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Preventing Job Site Storage Corrosion of Prepainted Building Panels

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. Excessive storage periods or improper storage conditions can often result in water intrusion into panel bundles. Exposure of bundled panels to wet conditions or high humidity can lead to premature failure of the coating system which may result in 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

Proper storage of prepainted building panels that protects them from any form of moisture is critical to protect them from premature corrosion. Storage in conditions where water or water vapor is available along the sides of a panel bundle may lead to penetration between the panels by capillary action. If proper precautions are not taken during transport, water may already 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 in uncontrolled temperature, panel bundles will eventually become wet and storage corrosion may occur.

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 chemicals would accelerate storage corrosion.

Prepainted Panel Properties

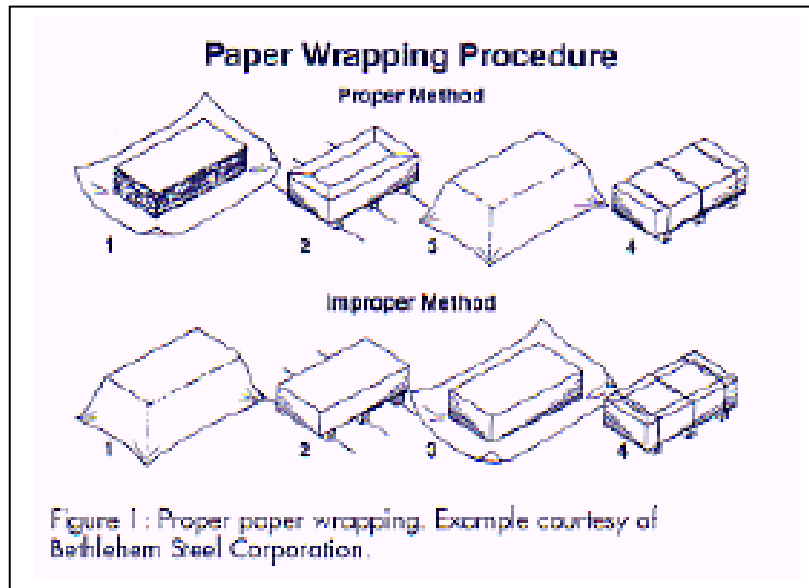
Both environmental conditions and the prepainted material itself influence storage corrosion. Specifically, the metal substrate, pretreatment, paint system, and panel geometry can all contribute to the durability of the prepainted panel in both the storage and service environments.

This Tool Kit is part of a series of educational aids developed by the members of the National Coil Coating Association. NCCA is a trade association of coil coaters and suppliers of raw materials and equipment used in the coil coating process. The association concentrates its efforts on providing educational resources and assisting its members in providing superior products and services to their customers. NCCA Tool Kits are informational tools and should not be used as substitutes for instructions from individual manufacturers. Always consult with individual manufacturers for specific instructions regarding their products and equipment.

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).

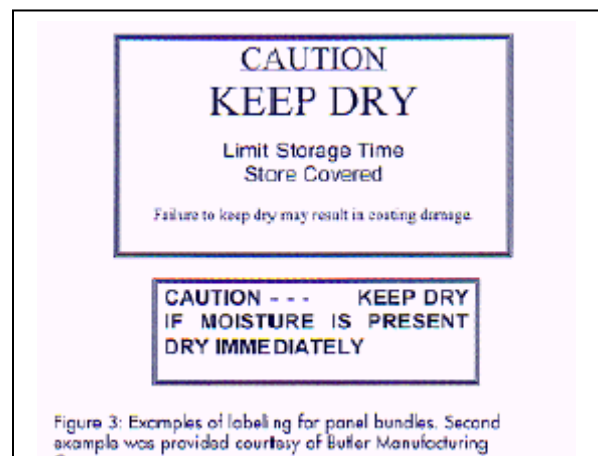
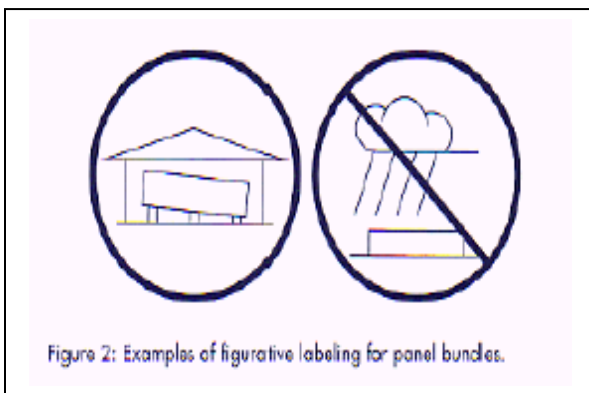
Panel Packaging

To minimize job site storage corrosion, panel bundles must be paper wrapped with a water repellent paper 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.



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.



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.

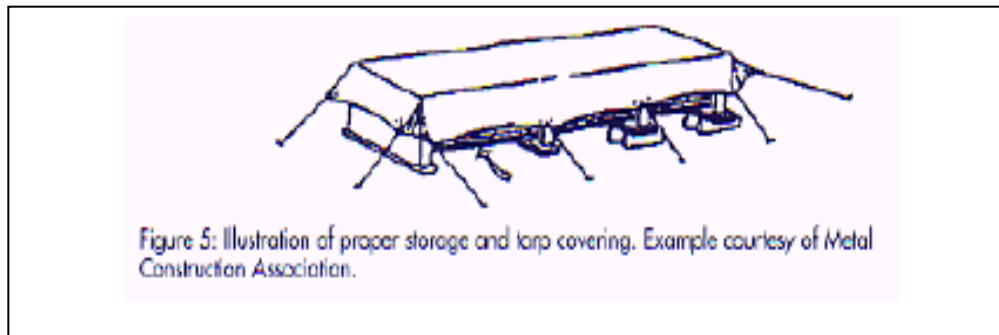
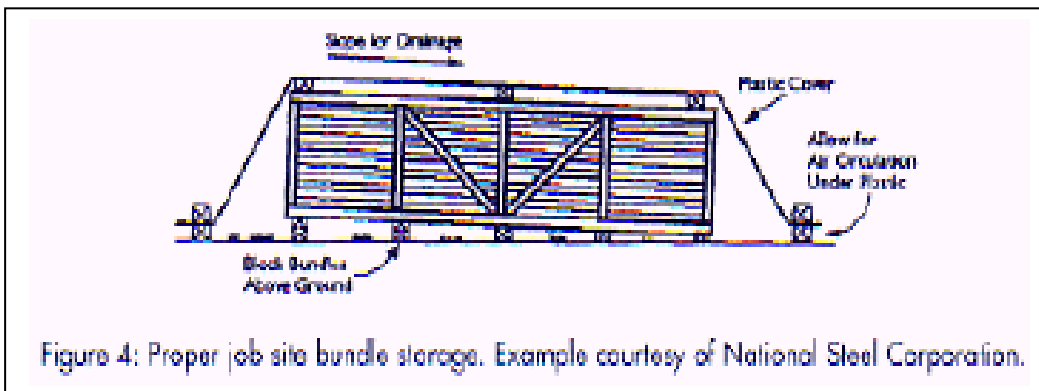
Applying a proper paper wrapping is usually not possible at the job site. Whether the panel bundles are properly paper wrapped or not, the bundles must be stored as described below.

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 away from 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 sunlight and should act to moderate high temperature extremes.



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.”

Appendix

Test Methods for Evaluating Water Sensitivity of Prepainted Sheet Products

Standard Test Methods

1. ASTM D1735-14 Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus.
2. ASTM D4585/D4585M-13 Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation.
3. ASTM D2247-15 Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity.
4. ASTM D870-15 Standard Practice for Testing Water Resistance of Coatings Using Water Immersion.
5. ASTM D7376 Standard Practice for Outdoor Evaluation of Wet Stack Storage Conditions on Coil-Coated Metals.