

As a part of the marketing plan developed by NCCA's Board of Directors, the following article by Fritz Friedersdorf is the first in a series of resources designed to help you in your sales and marketing efforts. In subsequent issues of Coil Lines, similar proofs will be featured providing you with the educational resources you need.

Preventing Job Site Storage Corrosion of Prepainted Building Panels

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Introduction

Prepainted building panels have been successfully used for many years. In general, properly installed building panels under normal service conditions have excellent corrosion resistance. However, prepainted building panels are subject to premature corrosion failures prior to installation, if they are not handled and stored properly on the job site. Excessive storage periods or poor storage conditions often result in water intrusion into panel bundles. Prolonged exposure of bundled panels to wet conditions can cause paint blistering and substrate corrosion.

This document is intended to provide guidance for the prevention of storage corrosion of prepainted building panels and accessory items.

Environmental and Service Conditions

Water is a necessary prerequisite for corrosion of stored prepainted panels. When water or water vapor is available along the sides of a panel bundle, it may penetrate between the panels by capillary action. If proper precautions are not taken during transport, water may be present between the panels upon delivery at the job site. Ambient humidity and temperature cycles will also promote water intrusion into stored panel bundles through condensation. Finally, rain and snow are other potential sources of water that can cause storage corrosion of prepainted panels.

Besides water, two other important factors that contribute to the corrosion of stored prepainted panels are temperature and exposure time. Corrosion will accelerate with increased temperature. Given enough time, panel bundles will eventually become

wet and storage corrosion may occur under most job site panels.

Storage corrosion can be prevented by:

- Reducing site storage time.
- Decreasing water contact.
- Moderating temperature extremes.

Special case factors not considered here are the presence of aggressive soluble chemicals, such as sulfur and chlorine compounds, that might be present in polluted atmospheres, road salt contaminants, or marine environments. It is reasonable to assume that these soluble species would accelerate storage corrosion.

Prepainted Panel Properties

Both environmental conditions and the prepainted material itself influence storage corrosion. Specifically, the metal substrate, pretreatment, paint system and panel geometry can all contribute to the durability of the prepainted panel in both the storage and service environments.

There is currently no test method to determine the storage corrosion resistance of prepainted sheet products that has been correlated with actual storage performance; although, there are a number of test methods that have been utilized by the building products industry (See Appendix on page 3).

Panel Packaging

To minimize job site storage corrosion, panel bundles must be paper wrapped and possibly have cover (waster) sheets and end caps. Proper paper wrapping requires that the top sheet lap over the bottom sheet to shed water (Figure 1). The paper wrapping should have no folds or laps that could collect and hold water in, or on the panel bundle.

The contents of each bundle must be described in an external packing slip to minimize damage to paper packaging required for receipt inspection. Generic labels may also be affixed to panel bundles describing proper handling and storage practices (Figures 2 and 3).

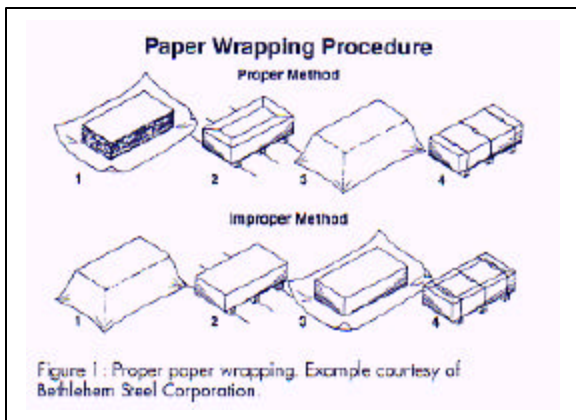


Figure 1: Proper paper wrapping. Example courtesy of Bethlehem Steel Corporation.

Receiving

Panel bundles must always be carefully inspected when received at the job site. The bundles must be received paper wrapped as described above (Figure 1). The bundles must be examined for mechanical damage, rips and tears in the packaging and the presence of water. Rips and tears in the paper wrapping have to be repaired using water-resistant tape.

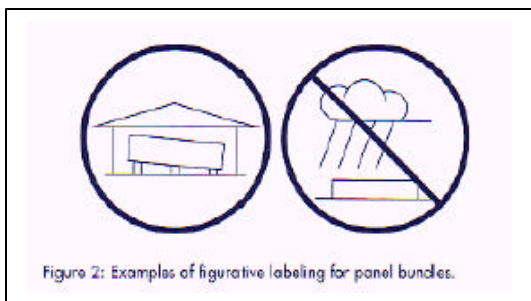


Figure 2: Examples of figurative labeling for panel bundles.

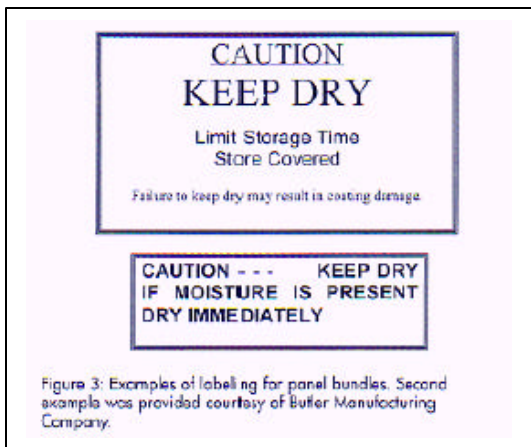


Figure 3: Examples of labeling for panel bundles. Second example was provided courtesy of Butler Manufacturing Company.

If water is present in the panel bundle, the panels must be separated and wiped dry with a clean soft cloth and stacked with a space between each panel, so that air circulation can complete the drying process. The panels must also be inspected for paint blistering and corrosion. If wet and corroded panels are observed during the receipt inspection, these conditions have to be noted on the delivery receipt and reported promptly to the panel supplier.

Panel bundles must not be stored with plastic wrapping. If the bundles are received with plastic wrap, the wrapping has to be removed to prevent water from being trapped in the bundles.

Applying a proper paper wrapping is usually not possible at the job site. Whether the panel bundles are properly paper wrapped or not, the bundles must be stored as described on page 3.

Job Site Storage

Prolonged storage will always increase the likelihood of storage corrosion; therefore, the best prevention is to minimize the storage time. Proper storage limits the collection of water from rain, snow and condensation on the panel surfaces. Under roof storage is always preferred.

If panel bundles have to be stored outdoors, a number of precautions must be taken to prevent storage corrosion. The panel bundles should be stored in a level area out of the way of other construction activities to minimize the number of bundle movements required at the job site. If the bundles are stored on the ground, a plastic ground cover must be put down under the bundle to minimize condensation of water from the ground onto the panels. The bundles must then be raised off the plastic ground cover to avoid contact with water puddles, and allow for air circulation around the bundle to promote drying of condensed water (Figure 4). Wet, uncured or pretreated lumber should not come in contact with the panel bundles. The panels must be stored on an angle to promote drainage of water off the bundle. Sufficient support must be provided to the raised and angled bundles to avoid excessive bowing, which may result in low spots that could hold water.

The bundle must be completely sheltered with a loose fitting waterproof tarp to protect the bundle during rain or snow events, but allow for air circulation and drying of condensed water (Figures 4 and 5). A loose fitting tarp also shadows the bundle from direct sun light and should act to moderate high temperature extremes.

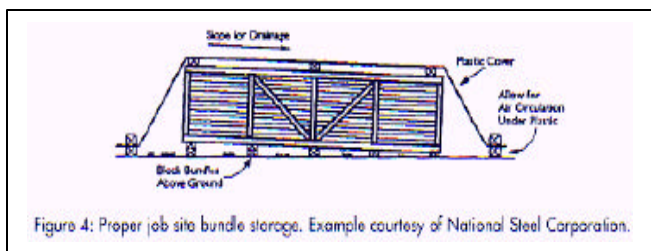


Figure 4: Proper job site bundle storage. Example courtesy of National Steel Corporation.

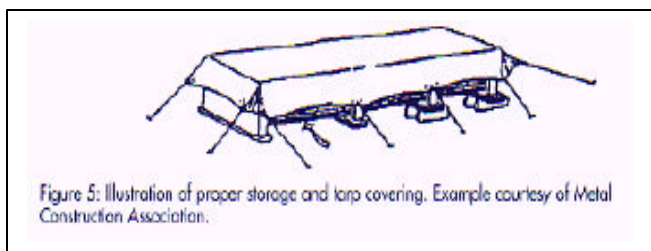


Figure 5: Illustration of proper storage and tarp covering. Example courtesy of Metal Construction Association.

Unused portions of open bundles must be recovered. The condition of the tarps and paper wrapping of stored bundles should be inspected daily for damage, puddles and snow accumulation. Damage to packaging or tarps must be repaired and snow accumulation or puddles should be removed. If water is present in the panel bundles, the panels must be separated and wiped dry with a clean soft cloth and stacked with a space between each panel, so that air circulation can complete the drying process.

Handling

Proper handling of the individual panels and panel bundles is important for avoiding product damage and maintaining worker safety. Handling of panels and bundles is thoroughly addressed in the Metal Construction Association, “Guide to Metal Panel Shipping and Job Site Handling and Storage.”

References

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National Coil Coating Association, *Coil Coated Metal Building Panels – Care and Maintenance*. April 1988.

National Coil Coating Association, *Technical Bulletin No. IV-7, Recommendations for Prevention of Job Site Corrosion on Precoated HDG Steel Building Panels*. Undated.

Appendix

Test Methods for Evaluating Water Sensitivity of Prepainted Sheet Products

Standard Test Methods

1. Practice D1735-99 Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus.
2. Practice D4585-99 Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation.
3. Practice D2247-99 Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
4. Practice D870-97 Standard Practice for Testing Water Resistance of Coatings Using Water Immersion.