

Technical Bulletin – Understanding Wood Decking and the Elements

“Wood decking behaves predictably, and understandably in response to the conditions to which it has been subjected”

This summary is to assist in the diagnosis of common complaints associated with wood decks. This is not limited to imported hardwoods, but insight contained in this report will also help in understanding softwoods, both treated and untreated.

The most important points in analyzing jobsite issues are to go in with an open mind, and not to jump to conclusions. When dealing with wood, it is predictable. Based on what the wood is subjected to, it will behave in an expected manner. This is not rocket science, but an exercise in gathering data and observations to determine what the substrate was really subjected to and help develop an understanding of how to correct the problem, minimize the damage that may result, and to determine a course of action towards long term customer satisfaction. With this, we need to look at material selection, application, design, installation, finishing, fastening, end sealing, jobsite storage and handling, seasonal environmental impacts on wood equilibrium as well as freeze/thaw, and the effects of footings moving from frost causing the deck itself to rack. Is this an attempt to find a way out, or that this type of inspection can make any warranty bogus? No, not at all. Only by ruling these things out can we document what may become deemed a defect in materials or workmanship.

The greatest source of problems on wood exterior decking is moisture and proper or improper deck ventilation. In fact, the biggest problems are not normally associated with unfinished deck boards, but with improperly or partially finished boards. Here's why: Wood has some unique properties, as it will always seek equilibrium with the surrounding environment, and this is best controlled with proper and complete finishing of all six sides. The ends are where the greatest absorption and release of moisture will occur. If you finish the board, yet neglect to seal the ends, the board will naturally pull in water from direct contact with rain and condensation, as well as ambient moisture from the air. The moisture will gravitate towards the interior of the deck board, but will not be able to flow freely, as the hydroscopic abilities of the exposed faces have been minimized by paint or stain. This will certainly cause stresses, first with swelled ends, and eventually surface checking, lifted paint, or premature failure of penetrating stains. A larger problem results when the face of the decking is finished after installation, but the underside is left raw. Now we have the back of the board exposed to a cool, dry, shaded environment often wet if close to the ground, but the face is exposed to the sun, hot, dry, and harsh. The result here is that the board drinks up moisture with an appetite that will never be satisfied. The sun works overtime beating down on the face, again compromising the finish, but cupping and uncontrolled movement should be expected.

Face readings of 3-8% moisture content in this circumstance is common, with the back not only 4 – 5 times higher moisture, but measurably wider in width, causing cupping and movement. In fact, this condition let to continue will see standing water left on the face after raining, with the sun evaporating it rapidly. Now we often see checking becoming real splits.

In addition to finishing, we need to address what the finish is being subjected to, and what can we do to help insure performance. For instance, if we have a long valley funneling huge amounts of water concentrated to a single spot, we might see the coating take a beating. Without free airflow under the deck, and poor drainage, we could expect to see a potential for mold growth, cupping and possibly checking even when finished properly. Are these issues the fault of the wood? No, but without understanding accepted building practices and proper design, the uneducated consumer will probably think so.

The last area of inspection is the frame and connection to the structure. In particular if the deck was designed and assembled by a Homeowner, or Do-it-yourselfer, we need to inspect connections, water proofing at the connection to the house, nail selection at the hangers, and most importantly, footing depth for frost protection. Keep in mind, that a 12' X 12' deck out of square by one inch due to footing moving, will hold standing water. This is normally described as, "My deck boards swelled and the gaps closed up."

As with any type of construction there is no substitute for experience. Too often when materials fail to perform as expected we hear from an installer "Well you didn't tell me that I couldn't do it this way" as an excuse for lack of product knowledge, experience, skill or common sense.

It is precisely for this reason that virtually all building products literature emphasizes that it the responsibility of the designer, be it an architect, engineer, contractor or consumer to determine the suitability of any given building material in its final application.

I hope this sheds light on items to look for, clues to a cause, or at least illustrates that there is no one thing to look for, but many things that together can affect performance and satisfaction. The one saving grace is that with understanding comes efficiency, as the most expensive fix is always trial and error.