PRESSURE TREATED WOOD AND STEEL FRAMING

Steel-framed buildings often include wood components, such as sill plates, top plates, door or window bucks, and sheathing for floors, walls and roofs. Consumers and regulators of building construction involving wood components often require pressure-treated wood to help protect the components from attack by termites, other insects, and fungal decay. Designers and builders need to be aware that recent changes in the available wood preservatives used in such applications may impact the durability of the steel framing.

Pressure Treated Wood

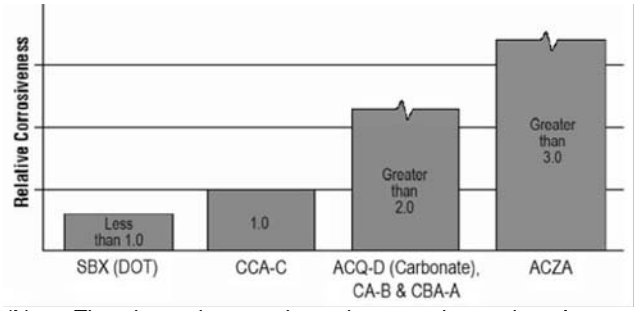
Wood is pressure treated when there is concern about premature deterioration due to termites, other insects and fungal decay. Pressure treatment is a process that forces preservatives into the cellular structure of the wood. Waterborne, Creosote, and Oil-borne (penta) are the three broad classes of preservatives typically used when pressure-treating wood. Wood treated with waterborne preservatives is typically used in residential, commercial and industrial building structures. Creosote is primarily used for treating railroad ties, guardrail posts, and timbers used in marine structures. Oil-borne (penta) is most often used for treating utility poles.

Typical waterborne preservatives used in building applications include Sodium Borate (SBX / DOT), Chromated Copper Arsenate Type C (CCA-C), Alkaline Copper Quat Type D Carbonate (ACQ-D Carbonate), Copper Azole Type B (CA-B), Copper Boron Azole Type A (CBA-A), and Ammoniacal Copper Zinc Arsenate (ACZA). There are a number of variations of these treatments available and they are often referred to by trade name. Please refer to the treated wood industry web site (www.awpa.com) for additional data.

Chromated Copper Arsenate (CCA) has been used for a number of decades for pressure treating wood. The building construction industry has become familiar with its attributes and its impact on other materials, and CCA has been the most widely used preservative in building construction. However, since December 31, 2003, CCA has not been produced for residential or general consumer use. This was due in part to negative publicity focused on the use of arsenic in CCA. The treated wood products industry has transitioned from CCA to alternative preservative systems such as Alkaline Copper Quat (ACQ) and Copper Azole (CA).

Unfortunately, testing has indicated that ACQ, CA, and ACZA are more corrosive to galvanized steel than the former CCA (Reference 1).

This has become a significant concern to the wood fastener, connector, and metal plate connected truss industries. It may also have an impact on steel-framed buildings.

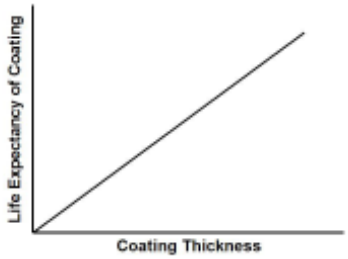


(Note: The above data are based on accelerated testing per AWPA Standard E12-94, and may or may not have a relation to actual service life)

Galvanized Steel Framing

Steel framing members are galvanized to protect the steel from corrosion. Hot-dip galvanizing is a process of providing a protective coating (zinc) over bare steel. In this process, coils of steel sheet are continuously unwound, cleaned, and passed through a bath of molten zinc where a specified zinc coating thickness is applied to the steel sheet. The galvanized coils are later slit into narrower widths and cold-formed into shapes suitable for framing applications.

Industry standard practice is to use G40 for non-structural and G60 for structural framing when the members are "located within the building envelope and adequately shielded from direct contact with moisture from the ground or the outdoor climate" (Reference 2). Heavier coatings, such as G90, are recommended in those cases where additional protection is needed. Oceanfront buildings are one example (Reference 3).



Several manufacturers now market cold-formed steel framing fabricated from G90 galvanized steel, which, compared to the standard G60, has a zinc coating that is 50 percent thicker. Since the corrosion resistance of zinc is proportional to the thickness of the zinc, these framing members should last approximately 1.5 times longer. However, when using the more corrosive ACQ, CA, or

ACZA, increasing to G90 may not match the performance of the former CCA with G60. Heavier than G90 coatings are typically not available for framing members, therefore, this would not be considered a practical option.

Impact of PT Wood on Steel Industry

Manufacturers of products that come in contact with pressure treated wood, such as fasteners, metal connectors, and truss plates, have become aware of the potential for increased corrosiveness of the new generation copper-based products. They have conducted tests and published recommendations for the specification and use of their products.

It needs to be recognized, however, that the primary focus of this work by others has been in developing recommendations for their products in a wide range of applications including outdoor applications. In many cases, relatively heavy galvanized coatings (>G90) and stainless steel are being recommended – options not readily available or cost effective for cold-formed steel framing.

Recommendations for Steel Framing

The following would seem to be viable options for cold-formed steel framing that should be considered:

- Specify Sodium Borate (SBX/DOT)
- Isolate the steel and wood components
- Avoid use of pressure treated wood

Specify Sodium Borate

Testing has demonstrated that the Sodium Borate (SBX/DOT) preservative is less corrosive to galvanized steel than the former CCA. However, being water soluble, it is generally not recommended for applications that are exposed to the weather and special care should be taken to ensure the wood is covered during transport and storage at the job site. Producers indicate it is suitable for sill plates and other such applications. However, specifiers and builders are cautioned to first verify local availability of these products for their building projects.

Isolate the Steel and Wood Components

Another option is to isolate the steel framing from the pressure treated wood components. This could be done with a polyethylene barrier or other non-absorbent barrier material. However, care needs to be taken during construction to assure that integrity of the barrier is maintained. Consideration also needs to be given to the appropriate selection of fasteners used to connect the steel and wood components and should consider dissimilar metals. Use of typical self-tapping screws, which are not hot-dip galvanized (Reference 4), would not be recommended for connections into pressure treated wood.

Avoid Use of Pressure Treated Wood

The pressure treated wood components often used in steel-framed buildings can usually be eliminated. This obviously avoids the problem altogether. For example, building codes do not require a wood sill plate beneath steel framing and, when needed, relatively inexpensive barrier products are available. Wood top plates are generally not required either, as alignment framing or a steel load bearing top track can be selected. Avoiding use of pressure treated wood probably provides the greatest assurance that the design intent will be realized.

References

1) Technical Bulletin, Preservative Treated Wood, T-PTWOOD, Simpson Strong-Tie Company, Inc., Pleasanton, CA

2) AISI, Standard for Cold-Formed Steel Framing – General Provisions, 2004, American Iron and Steel Institute, Washington, DC.

3) CFSEI Technical Note D200-07, Corrosion Protection for Cold-Formed Steel Framing in Coastal Areas, 2007, Cold-Formed Steel Engineers Institute, Washington, DC.

4) LGSEA Technical Note 560-b5, Fastener Corrosion, 1999, Cold-Formed Steel Engineers Institute, Washington, DC.

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