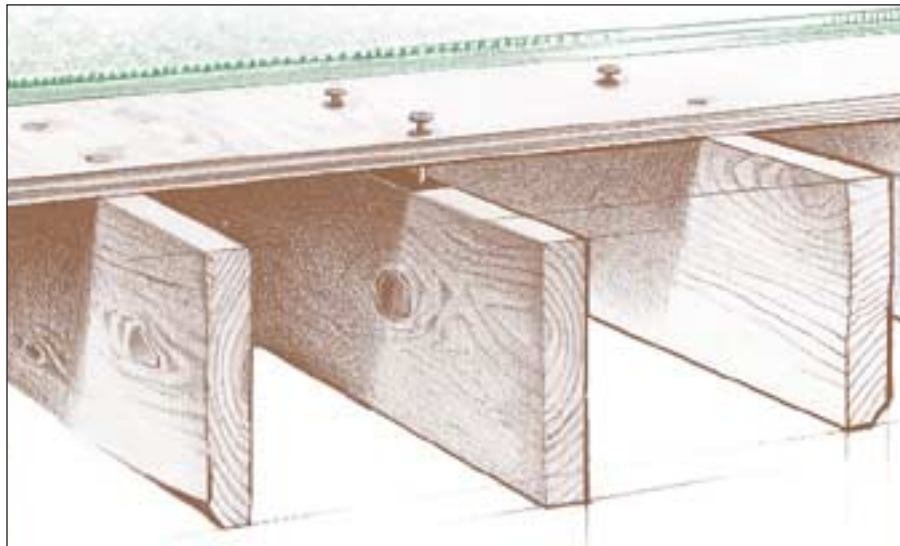




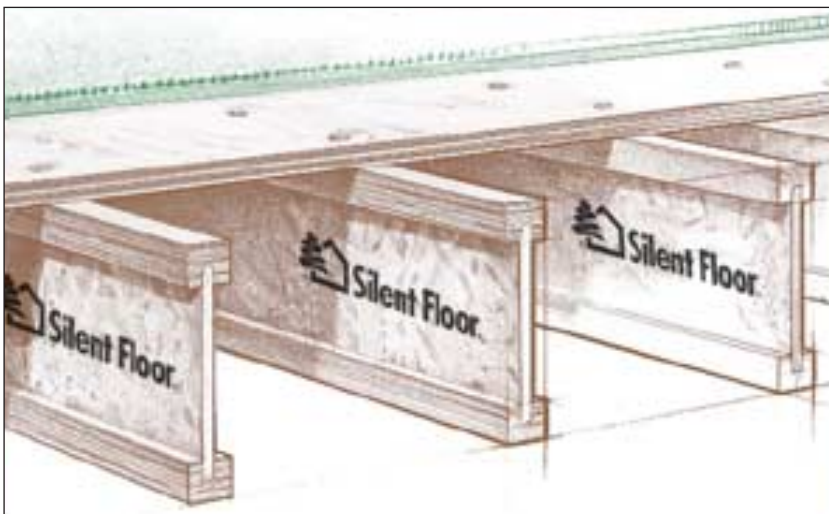
**Trus Joist**<sup>TM</sup>  
A Weyerhaeuser Business

# The Silent Floor<sup>®</sup> System Field Guide for Prevention and Repair of Squeaks



The single biggest cause of floor squeaks is the inconsistency of lumber used as floor framing material. No two pieces of ordinary sawn lumber are alike. Their size, wood grain, moisture content and strength vary from one to the next. Ordinary lumber—even kiln dried lumber—can warp, twist and shrink. This creates gaps around the nails between the joist and the sheathing—a common source of squeaks.

A properly installed Silent Floor<sup>®</sup> System will ensure a squeak-free floor due to the dimensional and structural uniformity of the TJI<sup>®</sup> joists. However, a totally squeak-free floor is dependent upon other components of the floor system as well. **This guide addresses the prevention and repair of floor squeaks in the following areas:**



- Hangers . . . . . page 2
- Mechanical, Electrical or Plumbing Items Rubbing Against TJI<sup>®</sup> Joists . . . . . page 3
- Deck Sheathing . . . . . page 4
- Nails Rubbing Against TJI<sup>®</sup> Joists . . . . . page 5
- Installation of Underlayment . . . . . page 6
- Nailing of Partition Walls to Floor . . . . . page 7

## Hangers

**A. Incomplete or improper hanger nailing** not only affects the load-carrying capacity of the hanger but may also allow movement between the joist and hanger, resulting in a squeak.

**Prevention:**

Always fill every nail hole with the nails recommended by the hanger manufacturer. The nails must be completely “set” with the head of the nail driven tight to the hanger.

**Repair:**

Hanger nails must be properly installed. Gain access to the hanger and correct the nailing.

**B. TJI® joists improperly seated in hangers** may create a gap between the bottom of the joist and the seat of the hanger. This gap allows movement when a load is applied, resulting in a squeak (Figure 1).

**Prevention:**

Always seat the joist so that full bearing is achieved in the hanger. On Simpson Strong-Tie® ITT and IUT hangers, bend the bottom flange tabs over and nail through into the TJI® joist bottom flange (Figure 2).

In some circumstances, squeaks can be reduced by placing a dab of subfloor adhesive in the seat of the hanger prior to joist installation, or if a hole is provided, installing a wood screw (#8 x 1½" max.) through the bottom seat. To ensure uniform bearing, install screws before the glue sets. These methods should supplement, but not replace, the joist nails unless verified otherwise.

**Repair:**

If a gap exists and the hanger is accessible, place a shim between the bottom of the joist and the hanger.

If the joists have a directly attached ceiling:

- Locate the middle of the hanger with a magnetic stud finder.
- Make a hole through the ceiling.
- Drill a pilot hole larger than the screw shank through the hanger seat.
- Apply construction adhesive through the hole.
- Draw the joist down into the hanger with a single #8x1¼" screw (Figure 3).
- Test area for squeaks.
- Patch the ceiling.

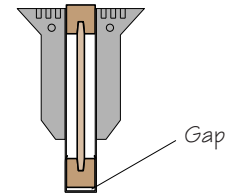


Figure 1

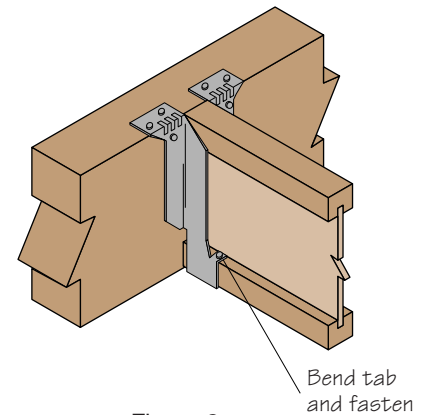


Figure 2

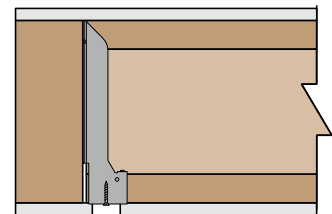


Figure 3

## Hangers (continued)

Another method of pulling the joist into the hanger seat is to install a wood screw at a 45 degree angle from above:

- Drill a pilot hole larger than the screw shank through the floor sheathing, TJI® joist top flange and starting into the beam.
- Install screw through pilot hole into beam to draw the joist down into the hanger (Figure 4).

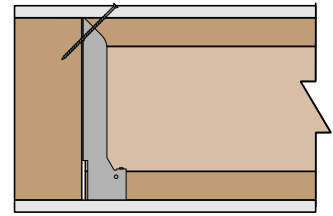


Figure 4

- C. Improper location of sill plate** prevents the top flange of the hanger from being fully supported. When a load is applied, the top flange of the hanger may distort and rub against the face of the concrete or beam, resulting in a squeak (Figure 5).

### Prevention:

Always install the sill plate flush with the inside face of the foundation or beam.

### Repair:

Jack up joist near hanger to eliminate gap and support from below with a stud wall, post or ledger (Figure 6).

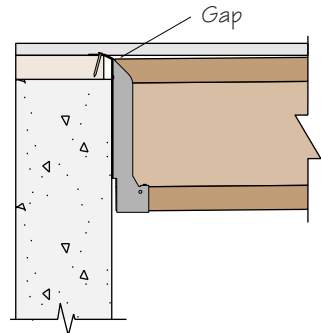


Figure 5

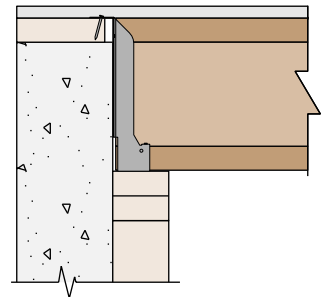


Figure 6

## Mechanical, Electrical or Plumbing Items Rubbing Against TJI® Joists

- A. Items that are threaded through TJI® joists** may rub against the joist web, resulting in a squeak.

### Prevention:

Cut the hole in the joist web to allow 1/4" clearance. See hole charts in the Trus Joist current product literature for allowable hole sizes and locations.

### Repair:

Install plastic sleeves in joist holes around threaded items.

- B. Items that are suspended from TJI® joists** may rub against the joist flange, resulting in a squeak.

### Prevention:

Do not lap strapping over the joist flanges. Connect strapping to a filler block that has been securely attached to the TJI® joist web (Figure 7).

### Repair:

Install a plastic or cardboard shim between the strap and the TJI® joist flange (Figure 8).

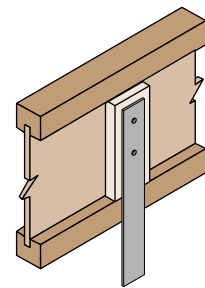


Figure 7

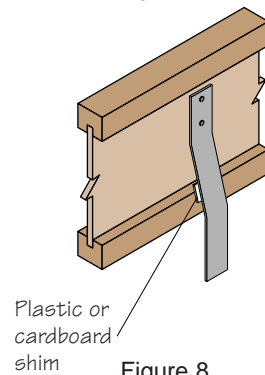


Figure 8

## Deck Sheathing

- A. Floor sheathing that gets excessively wet during construction** may swell and shrink later after drying out. The shrinking may leave a gap under the head of the nail allowing the sheathing to move when stepped upon, resulting in a squeak (Figure 9).

### **Prevention:**

Keep building materials dry. Properly glue the sheathing to the joists.

### **Repair:**

The floor sheathing may be re-attached to the joists by one of the following methods:

1. Pull back the carpet, drive the nails flush and install a wood screw near the nail.
2. Use tools such as Squeeeeeek No More™ by O'Berry Enterprises, Inc. of Crystal Lake, Illinois. This tool attaches special screws through the pad and carpet. The screws are scored so that they can be broken off at the face of the sheathing. Follow manufacturer's instructions (especially regarding Berber carpets) included with the tool.
3. If joists are accessible from below, drill a pilot hole larger than the screw shank up through the top flange of the joist and starting into the sheathing. Install a screw through the joist and into the sheathing, pulling the sheathing tight to the joist (Figure 10).

- B. Use of improper sheathing** may allow excessive deflection, causing movement or friction and resulting in pops and squeaks throughout the floor.

### **Prevention:**

Trus Joist recommends selecting a subfloor that is thicker than that required by code for the given joist spacing.

### **Repair:**

The floor may be improved by:

- Adding another layer of structural decking over the existing.
- Installing blocking between the flanges of the joists along the sheathing seams if the floor is accessible from below (Figure 11). Glue all contact surfaces and nail blocking carefully to prevent development of new squeaks.

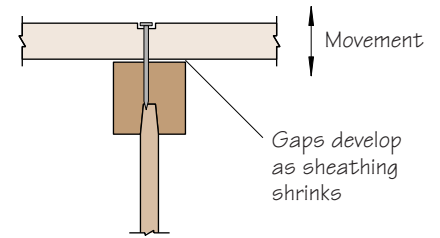


Figure 9

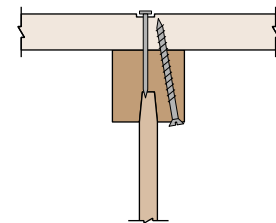


Figure 10

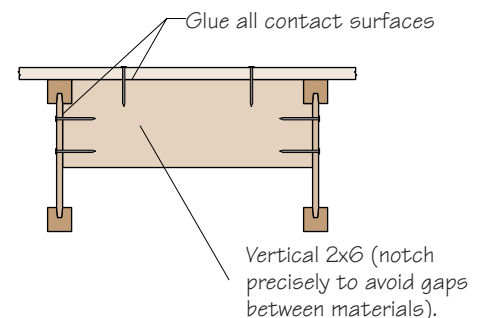


Figure 11

## Deck Sheathing (continued)

**C. Improperly installed sheathing** may cause squeaks at the joist or tongue-and-groove joint.

### Prevention:

Follow American Plywood Association recommendations for installation, especially as they relate to spacing, nailing and gluing.

1. Leave  $\frac{1}{8}$ " gap at all edges and end joints for expansion. Some sheathing panels are self-gapping (Figure 12).
2. Glue all tongue-and-groove joints.
3. Glue the sheathing to the joists with adhesives conforming to APA – The Engineered Wood Association performance specification AFG-01 (solvent-based). Apply enough glue to lay only 1 or 2 panels at a time. Apply two lines of glue where panel ends meet. Extend the glue completely across the 48" width of the panel.
4. Complete the nailing of each panel before glue sets.

### Repair:

- **For squeaks at the joist**, re-attach the sheathing to the joists with fasteners.
- **For squeaks at tongue-and-groove joints**, screw through the subfloor into a 2x4 block placed directly under the joint. Locate the screws on both sides of the tongue-and-groove joint and glue between the sheathing and the block (Figure 13).
- Cutting a saw kerf at the panel joint may stop the squeak. Be careful not to cut into the joist.

## Nails Rubbing Against TJI® Joists

**Shiners** (sheathing nails that barely hit the joists) do not hold the panel tight to the joist. When the sheathing deflects, the nails rub against the side of the joist, resulting in a squeak (Figure 14).

### Prevention:

Exercise care when nailing.

### Repair:

- **If access from above is possible**, remove the nails and re-attach the sheathing to the joist.
- **If finished floor is already installed**, make access from below and bend the nail away from contact with the joist flange. Re-attach the sheathing to the joist from below (Figure 10, page 4).

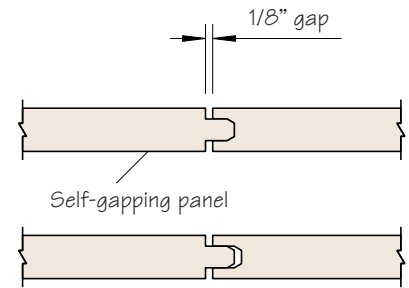


Figure 12

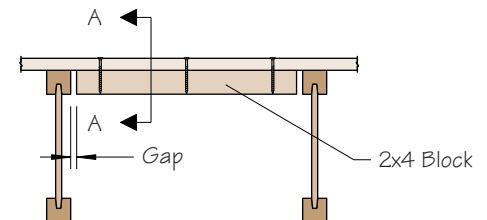
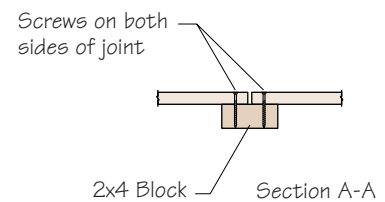


Figure 13

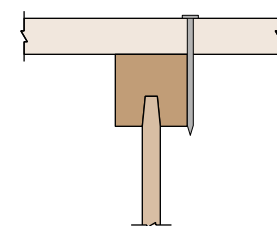


Figure 14

## Installation of Underlayment

**Improper installation of underlayment** may cause popping, clicking noises and squeaks which occur inconsistently and vary with changes in temperature and humidity.

### Prevention:

- Follow the underlayment manufacturer's recommendations for installation.
- Sweep and/or vacuum sawdust and other debris from the subfloor before laying the underlayment.
- Offset the underlayment joints from the subfloor joints (Figure 15).
- Properly attach the subfloor to the underlayment by nailing, stapling or glue/nailing (Figure 15).

### Repair:

- **For an isolated squeak** where access from below is possible, drill a pilot hole (larger than the screw shank) through the subfloor and starting into the underlayment. Install a screw that is long enough to reach at least half way through the underlayment (Figure 16).
- **For squeaks throughout the floor**, the carpet should be pulled back and the underlayment re-attached.

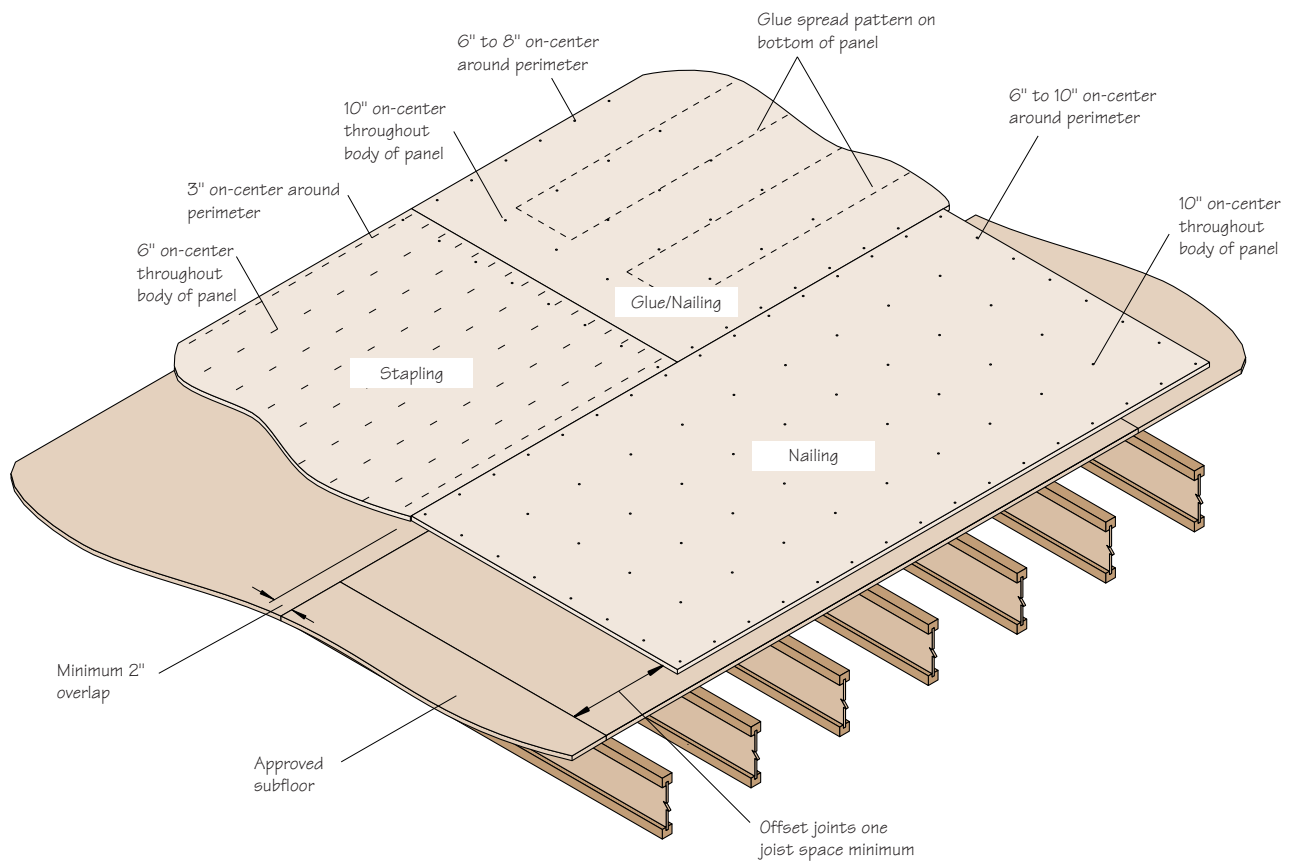


Figure 15

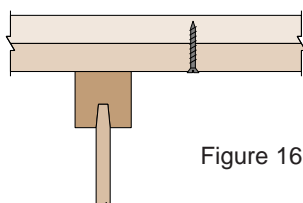


Figure 16

## Nailing of Partition Walls to Floor

**Floor squeaks at interior partitions** (both parallel and perpendicular to TJI® joists) are usually caused by the partition being nailed only to the floor sheathing. When load is applied, the sheathing deflects and rubs on the shank of the nail, resulting in a squeak (Figure 17).

### Prevention:

- Interior partitions should be nailed to the joists.
- Where the partition runs parallel to the joists and extends over more than  $\frac{1}{2}$  of the joist span, a joist should be added under the partition.
- If there is no option but to nail the wall to the sheathing only, run a bead of construction adhesive under the wall and either:
  - Cross-nail (Figure 18).
  - Nail through and clinch the nails tight.
  - Screw from below (Figure 19).
- Another option is to “bridge” between the joists (Figure 11, page 4) and attach wall at blocking locations.

### Repair:

- **If accessible from the underside**, nail up through the floor sheathing and into the bottom plate of the wall. Install screws for better results.
- **If not accessible from the underside**, remove the baseboard along the partition and drill a pilot hole (larger than the screw shank) through the bottom plate of the partition at a 45 degree angle. Install a screw to catch and pull the floor sheathing up to the partition (Figure 20).

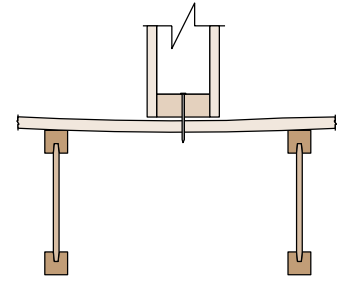


Figure 17

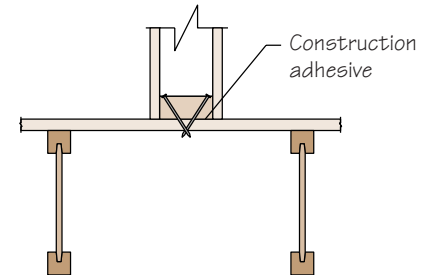


Figure 18

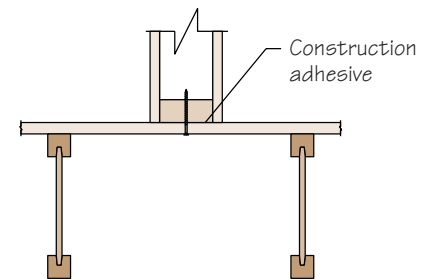


Figure 19

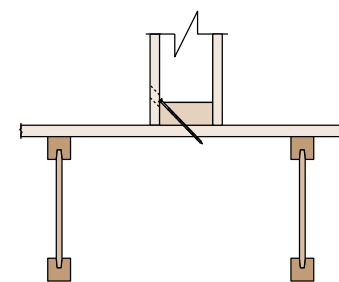


Figure 20

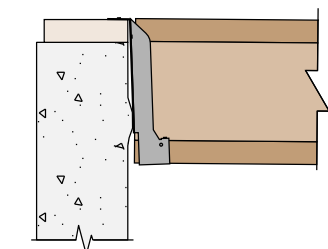


Figure 21

## Other Causes of Floor Squeaks

- Particleboard underlayment rubbing against metal sheetrock corner-bead when floor is stepped on.
- Nails squeaking at bottom of wall between plate and studs (studs cut too short).
- Incorrect nail sizes used. Undersized nails tend to pull out, resulting in squeaks.
- Hanger rubbing against deformation in the foundation (Figure 21).
- Improperly installed mid-span blocking rubbing against TJI® joists. If mid-span blocking is required by specifier, cut to fit tight and glue all contact surfaces. Nail through sheathing into blocking with two 10d (3") box nails minimum. Attach to bottom flange of joist with 10d (3") box nails.

## Hints

- Access to a floor squeak may be difficult when the finished floor and ceiling have already been installed but may be accomplished by the following method:
  - Pull back the pad and carpet.
  - Locate the joists with the aid of a stud finder or by probing through the sheathing with a pattern of nailing.
  - Drill or cut a 4" hole through the sheathing between the joists.
  - Reach through the hole and fix the problem (shims, nails, glue, etc.).
  - Repair the hole by inserting glue-laden 2x4 blocks through the hole, pulling them up against the underside of the sheathing and screwing them in place.
  - Glue and screw the cut-out piece of sheathing back in place on the 2x4s (Figure 22).

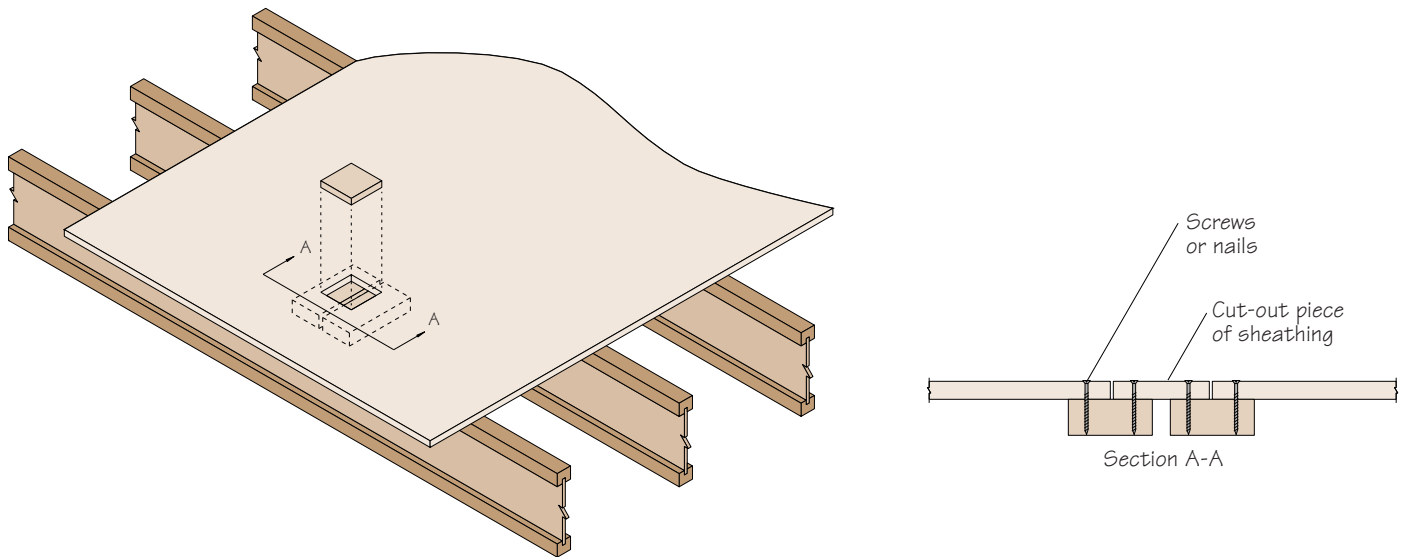


Figure 22

- To minimize floor vibration in crawlspaces and basements without direct applied ceilings, attach 1x4 strapping (perpendicular to the joists) to the underside of the bottom flange of each joist with two 8d (2½") nails. Run strapping continuous at 8' on-center and tie off at the end walls.
- High quality construction adhesive is important. Use solvent-based glue that will bond wood and metal. Consult with your local Trus Joist distributing lumberyard to find out what is best for your local climate.
- All fasteners attaching the sheathing to the joists should be driven vertically, not at an angle. The best fastener to use for nailing floor deck sheathing to the TJI® joist is a deformed shank nail. Screws are also good, but only if the top ¾" of the screw under the head has no threads. Do not use smooth, cement or vinyl coated nails.
- Always install hardwood flooring perpendicular to the joists. See manufacturer's recommendations.



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