STRUCTURAL BUILDING COMPONENTS MAGAZINE November 2004

Technical Q & A

Metal in Contact with Treated Lumber by Rachel Smith

New preservative treatments from the preservative treated wood industry are proving more corrosive than their CCA predecessor. Find out what you need to do to work safely with these new products.

This year the preservative treated wood (PTW) industry voluntarily stopped using the widely available Chromated Copper Arsenate (CCA) treatments on lumber headed for residential and general consumer use. When CCA lumber was still in use, the PTW industry recommended using stainless steel or hot-dip galvanized connectors and fasteners in order to reduce the risk of metal corrosion in high moisture content environments or exterior applications. The alternative wood preservatives replacing CCA are no exception, but recent testing and research suggests that some of the treatments are even more corrosive than CCA, particularly in dry interior applications where CCA was used with traditional galvanized products, such as G60 metal connector plates.

The "new generation" treatments are Sodium Borate (SBX), Alkaline Copper Quat (ACQ), Copper Azole (CBA-A & CA-B) and Ammoniacal Copper Zinc Arsenate (ACZA). The formulations of these treatments may vary by treater or chemical supplier so it's important to get the exact specifications from the wood treater in order determine what level of corrosion protection may be required for any truss plates, connectors or fasteners in contact with treated lumber. Visit the American Wood-Preservers' Association (www.awpa.com) for wood treater information.

To help truss manufacturers understand the issues these alternative treatments create, WTCA and the Truss Plate Institute developed Guidelines for the Use of Alternative Preservative Treatments with Metal Connector Plates. This guideline does not apply only to trusses built from PTW. It also applies to any metal product that comes in contact with PTW, which includes truss plates on untreated lumber, connectors and fasteners. Visit the <u>Lumber Section</u> on the WTCA web site to download a copy of this guideline.

SODIUM BORATE (SBX)

Borate treatments are generally less corrosive than CCA treatments. They are also water soluble which makes them a bad choice for applications where the wood will be wet or exposed to the environment. Treaters recommend that metal products in contact with SBX treated lumber have at least a G60 galvanized coating. Standard truss plates in use today have a G60 coating.

The amount of protection offered by hot-dip galvanization (HDG) is in direct proportion to the thickness of zinc coating applied. G60 is a zinc coating applied at 0.60oz/ft2 and G90 is applied at 0.90oz/ft2, therefore G90 coating offers 50 percent more protection than G60. G185 as an example offers three times more protection than G60.

ACQ & COPPER AZOLE

These treatments have higher amounts of corrosion-inducing copper than CCA. Some testing found ACQ to be two times more corrosive than CCA. For metal in contact with this type of treated lumber, treaters recommend stainless steel or hot-dip galvanized coating of G185. Simpson Strong-Tie and USP Structural Connectors are voluntarily increasing the hot-dip galvanized coating on their standard product lines from G60 to G90, but offer thicker coatings of G185 called ZMAX and Triple Zinc respectively. In order for truss plates to have this level of protection, they must be stainless steel, special order G185 galvanized, or post-manufacture hot-dip galvanized to standards outlined in ASTM A153. The last option requires the truss manufacturer to gather the appropriate number and type of standard G60 truss plates and send them to a local galvanizer to add the additional coating to the plates before the trusses are manufactured. Visit the American Galvanizers Association web site (www.galvanizeit.org) to find a galvanizer.

AMMONIACAL COPPER ZINC ARSENATE (ACZA)

Simpson Strong-Tie tested ACZA treatment and found it to be three times more corrosive than CCA. They recommend using only stainless steel connectors and fasteners with ACZA treated lumber.

WHAT TO DO WHEN PTW IS ON THE JOB

If you are a truss manufacturer, contact your truss engineer and/or plate supplier to discuss the best protection option based on the lumber treatment, the application and the truss design parameters. In some cases the truss plates don't come in contact with treated lumber until they are installed at the jobsite. It is important for truss manufacturers to be on the look-out for these types of situations so they can bring the "corrosive environment" to the attention of the builder and avoid long-term damage to truss plates, connectors and fasteners. It is worth noting that aluminum corrodes very easily when in contact with PTW. Never install aluminum products like siding, flashings, skirting or Galvalume® directly on PTW.

QUESTION:

I am a truss manufacturer and I have a question regarding treated lumber and the effects it has on our trusses. I have two scenarios for you to consider. The first is treated joists attached to the side of floor trusses and it is cantilevered to the outside forming a deck. In this situation I am concerned about two things, one is the treated joists are in direct contact with our truss plates and the second is the fasteners used to attach the joist to our truss. The second scenario is in post frame construction. If the customer is using a completely treated post and notching it to accept the truss for bearing, our truss plate is exposed to the preservative treatment. In the first case there is always a possibility that we could get a leak where the deck goes into the house. The second case the truss and post are completely covered and should be in a dry condition. Do we need to be concerned in either case? (See Figures 1 and 2.)



ANSWER:

Yes, you need to be concerned any time metal connector plates are in contact with treated wood. The corrosive action of lumber preservative treatments on metal is not moisture dependent. Excessive moisture may accelerate the reaction, but the absence of water does not stop it. In fact, corrosion tests are conducted by placing steel coupons between two blocks of dry treated lumber. Use the WTCA/TPI Guidelines for PTW mentioned above to instruct your customers on properly protecting the plates, fasteners and any structural connectors.

If the recommendations for using stainless steel plates or post-manufacture hot-dip galvanized plates aren't practical, then you might consider a durable barrier between and treated lumber and untreated truss plates. ANSI/TPI 1-2002 Section 6.5 outlines several protective coatings for metal connector plates on untreated trusses in corrosive environments. Another option is a membrane-type barrier. It sounds simple enough but the problem is that currently we are only aware of one recommendation for a type and brand of membrane barrier.

Simpson Strong-Tie conducted tests with Grace Construction Products on the product Grace Vycor Deck Protector. Visit the Simpson web site (<u>www.strongtie.com</u>) to see the details on using this product. As recommendations from other stakeholders develop, WTCA will continue to update the Lumber Section with current information.

You should also be concerned any time trusses will get wet throughout their service life. Repeated wetting and drying of trusses leads to wood swelling and shrinking. If the water contact is at a plated joint, this can weaken the joint and reduce the overall strength of the truss.

QUESTION:

I am a contractor installing cold-formed steel trusses. The plans specify treated plywood sheathing attached directly to the truss top chords. I am concerned that the preservative treatment might corrode the truss top chords. What should I do?

ANSWER:

Cold-formed steel trusses are protected with G60 galvanization, the same level of galvanization as standard metal connector plates for wood trusses. The galvanization can be specified at a higher rating like G90 for coastal applications. However, you need to be concerned any time metal is in contact with treated wood. Follow the same procedure as for wood trusses determine the type of PTW panel and let that guide how to protect the steel.

Treated plywood sheathing is not a very common decking option for steel trusses. Even so, there are still opportunities for PTW to come in contact with steel framing. The Steel Framing Alliance (SFA) has addressed this possibility in their Issue Paper on Pressure Treated Wood and Steel Framing. Besides avoiding the use of pressure treated wood altogether, SFA recommends two courses of action: (1) Specifying sodium borate treatments: These are the least corrosive, but are water soluble so they are not suitable for wet service conditions; and (2) Isolating the steel from the wood components: They recommend a barrier of felt paper, closed cell foam, heavy plastic or perhaps even paint. They mention that care must be taken to maintain the integrity of the barrier during construction. There are no suggestions for any particular type or brand of these products or whether they have been tested and proven successful.

REFERENCES:

Visit the Lumber Section on the WTCA web site for links to these publications:

- Guidelines for Use of Alternative Preservative Treatments with Metal Connector Plates, 2004, Wood Truss Council of America and Truss Plate Institute, Madison, WI.
- Corrosion Protection News, 2004, USP Structural Connectors, Montgomery, MN.
- Technical Bulletin, Preservative Treated Wood, 2004, Simpson Strong-Tie Company, Inc., Dublin, CA.
- Technical Bulletin, Barrier Membranes & Preservative Treated Wood, 2004, Simpson Strong-Tie Company, Inc., Dublin, CA.
- Issue Paper on Pressure Treated Wood and Steel Framing, 2004, Steel Framing Alliance, Washington, DC.

SAFE HANDLING OF TREATED LUMBER

- Follow the same handling advice for CCA treated wood.
- When sawing, sanding and machining wood, wear goggles and a dust mask.
- Do not burn treated wood, instead comply with local landfill rules.

 Avoid contact with skin, some users have reported a sunburn-like rash or dermatitis after exposure. Wear gloves and protective clothing, afterwards, wash exposed areas thoroughly.

To pose a question for this column, email us at <u>techincalqa@sbcmag.info</u>. To view other questions visit the <u>WTCA website</u>.

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