JOBSITE STORAGE REQUIREMENTS FOR STEEL DECK

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The SDI Design Manual (Publication No. 30) Section 4.1 provides the basic guideline for proper storage of steel deck:

> "***Site Storage:*** *Steel deck shall be stored off the ground with one end elevated to provide drainage, and shall be protected from the elements with a waterproof covering, ventilated to avoid condensation."*

Proper storage of steel deck bundles at jobsites has been addressed by the SDI for many years. Besides the "Steel Deck Institute Design Manual (Publication 30)", proper storage is also discussed in the "SDI Manual of Construction with Steel Deck". In addition, the SDI has published a White Paper No. SDCP entitled "A Rational Approach to Steel Deck Corrosion Protection" discussing the dynamics of corrosion when moisture is trapped in deck bundles with little or no air flow.

In reponse to OSHA concerns, the steel deck industry recently adopted the Voluntary Lubricant Compliance Program (VLCP) developed by the Steel Coalition which consists of manufacturers of sheet steel products used for construction. The VLCP requires the deck manufacturer to either use a highly evaporative lubricant, or remove the non-evaporative lubricants from the surfaces of all steel decks to minimize the slip hazard during the construction process. Without the added corrosion protection of this light lubricant film, proper storage of steel deck has become more critical than ever.

Steel deck should not be delivered to the jobsite until it is time for installation. Even if the material is properly stored, lengthy exposure to the elements will result in the gradual deterioration of the bundled steel deck. Deck bundles stored outdoors in winter that are subjected to cold, damp conditions with freeze-thaw cycles will likely corrode much faster than bundles stored in a warm dry climate. Seasonal and/or regional conditions as well as the presence of corrosive materials such as road salt also affect the rate of deterioration of the steel deck finish.

If aesthetics of the erected product is an important consideration, special care must be taken to protect the steel deck during the pre-erection storage as well as throughout the installation process.

If the steel deck is not stored properly, it is likely water from rainfall and condensation will be entrapped in the tight spaces between the steel deck sheets. If the moisture remains trapped in the bundle, the environment becomes extremely corrosive to either galvanized or painted material.

In the case of galvanized material, the zinc carbonate passive film that normally forms in open air and seals the galvanized surface cannot form due to the restricted air supply in the bundle. Without this passive film, severe corrosion damage can occur in a very short time period, since zinc is such a reactive metal. It should also be noted the application of

a surface passivation treatment (commonly referred to as mill-passivation) applied by the steel mill provides an additional measure of protection. However, the mill passivation is also broken down quickly in this hostile environment followed by the rapid degradation of the galvanized finish.

When water is left in the bundles of painted deck, it may soften the paint and destroy it's adhesion to the base metal. Once the adhesion is compromised, the paint will begin peeling, exposing the base metal. In the peeled area, moisture can spread more easily under the exposed edges of the paint film, causing even more damage. As with the galvanized material, severe corrosion can occur in a short time period in the presence of trapped water.

In both cases, the initial deterioration is an aesthetic issue and is commonly referred to as "wet storage stain". On galvanized steel, the oxidation appears as a milky substance when wet or as a gray-white powder once it dries. On painted material, it has the typical rusty appearance. At this stage, there are only small areas of minor corrosion. However, the entrapped water can spread the rust stain along broad areas of the deck flute giving the appearance of widespread rusting. (Other than the small areas of minor corrosion, the rust staining can typically be wiped clean revealing the undamaged finish beneath.) At this stage the steel deck has not been structurally damaged. Once the deck is erected, the surface will dry, and deterioration due to entrapped water is typically alleviated.

Eventually, corrosion of the base metal resulting in red rust will occur once the protective coatings are breached and the steel is directly exposed to the moisture. Continued exposure to the corrosive environment will eventually cause the structural failure of the steel.

In summary, proper storage of the steel deck in the field is a very important issue. Now, with the removal of lubricants from the steel deck surfaces, proper jobsite storage of steel deck has become even more critical.