

## APA Wood Structural Panels Over Concrete Slabs

---

APA wood structural panels can be used over concrete slab floors for both residential and commercial applications and in both new construction and remodeling. The information presented below is taken from observations of a number of successful field applications over a period of years.

Three methods of application are normally considered: structural panels applied 1) over sleepers over concrete; 2) over rigid foam over concrete; or 3) directly over concrete. The success of all three application methods depends greatly on the establishment of a proper vapor retarder. For new construction with a wood floor over a concrete slab, a 6-mil polyethylene vapor retarder should be installed underneath the concrete slab. For remodeling work, since the prior installation of a vapor retarder cannot be verified, it is best to apply a vapor retarder over the existing slab. Any wood products installed between the vapor retarder and the slab should be pressure-preservative-treated [waterborne ACQ or ACZA treatments are recommended, with a minimum preservative retention level of 0.25 lbs/ft<sup>3</sup>].

For indoor applications, use a preservative treatment meeting American Wood Protection Association Use Category 3B or higher level. Refer to *APA Technical Note, Preservative-Treated Plywood*, Form Q220, for detailed preservative-treated recommendations.

For new construction, the “green” concrete slab should be allowed to cure prior to the application of a wood floor. During this process, the slab loses its excess water to the interior of the building. The time required to complete the curing is dependent on a number of variables and can take from 6 to 18 months. If the amount of moisture in the concrete is unknown, install a 6-mil polyethylene vapor retarder between the concrete slab and the wood floor, as described below. For additional information on installing subfloor over concrete, please refer to the chapter on installing a subfloor over concrete in the National Wood Flooring Association Installation Guidelines.

### **WOOD STRUCTURAL PANELS OVER SLEEPERS**

Installing wood structural panels over sleepers is the most straightforward and cost-effective method of application over a concrete slab. In this method, APA Rated Sturd-I-Floor® tongue-and-groove panels, Exposure 1, are placed across 2x4 sleepers (installed flatwise), which can be spaced to match the Span Rating of the panels. There are several advantages to this system:

- a. The sleepers can be attached to the concrete floor with construction adhesive and/or fasteners, thus providing a nail base for the Sturd-I-Floor. This method minimizes the reduction in headroom to a little over 2 inches and allows the Sturd-I-Floor to be applied in a conventional manner using deformed shank nails and subfloor adhesive. Use a construction adhesive meeting ASTM D3498.

- b. The vapor retarder, when used above the slab, can be placed over preservative-treated sleepers or under untreated sleepers. When the vapor retarder is applied over the concrete slab floor, but under the sleepers, the sleepers must be mechanically fastened to the slab.
- c. Foam or fiberglass batt insulation can be installed between the sleepers to ensure a warm floor.
- d. The sleepers can be leveled to accommodate cracks and/or unevenness in the existing concrete floor.
- e. The use of sleepers installed with mechanical fasteners eliminates the need for a number of different adhesive systems to accommodate the various materials and surfaces to which they must bond (panel to foam, foam to concrete, panel and sleepers to concrete, etc.).
- f. Ensure that adequate spaces are maintained between panel ends and edges and between panels and walls. This is especially important for below-grade slabs where excessive moisture is more of a concern.

### **WOOD STRUCTURAL PANELS OVER RIGID FOAM INSULATION BOARD**

The second method is to apply the panel over minimum 1-inch rigid foam insulation board. The advantage of this system is that it results in a resilient floor with good insulating properties and uniform stiffness. Square edges of adjacent panels should be backed with plywood splice plates to prevent differential deflection due to concentrated loads at panel edges. Structural panels with Performance Categories of at least 15/32 (15/32 panels are generally available square-edged; the minimum thickness for tongue-and-groove panels is normally 19/32) are recommended to distribute concentrated loads and prevent crushing of the foam. A double-layer floor system may be used with square edge panels, with top and bottom layer joints staggered. This will eliminate the necessity to use tongue-and-groove panels or splice plates. As with any floor construction, ensure that proper spacing between panels is achieved.

When the vapor retarder is used beneath the slab, the floor system may be applied with adhesives. Separate adhesive systems may be required to attach the plywood to the foam and the foam to the concrete slab. Care must be used in selecting an adhesive system to ensure that the adhesive will bond to the concrete and/or floor panels and not react adversely with the foam. In some regions, wood structural panels with foam insulation bonded to one side may be available (contact local building materials suppliers).

Pressure must be applied to the floor system through the use of weights or temporary floor-to-ceiling compression struts and bearing blocks to ensure a good glue bond.

When mechanical fasteners are used, prevent overdriving the fasteners as this can cause localized crushing of the foam or spalling of the concrete floor. Heavy loads in the area of fasteners may cause “nail popping” if the foam compresses under the applied loads. This can cause squeaks and may damage floor coverings. A double-layer floor system (plywood underlayment installed over subfloor panels) can be used to minimize “nail popping” problems. This will also eliminate the need to use tongue-and-groove panels or edge splice plates.

### **WOOD STRUCTURAL PANELS ATTACHED DIRECTLY TO CONCRETE SLAB FLOOR**

The application of wood structural panels directly to the concrete slab may not be feasible in many cases unless the slab is flat enough to be suitable. A self-leveling topping layer of lightweight concrete or gypsum concrete can be poured first to level existing concrete slab floors. If this is the case, the toppings must be allowed to cure prior to the application of the wood floor. For information on cure times, contact the topping applicator.

If an adhesive is used to apply the panels, be careful to apply sufficient pressure over glue contact areas to ensure a good glue bond and a flat floor.

In remodeling projects, 6-mil polyethylene sheeting should be placed over the concrete floor to act as a vapor retarder. Since the panels cannot be glued to the vapor retarder, the panels must be installed with mechanical fasteners. Due to the large number of mechanical fasteners required and the expense associated with “shooting in” concrete slabs, this method may not be practical for most applications.

## **WOOD STRUCTURAL PANELS OVER ABOVE-GRADE CONCRETE FLOORS**

Concrete can take many months to lose its free moisture. When installing wood to “green” concrete, it is recommended that the attachment method follow the recommendations discussed above for installation over concrete slabs.

### **SUMMARY**

Application of APA Rated Sturd-I-Floor® panels over sleepers provides the most economical and easiest method to gain the benefits of a wood floor system over an existing concrete slab. Whichever method is chosen, remember to ensure the presence of an adequate vapor retarder and always use pressure-preservative-treated wood between the vapor retarder (when used) and the concrete slab.

<p>We have field representatives in many major U.S. cities and in Canada who can help answer questions involving APA trademarked products. For additional assistance in specifying engineered wood products, contact us:</p> <p><b>APA HEADQUARTERS:</b> 7011 So. 19th St. ▪ Tacoma, Washington 98466 ▪ (253) 565-6600 ▪ Fax: (253) 565-7265</p> <p><b>APA PRODUCT SUPPORT HELP DESK:</b> (253) 620-7400 ▪ E-mail: <a href="mailto:help@apawood.org">help@apawood.org</a></p>	<p>Form No. TT-007C Revised February 2017</p>
<p><b>DISCLAIMER:</b> <i>The information contained herein is based on APA – The Engineered Wood Association’s continuing programs of laboratory testing, product research, and comprehensive field experience. Neither APA nor its members make any warranty, expressed or implied, or assume any legal liability or responsibility for the use, application of, and/or reference to opinions, findings, conclusions, or recommendations included in this publication. Consult your local jurisdiction or design professional to assure compliance with code, construction, and performance requirements. Because APA has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility for product performance or designs as actually constructed.</i></p>	