



December 1, 2021

Adam Hicks, Chief Building Official
Coconino County Community Development
Building Division
2500 N. Fort Valley Rd.
Flagstaff, AZ 86001

RE: ATAG findings for 2021 IBC Section 3315 for Intermodal Shipping Containers

Dear Mr. Hicks,

The Alternative Technology Advisory Group has completed its review of the 2021 International Building Code Section 3315 for Intermodal Shipping Containers. Our specific focus was on determining if it provides a prescriptive approach to the design of shipping container dwellings. The purpose of this letter is to share the group's findings with you.

Our primary finding was that the code is not prescriptive, and that an engineered design will be necessary to comply with adopted building code. Subsection **3115.8.5 Simplified structural design of single-unit containers**, provides specific coefficients engineers can use in their calculations if certain limitations and conditions are met, but the architects and designers in the group did not find the information adequate for a design. The information in this subsection will potentially reduce the time required for the engineered design but will not side-step it.

The following are further items of discussion and conclusions of the group:

3115.5 Under-floor ventilation

The group assumed pier foundations for the shipping containers (though other types can be proposed) and that this item on ventilation was ensuring that if the area below the shipping containers were closed in, a means of ventilation would need to be provided.

3115.6 Roof assemblies

The group assumed that if multiple shipping containers are used and a roof is built over them this item would apply.

3115.8.2 Welds

There are several ways to measure a weld to approximate a strength. In general, determination of this can be done by comparing original and final weld sizes. The group thought that verification of this item would likely need to be done by a third party.

3115.8.4.1 Material Properties

This item requires materials testing to determine the material properties for the steel components of the container if the steel grade and composition cannot be identified by the manufacturer's designation. We looked at shipping container tags and labels and the ISO standard to see if this information was readily available. The container tags do show the specific materials each part of the container is made of, but they do not show thicknesses. The ISO standard does not include thickness of materials either, but rather the required tests that must be done to show structural integrity under the required loads. I spoke with Clint at Bleekers Boxes, and he said you can get that information by calling the manufacturer. This information will be needed by the structural engineer for the design.

3115.8.4.3 Allowable shear value

Rational analysis has a specific meaning for structural engineers and involves a material analysis- essentially looking at what the material is and what its strength is in the direction of the load.

3115.8.5 Simplified structural design of single-unit containers

3115.8.5.2 Simplified structural design

The coefficients shown in this item may be used for engineering calculations if the conditions listed in **3115.8.5.3 Allowable shear** are met. When these conditions are not met, the engineer must determine the appropriate coefficients for the design.

Please let us know if you have any questions regarding these findings.

Sincerely,

Nina Schmidt

Nina Schmidt

Chair, Alternative Technology Advisory Group