

SINGAPORE CIVIL DEFENCE FORCE

Our Ref. : CD/FSSD/12/02/03/01

Your Ref :

Date : 06 Mar 2014



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Registrar, Board of Architects (BOA)
Registrar, Professional Engineers Board (PEB)
President, Singapore Institute of Architects (SIA)
President, Institution of Engineers, Singapore (IES)
President, Association of Consulting Engineers, Singapore (ACES)

Dear Sir/Mdm

FIRE SAFETY REQUIREMENTS FOR CROSS LAMINATED TIMBER BUILDING CONSTRUCTION

Clause 3.15.2 of the Fire Code requires all elements of structure to be constructed of non-combustible materials. Recently, there have been requests by representatives of the building industry to allow the use of Cross Laminated Timber (CLT), which is a combustible material, to form the elements of structure. This is due to potential productivity/cost savings and environmental benefits that can be achieved if builders choose to use CLT for their buildings.

2. To support the request by the building industry, a list of fire safety requirements have been formulated to manage the fire risks associated with using CLT for building construction. A building constructed using CLT is subjected to the following conditions in Annex A on top of the requirements in the prevailing Fire Code.

3. The QP responsible for the design of the CLT building project shall also ensure that the CLT product is listed in accordance with the requirements of the Product Listing Scheme (PLS).

4. Please convey the contents of this circular to members of your Institution/Association/ Board. The circular is also available in CORENET-e-Info: <http://www.corenet.gov.sg/einfo>.

5. For any clarification on the requirements for CLT construction, please contact MAJ Tong Hong Haey at DID: 68481448 or e-mail address: tong_hong_haey@sCDF.gov.sg.



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Yours faithfully,

(transmitted via e-mail)

MAJ Tan Chung Yee

Secretary, FSSD Standing Committee
for Commissioner

Singapore Civil Defence Force

cc

CEO, BCA

CEO, URA

CEO, HDB

CEO, JTC

CE, LTA

CE, SPRING Singapore

President, REDAS

President, IFE

President, SISV

President, FSMAS

President, SCAL

Honorary Secretary, SPM

FSSD Standing Committee



FIRE SAFETY REQUIREMENTS FOR CROSS LAMINATED TIMBER BUILDING CONSTRUCTION

Pre-design stage

- (a) The Qualified Person (QP) responsible for the design of the CLT building project shall inform SCDF of the project prior to the design and construction of the project.

Building design

- (b) The habitable height¹ of any CLT building shall not exceed 24m, including mezzanine levels and attics. For health-care related premises where the building occupants require some form of assistance during evacuation in fire emergencies, the habitable height of the health-care CLT building shall not exceed 12m, including mezzanine levels.
- (c) A fire safety performance-based (PB) approach shall be adopted in the design of any CLT building where its habitable height exceeds 12m.
- (d) The CLT building shall be fully protected by an automatic sprinkler system in accordance with CP 52 Code of Practice for automatic fire sprinkler system requirements. The automatic sprinkler system shall not be shared among different CLT buildings or units if the latter is under different occupier. If the external facade of the CLT building is unable to meet the stated performance in the prevailing Fire Code² for prevention of external fire spread, the external facade shall be required to be protected by a deluge system in accordance to CP 52.
- (e) The use of CLT system shall be permitted only for areas above the floor slab of the ground floor. Any construction for the ground floor slab and basement floors below it shall not be constructed using a CLT system.
- (f) Essential escape provisions such as staircase shafts, lift shafts, and fire-fighting/smoke-stop lobbies of a CLT building shall be constructed of non-combustible material which achieve the necessary fire resistance rating.
- (g) Essential facilities for fire safety and fire-fighting operations (such as Fire Command Centre, fire pump rooms, and generator rooms) shall be separated from other areas of the CLT building project by non-combustible material that achieve the necessary fire resistance rating.
- (h) The use of flammable gas cylinders for cooking is not permitted in the CLT building premises if the CLT building has access to piped-gas supply for cooking.
- (i) Where the usage of the building potentially involves the use of flammable gas cylinders (either for cooking, storage, factory production, etc) which may

¹ The habitable height is the height measured from the lowest level of fire engine accessway or access road to the finished floor level of the highest habitable floor.

² Code of Practice for Fire Precautions in Buildings 2013

result in explosions, the use of CLT is not allowed unless the CLT building is designed to take into account the explosive actions based on EN 1991³ or other relevant internationally recognised standards, so as to manage the impact of such explosions on the CLT building structure.

- (j) Residential CLT building projects shall fully comply with the technical requirements for household and storey shelters.
- (k) The CLT building project shall comply with the design & fire test performance requirements stipulated in European (EN) standards which include BS EN 1363 and BS EN 1365 & other internationally recognised standards deemed appropriate and necessary by SCDF. In addition, the CLT building shall also comply with all other requirements in the prevailing Fire Code.

Building under construction

- (l) The construction of the CLT building project shall be supervised by a QP who is competently trained in CLT construction. The QP will have to demonstrate his/her competency to SCDF prior to undertaking the construction of the CLT building project.
- (m) During the construction stage, the QP responsible for the CLT building project shall ensure that the CLT project work site complies with the Fire Safety Requirements for Buildings Under Construction in the prevailing Fire Code. In addition, the following worksite practices shall be adhered to:
 - There shall be no smoking or use of naked flames within the CLT project worksite.
 - If there is temporary overnight storage of CLT elements within the CLT project worksite, the temporary storage structure shall be provided with an automatic fire detection system, hoses and fire extinguishers compliant with the relevant codes of practices. This temporary storage structure shall maintain adequate setback distance away from the proposed CLT building as well as any other existing adjacent buildings, so as to minimise the possibility of fire spread.

Maintenance of sprinkler systems

- (n) The CLT building owner shall undertake to engage a QP to conduct annual inspection of the sprinkler system and to submit inspection report to SCDF.

General compliance

- (o) Compliance with all the above requirements for a CLT building project does not exempt the owner of the CLT building from the need to obtain the necessary permits or approval of plans from the relevant authorities, including SCDF.

³ Although single occupancy houses not exceeding 4 storeys are exempted from such assessment of explosive actions in EN 1991, this exemption shall not apply for such CLT buildings in Singapore.