Steel Framing Alliance™
Steel. The Better Builder.
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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

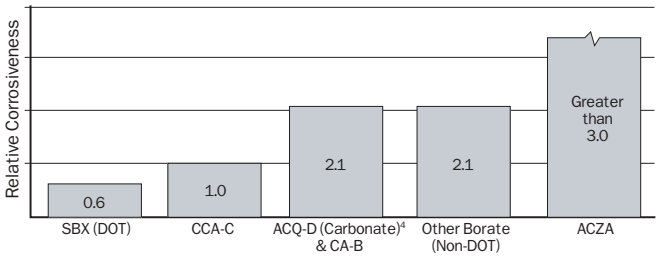
Wood is pressure treated when there is concern about premature deterioration due to termites, other insects and fungal decay. Pressure treatment is a process that forces preservatives into the cellular structure of the wood. Waterborne, Creosote, and Oil-borne (penta) are the three broad classes of preservatives 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), Chromated Copper Arsenate (CCA), Alkaline Copper Quat (ACQ), Copper Azole (CBA-A & CA-B), 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 treated wood industry web sites (www.awpa.com or www.preservedwood.com) for additional data.

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, CCA will no longer be produced for residential or general consumer use after December 31, 2003. This was due in part to negative publicity focused on the use of arsenic in CCA, and the treated wood products industry is rapidly transitioning from CCA to alternative preservative systems.

It is expected that the alternative preservatives will become more widely available and more commonly used.

Unfortunately, testing has indicated that ACQ, CBA-A, CA-B and ACZA, the new generation copper-based products, are more corrosive to galvanized steel than the former CCA (Reference 1).



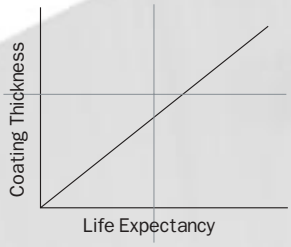
Note: The above data are based on accelerated testing per AWPA Standard E12-94, and may or may not have a relation to actual service life.

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

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, bare steel is cleaned, pickled, fluxed, then dipped in a molten bath of zinc and allowed to cool prior to being coiled. Various weights of coating are available. 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 such application (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.

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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, 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. 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)
- Isolate the steel and wood components
- Avoid use of pressure treated wood

Specify Sodium Borate (SBX)

Testing has demonstrated that the Sodium Borate (SBX) 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 barrier of felt paper, closed cell foam, heavy plastic, or perhaps even paint. 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, as the barrier would not reduce the corrosion rate of the fasteners. Use of typical self-tapping screws, which are not hot-dip galvanized (Reference 4), would not be recommended. Certain fasteners that may be more durable, such as stainless steel, are made of dissimilar metals and may accelerate corrosion of the galvanized steel framing

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 felt paper or closed cell foam sill seal 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, December 9, 2003, Simpson Strong-Tie Company, Inc., Dublin, CA.

2) AISI, North American Standard for Cold-Formed Steel Framing – General Provisions, AISI S200, American Iron and Steel Institute, Washington, DC.

3) CFSEI Technical Note D200 - Corrosion Protection for Cold-Formed Steel Framing in Coastal Areas, 2012, Cold-Formed Steel Engineers Institute, Washington, DC.

4) CFSEI Technical Note D100 - Corrosion Protection of Fasteners, 2013 Cold-Formed Steel Engineers Institute, Washington, DC.