and "Code of Practice for Bamboo Scaffolding Safety" published by the Buildings Department and the Labour Department respectively.

4.2 Study of Special Truss-out Bamboo Scaffolds

4.2.1 The Labour Department has noticed that several different designs of special truss-out bamboo scaffolds are commonly used for repair and maintenance work on external walls as necessary. The Labour Department has commissioned the Hong Kong Polytechnic University to conduct a structural mechanics study on these designs. The results of the study showed that by adopting the safety principles stated in section 4.1.1, these special truss-out bamboo scaffolds would have sufficient loading capacity for carrying out maintenance works at external wall facilities as described in section 4.3.6. The calculation assumptions of the related study are listed in Appendix II.

4.2.2 As factors such as exterior design of a building, nature of works and location of works vary from case to case, the schematic diagrams in Figures 10 to 26 are for reference of the trade only and should not be used as a substitute for design by a professional engineer. (Note: All dimensions in Figures 10 to 26 are in mm)

4.3 Designs of Special Truss-out Bamboo Scaffolds

4.3.1 Type 1: Truss-out bamboo scaffold supported by metal brackets with longer horizontal members (Figures 10, 11 and 12)

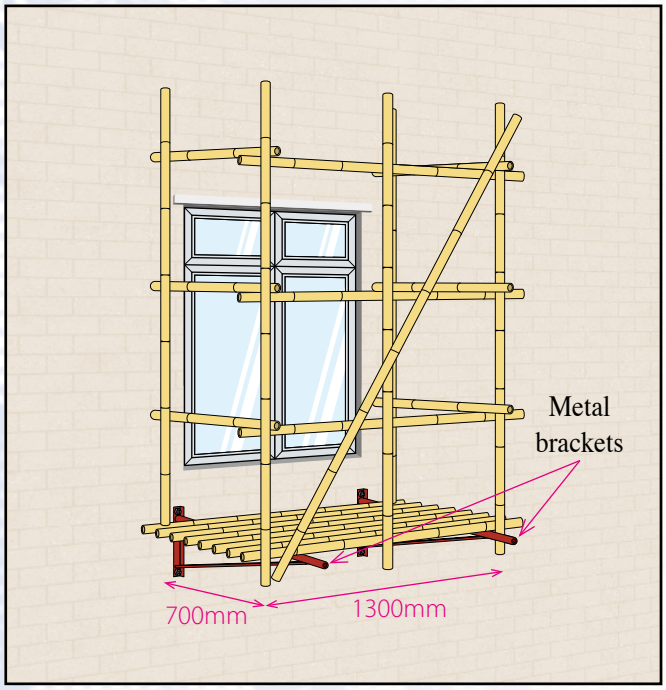


Figure 10 – Type 1 special truss-out bamboo scaffold

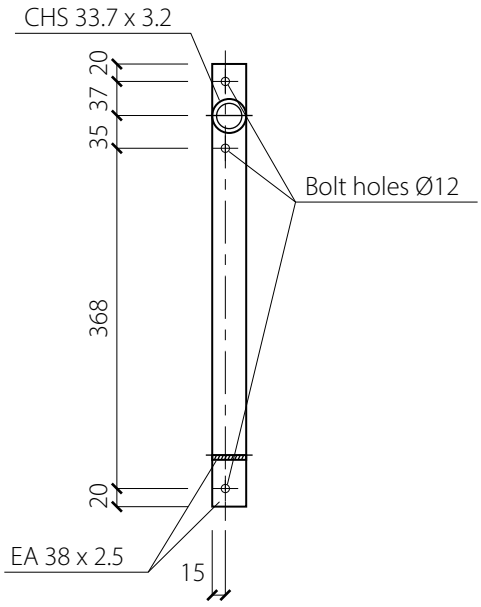


Figure 11 – Front view of a metal bracket for type 1 special truss-out bamboo scaffold

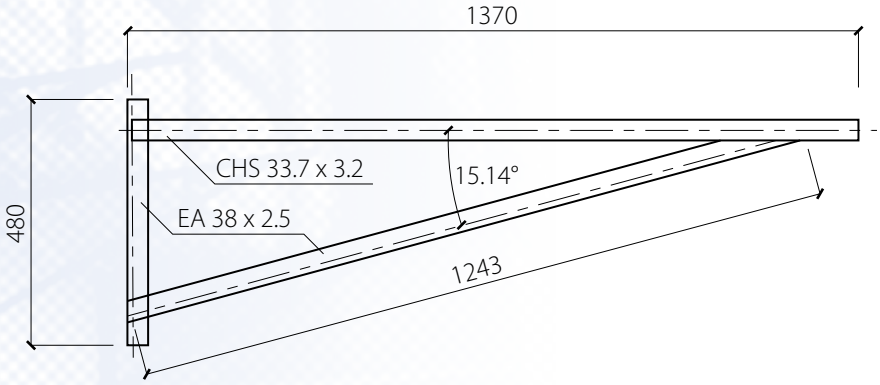


Figure 12 – Side view of a metal bracket for type 1 special truss-out bamboo scaffold

4.3.2 Type 2: Truss-out bamboo scaffold supported by T-shaped metal brackets with longer vertical members (Figures 13, 14 and 15)

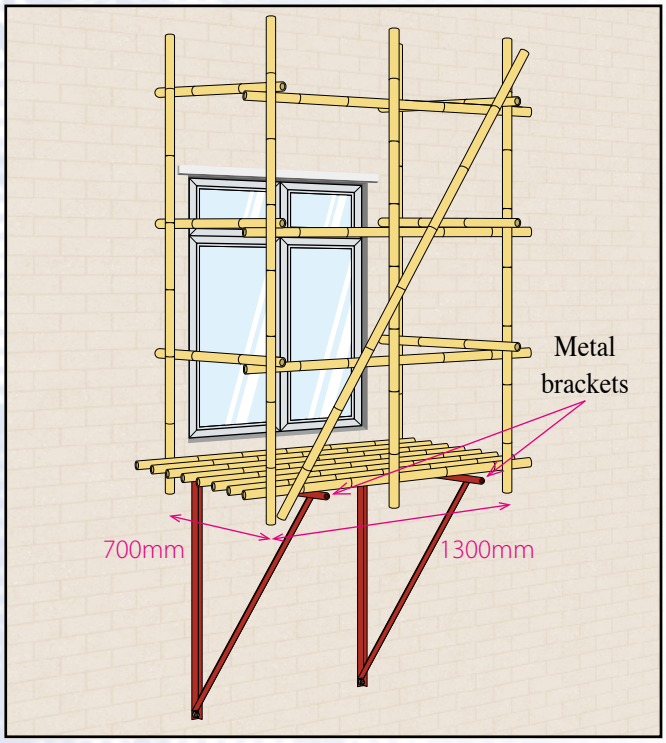


Figure 13 – Type 2 special truss-out bamboo scaffold

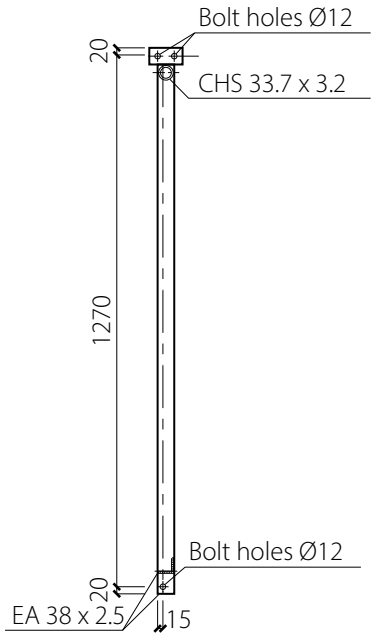


Figure 14 – Front view of a metal bracket for type 2 special truss-out bamboo scaffold

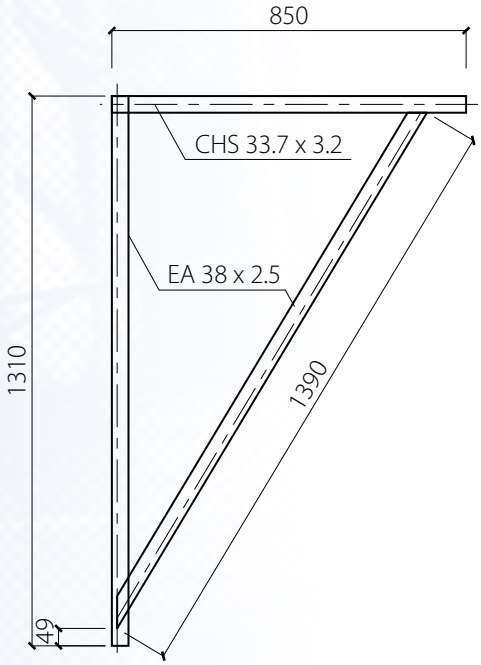


Figure 15 – Side view of a metal bracket for type 2 special truss-out bamboo scaffold

4.3.3 Type 3: Truss-out bamboo scaffold supported by horizontally installed metal brackets and metal wires (Figures 16, 17 and 18)

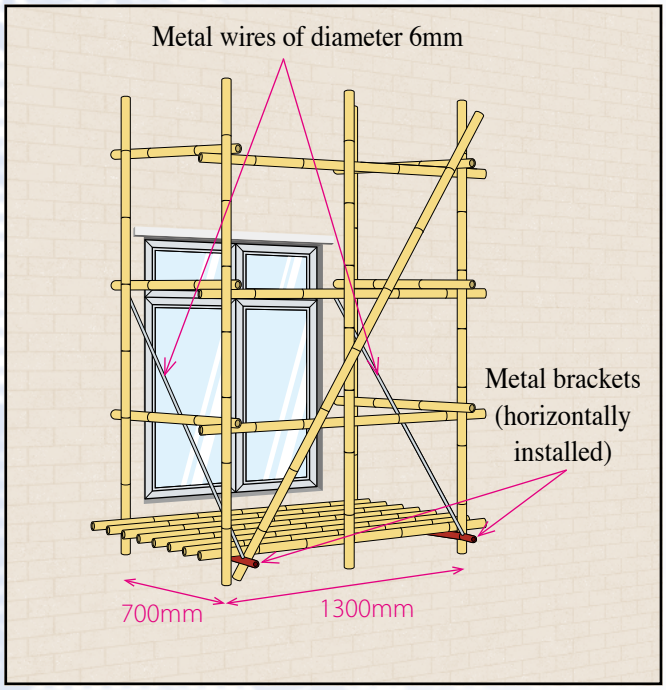


Figure 16 – Type 3 special truss-out bamboo scaffold

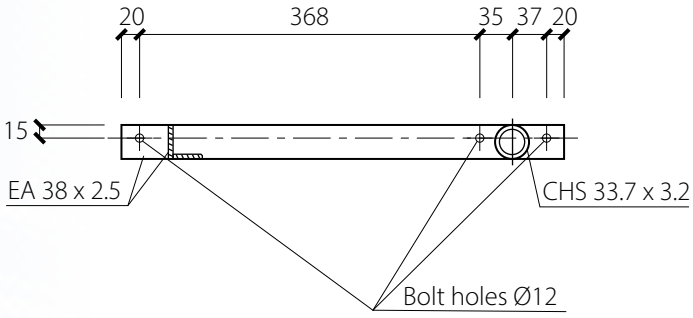


Figure 17 – Front view of a metal bracket (right side) for type 3 special truss-out bamboo scaffold

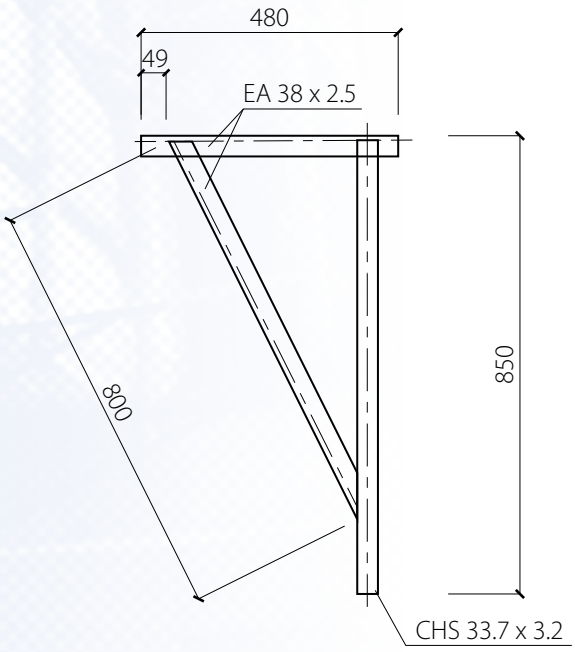


Figure 18 – Top view of a metal bracket (right side) for type 3 special truss-out bamboo scaffold

4.3.4 Type 4: Truss-out bamboo scaffold supported by inversely installed metal brackets (Figures 19, 20 and 21)

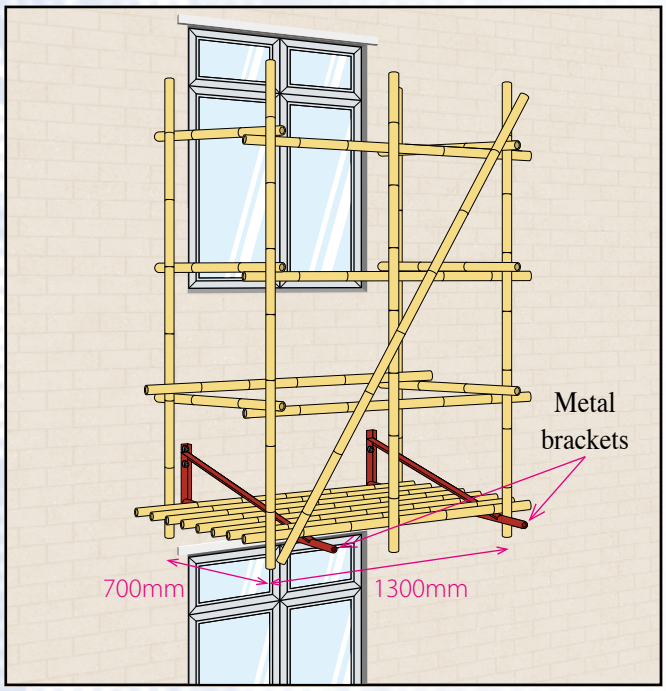


Figure 19 – Type 4 special truss-out bamboo scaffold

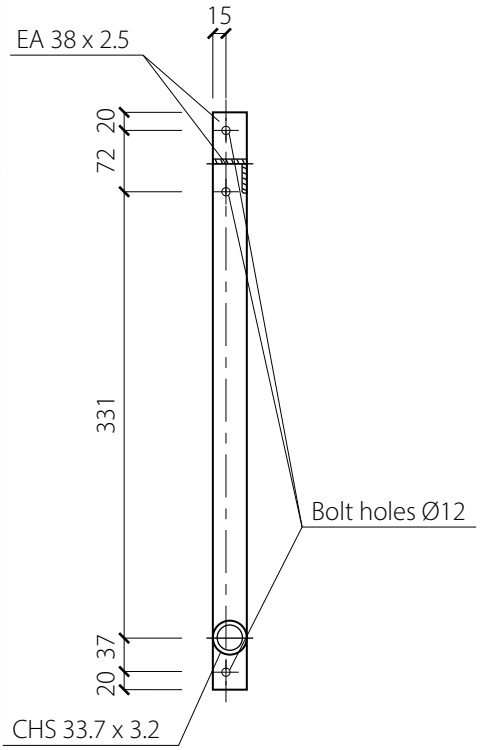


Figure 20 – Front view of a metal bracket for type 4 special truss-out bamboo scaffold

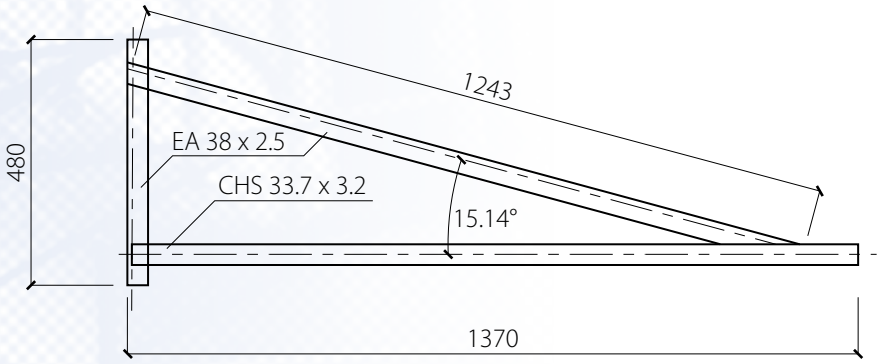


Figure 21 – Side view of a metal bracket for type 4 special truss-out bamboo scaffold

4.3.5 Type 5: Truss-out bamboo scaffold supported by 2 sets of brackets (namely the vertically installed upper set and the horizontally installed lower set) (Figures 22, 23, 24, 25 and 26)

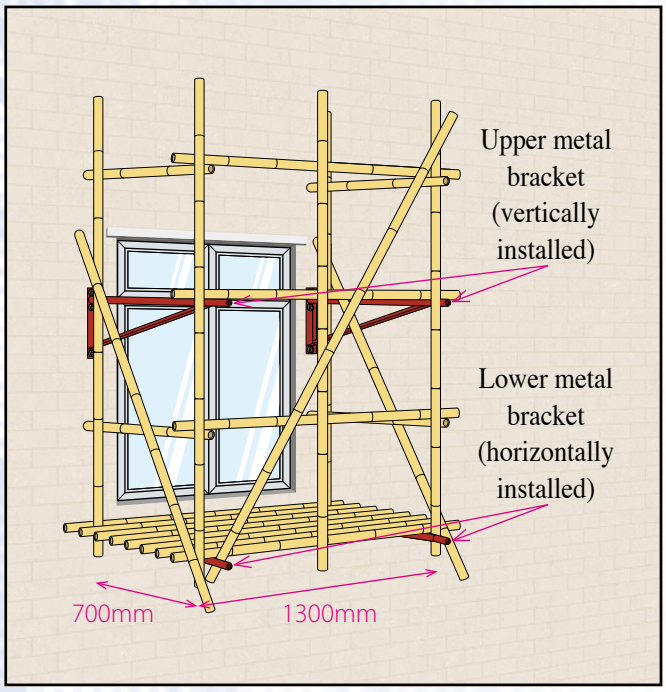


Figure 22 – Type 5 Special truss-out bamboo scaffold

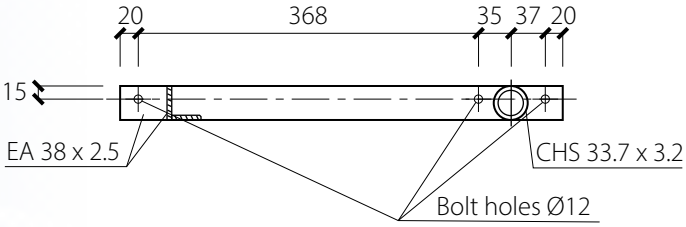


Figure 25 – Front view of lower right metal bracket for type 5 special truss-out bamboo scaffold

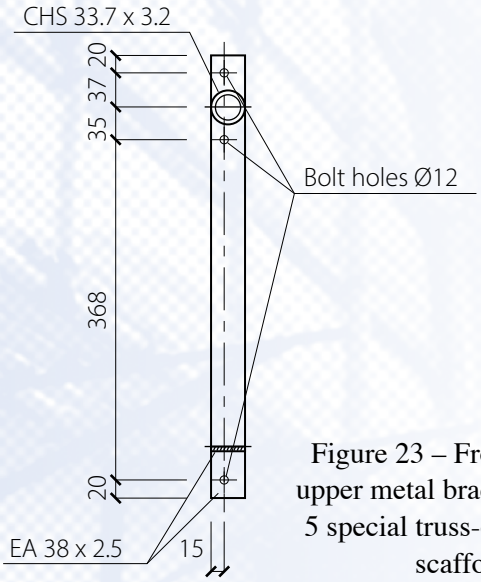


Figure 23 – Front view of upper metal bracket for type 5 special truss-out bamboo scaffold

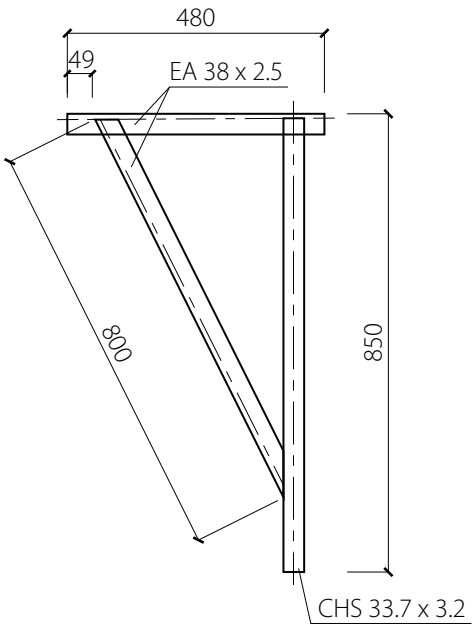


Figure 26 – Top view of lower right metal bracket for type 5 special truss-out bamboo scaffold

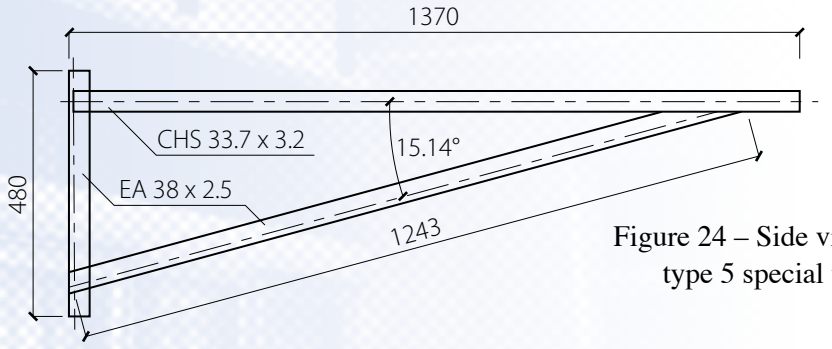


Figure 24 – Side view of upper metal bracket for type 5 special truss-out bamboo scaffold

4.3.6 The maximum load bearing capacity of the above special truss-out bamboo scaffolds is 3kN/m^2, suitable for 2 workers weighing 90kg each to perform heavy-duty work on the scaffolds (such as repairing or replacing two 2.5HP air-conditioners).

4.4 Requirements for Metal Brackets and Additional Members of Special Truss-out Bamboo Scaffolds

4.4.1 Special truss-out bamboo scaffolds, with an overall height of 1.2m to 3m and a working platform of 0.7m wide and 1.3m long by design, are suitable for buildings not higher than 200m.

4.4.2 The metal brackets of special truss-out bamboo scaffolds should consist of equal angles of 38x38x2.5mm and circular hollow sections of diameter 33.7mm and thickness 3.2mm, both of which should be made of steel not lower than Grade S275. The equal angles and circular hollow sections should be welded together using 5mm fillet welds.

4.4.3 Type 3 special truss-out bamboo scaffolds should be further supported by 6mm diameter steel bars or bundles of steel wires with equivalent tensile capacity and mechanical properties, which should be installed on the structural elements of the external wall using eyebolts with a diameter of at least 12mm and a safe working load of not lower than 3.3kN or those of other equivalent standards.

4.4.4 Contractors and workers should pay special attention to the fact that the lower metal brackets of Type 3 and Type 5 special truss-out bamboo scaffolds cannot carry the weight of workers before the steel bars and upper metal brackets are installed. Therefore, contractors should carefully plan the method and sequence of scaffold erection and ensure that workers would not work on the lower metal brackets without being securely supported.

4.4.5 Contractors should also note that although the metal brackets of Type 4 special truss-out bamboo scaffolds are inversely installed as supports, the brackets should still be installed with 2 anchor bolts at the top and 1 at the bottom in order to conform to mechanical requirements (Figure 20).

5. ENQUIRIES AND COMPLAINTS

ENQUIRIES

If you wish to enquire about this Guide or require advice on occupational safety and health (OSH) matters, please contact the Occupational Safety and Health Branch of the Labour Department (LD) through:

Telephone : 2559 2297 (auto-recording service available outside office hours)

Fax : 2915 1410

E-mail : enquiry@labour.gov.hk

Information on the services offered by LD and on major labour legislation is also available on our website at https://www.labour.gov.hk. For details on the services offered by the Occupational Safety and Health Council, please call 2739 9000.

Labour Department's Website

COMPLAINTS

If you have any complaint about unsafe operations and environments at workplaces, please call the LD's OSH complaint hotline at 2542 2172, or fill out and submit an online OSH complaint form on our website. All complaints will be treated in the strictest confidence.

Online OSH Complaint Form

Appendix I References

1. Anchor Fastening Technology Manual 2018, Hilti (Hong Kong) Limited
2. BS EN 795:2012, Personal fall protection equipment – Anchor devices
3. BS EN 1995-1-1:2004+A2:2014, Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings
4. BS EN 12811-1:2003, Temporary works equipment - Part 1: Scaffolds - Performance requirements and general design
5. BS ISO 22156:2021 Bamboo structures - Bamboo culms - Structural design
6. Chung KF & Chan SL. Design of Bamboo Scaffolds, Technical Report No. 23, International Network for Bamboo and Rattan, 2002
7. Code of Practice for Bamboo Scaffolding Safety, Labour Department
8. Code of Practice for Dead and Imposed Loads 2011, Buildings Department
9. Code of Practice for Structural Use of Concrete, Buildings Department
10. Code of Practice for Structural Use of Steel 2011, Buildings Department
11. Code of Practice on Wind Effects in Hong Kong, Buildings Department
12. Data sheet for 12mm RS RPO Zinc Plated Eye Nut DIN 582 SWL:340Kg (RS Stock No. 124-4842), RS Components Ltd, UK
13. Guidance Notes on Classification and Use of Safety Belts and their Anchorage Systems, Labour Department
14. Guidelines on the Design and Construction of Bamboo Scaffolds, Buildings Department
15. Guidelines on the Design, Installation and Maintenance of Cast-in Anchors at External Walls of New Buildings, Construction Industry Council
16. Guidelines on Planking Arrangement for Providing Work Platforms on Bamboo Scaffolds, Construction Industry Council
17. Guidelines on safety enhancement of and notification arrangement for truss-out bamboo scaffolds, Construction Industry Council
18. Make sure bamboo scaffolds are safe against strong winds, Buildings Department
19. Occupational Safety for Repair, Maintenance, Alteration and Addition Works, Labour Department
20. Safety Guide for Bamboo Scaffolding Work, Labour Department
21. 安全裝拆吊棚基本法 , Occupational Safety and Health Council

Appendix II Engineering Assumptions for Structural Calculations of Special Truss-out Bamboo Scaffold by The Hong Kong Polytechnic University

- Calculation software: SAP2000, a generic structural analysis commercial package
- Platform area of truss-out bamboo scaffolds: 700mm (width)x 1300mm (length)
- Height of truss-out bamboo scaffolds: 1.2m – 3m
- Building design height: 200m
- Maximum load of truss-out bamboo scaffolds: 3kN/m^2 under Typhoon Signal No. 3
- Height of canvas covering the lower side of truss-out bamboo scaffolds: 600mm
- Material Requirements for steel brackets and associated materials: certified S275 steel to BS EN 10025-2
- Section, material and mechanical properties of bamboo :
  - Kao Jue : External diameter = 40 mm ; Internal diameter = 30 mm ; Thickness = 5 mm
  - Cross-sectional area: $A = \pi(D_e^2 - D_i^2)/4 = 550mm^2$
  - Second moment of area: $I = \pi(D_e^4 - D_i^4)/64 = 85903mm^4$
  - Elastic section modulus: $Z = I/D_e = 4295mm^3$
  - Moisture contents: m.c. = 12.5 %
  - Design compressive strength: f_c = 38 N/mm^2 (incl. γ_m = 1.5)
  - Design bending strength: f_b = 39 N/mm^2 (incl. γ_m = 1.5)
  - Young's Modulus against compression: E_c = 8.6 kN/mm^2 (incl. γ_m = 1.0)
  - Young's Modulus against bending: E_b = 19.2 kN/mm^2 (incl. γ_m = 1.0)
  - Design shear strength: $f_{s,d}$ = 9.5kN/mm^2 (incl. γ_m = 1.5)
- Anchor bolt :
  - Certified M10 anchor bolt
  - Tension capacity = 5kN
  - Shear capacity = 7.9kN
  - Factor of safety = 3
- Eyebolt:
  - Certified M12 RS Component
  - Safe working load = 340kg or 3.3kN
  - Factor of safety = 4

Remark: The above assumptions are only used for the structural calculation conducted by the Hong Kong Polytechnic University.

Occupational Safety and Health Branch
Labour Department

Published by Occupational Safety and Health Branch
Labour Department

08/2023-2-193E