

Guidance Notes on Bamboo Scaffolding Safety

I. Statutory and Contractual Requirements

The codes and standards for erection, alteration, maintenance and removal of bamboo scaffolding shall refer to Clause 1.39 of the General Specification for Building, particularly the followings:-

- a. Particular Specification on Site Safety (PS on Site Safety);
- b. Special Conditions of Contract (SCC);
- c. Construction Sites (Safety) Regulations, Cap 59I (CSSR);
- d. Code of Practice on Bamboo Scaffolding Safety, Labour Department (CPFBSS); and
- e. Code of Practice for Site Supervision 2009, Buildings Department (BD's COP).

2. Reference shall also be made to the Guidelines on the Design and Construction of Bamboo Scaffolds (BD's Guidelines) promulgated by Buildings Department as per Clause 1.39.2 of the GS. For demolition works, reference shall be made to Section 3.3 of Code of Practice for Demolition of Buildings promulgated by Buildings Department.

3. There are various requirements governing contractors' preparations prior to commencing erection, alteration or dismantling of bamboo scaffold such as:-

- a. Clause 1.39.3 of the GS requires contractors to submit a method statement for erection, alteration or dismantling of bamboo scaffold according to the CPFBSS and BD's guidelines;
- b. Clause 8A of the PS on Site Safety requires contractors to submit risk assessment with its proposed measures incorporated in the method statement;
- c. Section 4 of the CPFBSS requires contractors to prepare scaffolding plan and bamboo scaffold drawings;
- d. SCC 21 or 96 requires contractors to appoint Technically Competent Persons (TCP) according to the BD's COP for Site Supervision;
- e. Section 2.3.2(b) of the CPFBSS requires contractors to appoint Competent Person for supervision of bamboo scaffold;
- f. Clauses 5 & 6 of the PS on Site Safety require contractors to appoint RSO and Safety Supervisors for general site safety supervision; and
- g. Clause 16(1.8) of the PS on Site Safety requires contractors to check the safety of all temporary works after each day's works.

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4. Clause 1.39.3 of the GS requires that a method statement shall be submitted to the SO prior to commencing scaffold works. This Guidance Notes helps stakeholders to prepare, review and check the scaffolding submission. Commonly overlooked areas are also provided for their attention.

II. Engineering Safety

5. Bamboo scaffold drawings shall be designed and approved by a Registered Professional Engineer (Structural or Civil discipline) under any of the following conditions:-

- a. The bamboo scaffold exceeds 15 m in height as per Clause 1.39.4(ii) of the GS; and
- b. The bamboo scaffold does not conform to the prescribed forms as set out in the CPFBSS or BD's Guidelines.

6. Some common examples of deviation from the CPFBSS and BD's Guidelines are given at below:-

- a. Spacing of bamboo standard > 1.3 m, diameter of bamboo standard < 75 mm, spacing of ties > 4 m vertically and 7 m horizontally, diameter of steel tie < 6 mm, overlap of standards < 1.5 m and ledgers/bracings < 2 m;
- b. Prop and tie arrangement for cantilevered bamboo scaffold above top floor and ceiling bamboo scaffold;
- c. Existence of special bamboo scaffolds, e.g. long span scaffold across foyer or large opening, and tilted scaffold; and
- d. Number of working platforms more than 2 for very light duty purpose or more than 1 for heavy duty purpose.

7. The bamboo scaffold shall not be used to support formwork or falsework even under the erection or dismantling process as per Clause 6.07 of the GS.

8. Bamboo scaffold with plastic sheeting installed (e.g. dust screen for demolition works) shall be strengthened to withstand strong wind as per Clause 1.39.5(k) of the GS.

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III. General Site Safety

9. Double layer scaffold against the perimeter of a structure shall be provided as per Clause 1.39.1 (i) of the GS and erected one floor above the top floor under construction as per Clause 1.39.7(ii) of the GS. Acceptance requirements of catch fan, safety net, walkway, etc. shall refer to Clauses 1.39.5 and 1.39.7 of the GS. Contractors' risk assessment in relation to the erection, alteration and dismantling of bamboo scaffold shall be endorsed by the Site Agent and RSO according to Clause 8A of PS on Site Safety.

10. The risk assessment and corresponding method statement shall be prepared according to Section 4.1.4 of the CPFBS. Particular attention shall also be given to:-

a. Prevention of Falling Person

Safe access should be provided between the building structure and the bamboo scaffold. No climbing in the scaffold is allowed unless a bamboo staircase is provided. Working platform shall be closely boarded with toe board and guardrails. Locations of accesses and staircases shall be indicated on bamboo scaffold drawings.

Where it is impracticable to erect the safe access or working platform, each worker shall wear a safety harness anchored to a secure anchorage point or an independent lifeline at all times. Bamboo members should not be used as anchorage.

b. Prevention of Falling Object

Catch fan and safety net shall be provided according to Section 4.4.4 of the CPFBS and Clause 1.39.7 of the GS.

c. Fire Prevention

Protective screen of bamboo scaffold including safety nets or plastic sheeting shall be fire retarding complying with BS5867 or equivalent as per Clause 1.39.5(k) of the GS.

d. Prevention of Unauthorized Alteration

Only trained workmen under the supervision of a competent person (CP) shall erect, alter or dismantle scaffolds as per Section 38E of the CSSR. The Contractor shall establish a safety co-ordination system to help sub-contractors obtain prompt services from the scaffolding sub-contractor to alter the scaffold

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as per Clause 3(13)(f) of the PS on Site Safety. The bamboo scaffold being altered shall be fenced off and displayed with a notice to prevent the scaffold from illegal use. The Statutory Form 5 shall be revalidated before allowing workers to use the altered scaffold.

e. **Emergency Preparedness**

Plastic sheeting of bamboo scaffold shall be removed in time of tropical cyclone or strong monsoon warning, in particular in cantilevered scaffold above top floor and long span scaffold over foyer or large opening.

IV. Site Safety Supervision

Supervision by Technical Competent Persons

11. The Contractor shall provide engineering safety supervision by TCPs of T3 or above, and general safety supervision by a TCP of T1 at a frequency according to the BD's COP as per SCC21 or 96. The relevant inspection records shall be kept on site for checking.

12. The daily inspection of the bamboo scaffolding safety by a TCP of T1 shall at least be conducted after each day's works in compliance with Clause 16(1.8)(viii) of the PS on Site Safety. The inspections by other TCPs shall be made regularly. Inspections by TCP of T3 shall be provided (i) before long holiday, (ii) in typhoon or monsoon wind seasons and (iii) when there is severe gust wind, especially during April and May. The Supervising Officer's site supervisory staff shall ensure that this checking is properly carried out.

Supervision by Competent Person

13. The Contractor shall appoint a Competent Person (CP) to conduct regular safety inspection. The inspection result shall be recorded in the Statutory Form 5 under the CSSR and signed by the CP. The Form 5 shall be displayed prominently on the Bamboo Scaffold. Bamboo scaffold shall not be used unless a valid Form 5 is displayed on it (i) after erection, (ii) at intervals not exceeding 14 days, (iii) after substantial addition or alteration and (iv) after exposure to adverse weather likely to have affected its strength.

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Supervision by RSO and Safety Supervisor

14. The Contractor shall appoint RSO(s) to conduct regular safety inspection, and Safety Supervisor(s) to conduct daily safety inspection according to the PS on Site Safety. The relevant inspection records shall be kept on site for checking.

Weekly Safety Walks

15. According to the PS on Site Safety Clause 11, weekly safety walks shall be attended by the Contractor's Safety Officer, Site Agent and the Supervising Officer's nominated site representative. To ensure a proper checking on the safety of bamboo scaffold, the Contractor's TCP of T3 or above shall also attend the weekly safety walks. The Supervising Officer's representative shall ensure that this checking is included in the weekly safety walk.

Check Items

16. Sample safety checklists to be used by in the site safety supervision as mentioned above shall be included in the bamboo scaffolding submission. The following check items are recommended to be added into these checklists amongst others:-


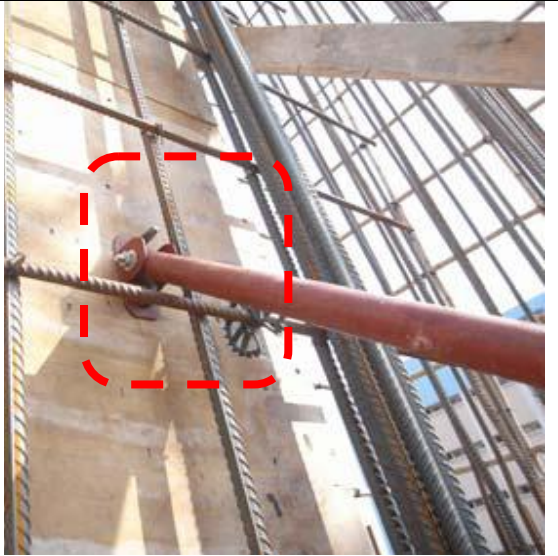


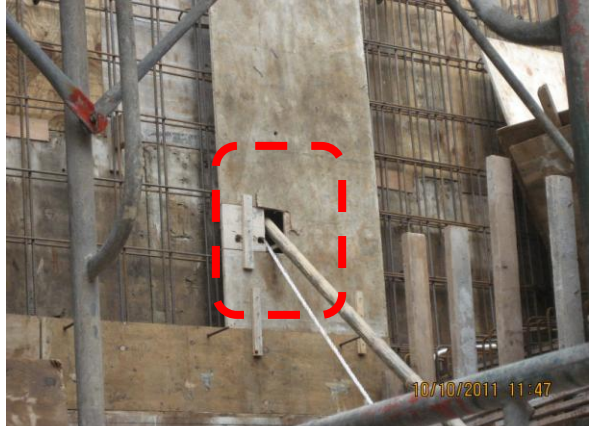

- a. Bamboo scaffold are not used to support wall formworks. Instead, independent struts are provided to wall formwork (photos 1 & 2);
- b. Bamboo structures not covered by the prescribed types in the CPFBS and BD's Guidelines or with any segment exceeding 15m in height are constructed according to bamboo scaffolding drawings endorsed by RPE;
- c. Effective prop and ties are provided for the cantilever bamboo scaffold above the top floor (photos 3 to 6);
- d. Inter-storey ties and struts are provided to the bamboo scaffold according to the CPFBS (photos 7 to 10);
- e. The size of bamboo standards and ledgers are adequate (photos 11 to 12);
- f. The lap length of bamboo standards, ledgers and bracings are adequate (photos 13 to 14);
- g. Closely boarded working platforms with toe boards and guardrails are provided (photos 15 to 16);
- h. Safe access and egress are provided within the bamboo scaffold, and between the scaffold and the building structure (photo 17);
- i. Catch fans are provided at 15 m vertical intervals (photo 18);

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- j. Statutory Form 5 is revalidated for each alteration of bamboo scaffold;
- k. Vertical spacing of steel brackets does not exceeds 15 m;
- l. Each steel bracket has 3 anchored bolts and tested at agreed frequency;
- m. The space between scaffold and building does not exceed 300 mm; and
- n. Emergency measures based on the result of risk assessment and Section 4.3.1(d) of the CPFBS shall be included.







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Photos of Typical Check Items

	
<p>1. Independent wall formwork support</p>	<p>2. Independent wall formwork support</p>
	
<p>3. Closely spaced ties & struts for cantilevered bamboo scaffold</p>	<p>4. Cantilevered bamboo scaffold's tie & strut connection to floor slab</p>
	
<p>5. Box out for ties & struts of cantilevered bamboo scaffold</p>	<p>6. Box out for ties & struts of cantilevered bamboo scaffold</p>

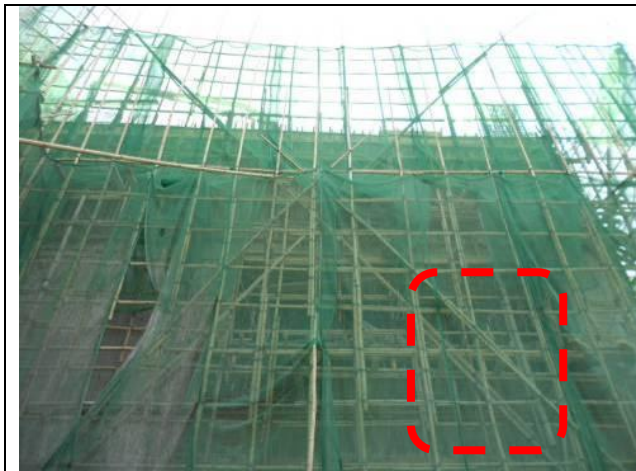
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Photos of Typical Check Items

	
<p>7. Tie and strut in a pair at 4m c/c vertically and 7 m c/c horizontally</p>	<p>8. Multiple loops of tie connection</p>
	
<p>9. Steel tie of 6 mm diameter (4 m c/c vertically and 7 m c/c horizontally)</p>	<p>10. Cast-in steel tie of 6 mm diameter</p>
	
<p>11. Bottommost ledger of 75 mm diameter</p>	<p>12. Standard of 75 mm diameter</p>

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Photos of Typical Check Items



13. Lap length of bamboo bracings or ledgers at least 2 m long



14. Lap length of bamboo standards at least 1.5 m long



15. Working platform of minimum 400 mm width



16. 200 mm high toe board



17. Safe access and egress



18. Catch fans at 15 m c/c vertical intervals