

Our Ref: APPBCA-2023-16

1 Dec 2023

For enquiries, please contact
Building Engineering Group (#12-00)

Tel: 1800 3425 222 (1800-DIAL-BCA)
or use our online Feedback Form at:
<https://www.bca.gov.sg/feedbackform/>

See **Distribution List**

Dear Sir/Madam,

ADVISORY ON DESIGN, SUPERVISION AND PREVENTIVE MAINTENANCE OF CONTAINER STRUCTURES

Objective

1. This advisory reminds the industry on the structural design, supervision and preventive maintenance requirements on the use of modular steel containers as buildings and their connections. It also serves as a reminder to the project parties, including the Qualified Person (“QP”) / Professional Engineer (“PE”) and the builder, of their respective duties stipulated in the Building Control Act 1989 (“**BC Act**”) and regulations for both design and supervision in relation to such structures.

Background

2. BCA has received an increasing number of submissions for containers being repurposed as offices, classrooms or for industrial use. Some of these containers, be it at ground level or elevated with supporting structure, were not appropriately designed for the most onerous action from wind or accidental loads. BCA had also found containers that were modified by the project parties without the QP’s or PE’s knowledge and design checks.

Duties of Project Parties

3. BCA would like to remind the project parties, including Developers, QPs/PEs, site supervisors and builders, of their respective duties in relation to the design and

supervision of container structures, as stipulated in the BC Act and the Building Control (Temporary Building) Regulations 2018, as may be applicable.

4. In particular, the appointed QPs/PEs shall take all reasonable steps and exercise due diligence to ensure that the building works in respect of container structures are designed and carried out in accordance with the provisions of the BC Act and the building regulations. These requirements include ensuring that:

- a. the container structure, including its foundation and supporting structure, are designed and constructed so that the combined dead, imposed, wind and other intended loads can be sustained and transmitted by it to the ground:
 - i. safely; and
 - ii. without causing such deflection or deformation of any part of that building, or such movement of the ground, as will impair the stability of any part of another building or property;
- b. the container structure including its foundation and supporting structure, are constructed with materials that are appropriate for the circumstances in which they are used;
- c. tests that are appropriate to the materials and building works concerned are performed on those materials and building works to ensure that the materials used comply with the code of practice; and
- d. the building works are carried out according to plans approved by the Commissioner of Building Control.

Other Design and Connection Considerations

5. As a good practice, QPs/PEs may also refer to the International Building Code (IBC)¹ for the design of repurposed container structures. In particular, the IBC requires that:

- a. Container structures repurposed for use as a permanent building or structure shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path;
- b. structural material properties for existing container shall be established by material testing;
- c. the container top and bottom rails, corner castings, and columns shall not be notched, cut or removed in any manner;

¹ The International Building Code is a base code standard adopted by most jurisdictions in the United States. Provisions for shipping containers are covered in Appendix 3 of the IBC.

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- d. the total linear length of all openings in any individual side walls or end walls shall be limited to not more than 50% of the length of that side walls or end walls; and
- e. openings in container walls shall be framed with steel elements.

Preventive Maintenance Requirements

6. PEs carrying out Periodic Structural Inspection shall inspect and check that container structures (including supporting structures) remain in a condition so that the combined dead, imposed, wind and other intended loads can be sustained and transmitted to the ground, and any connections in the container structures are free of defects or corrosion. There should also not be any unauthorised additions to the container structures that create additional loads onto the container structures.

Clarification

7. Please disseminate the contents of this circular to your members. Should you need any clarification, please submit your enquiry through BCA's Online Feedback Form at <https://www.bca.gov.sg/feedbackform/> or call us at 1800 342 5222.

Yours faithfully



ER. KWA CHIN SOON
DIRECTOR
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BUILDING AND CONSTRUCTION AUTHORITY
For COMMISSIONER OF BUILDING CONTROL

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