

## My Hardwood Floor Looks Wavy

By: David Barkstedt

I received a phone call from a consumer who commissioned me to inspect her factory finished solid wood floor. The floor had been installed the previous winter and since then had become "wavy" across the width of the boards. The consumer first noticed this condition during the summer. The wavy appearance she was describing was actually cupping.

The floor was installed over a wood sub-floor in the living room and hallway during the previous winter. The sub-floor in the living room and foyer were installed over a crawlspace with no vapor barrier and no ventilation. The sub-floor in the hallway was installed over an existing basement with a concrete floor. From a conversation with the installer, I discovered that he had not performed any pre-installation moisture testing and had not examined the conditions over which the sub-floor was installed. The installer also had not acclimated the flooring prior to installation (as required by the flooring manufacturer).

I carefully examined the floor and tested for moisture using a probe-type moisture meter. I used a probe-type moisture meter that measures electrical resistance across the opposed sets of pins that are pushed into the wood parallel with the grain testing into the sub-floor using 1 1/8" penetration electrodes. The purpose is to compare the top 3/16" of the wood to the bottom of the wood and then into the sub-floor. I used the probe moisture meter to take measurements with the penetration electrode to the center of the plank, then to the bottom, then into the sub-floor. These tests revealed moisture imbalances between the wood floor and the subfloor. There was a moisture imbalance of greater than 4 percent giving cause for concern.

The moisture imbalance allowed the boards to cup or, as the consumer stated, become wavy. As humidity levels increased during the summer months, moisture from the crawlspace migrated up through the sub-floor into the wood floor.

The first item to address was the origin of the significant moisture. A vapor barrier was installed in the crawlspace, as well as adequate venting to allow for cross ventilation. Once that had been done, the moisture levels between the sub-floor and wood floor had to equalize. In situations such as this, the time needed to allow the moisture to become balanced through the wood floor and sub-floor could be up to a year or through a complete heating and cooling cycle. After the moisture imbalance is stabilized, it may be necessary to sand the floor flat and refinish. Sometimes after stabilization has occurred, the wood floor returns to an acceptable appearance and/or condition.

Unfortunately, in this particular floor, the boards did not flatten to an acceptable appearance through stabilization of the moisture conditions. There were additional

installation concerns, and the consumer currently is proceeding with legal measures against both the installer and the retailer.

The installer/retailer is responsible for checking to see if the job-site conditions are acceptable for a solid wood floor installation. These checks should be done long before the installer arrives on the job site to start the installation. In this case, a quick inspection when the job was estimated would have revealed that the crawlspace was unacceptable, and therefore the job site was not ready for a wood flooring installation. Current guidelines for crawlspaces are that they must be dry (no apparent moisture or standing water) and must be covered 100 percent by a vapor retarder of 6-mil black polyethylene. Crawlspaces also should have 1.5 percent of open venting per 1,000 square feet (92.90 square meters) of floor area, and the venting should be properly located to foster cross ventilation. In addition to these guidelines, installers must check and follow local building codes.

In this case, not checking the crawl space was the worst problem, but it was not the only problem. Moisture meters can be an installer's best friend. Moisture content readings should be done on different areas throughout the sub-floor. Adequate acclimation of solid wood flooring prior to installation is a must, and moisture content readings of the flooring must be within 4 percentage points of the sub-floor moisture content before installation can begin. Hygrometer and thermometer readings must show that the job site is at acceptable temperature and relative humidity levels. In this case, none of these readings were taken. Installers and installation contractors may perform 100 installations without problems, but it only takes one installation failure to feel the financial loss into the thousands of dollars.

For further information regarding inspections on hardwood, laminate or other hard surfaces contact Dave at (845) 246-4414.

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