



STEP 6

Steps in the Mobile Home Series

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E³A: Repairing the Belly

The idea of repairing the belly (underneath) of a mobile home takes some getting used to. Who knows what is under there? It's dark, maybe damp, there's stuff everywhere and you have to lie on your belly and slither around. Rest assured! Many people have done it and survived!

Personal protective equipment is important. We recommend a Tyvek© bunny suit, a good respirator, gloves, eye protection and a hat. Once dressed, open up the access door, turn on a flashlight and start learning how mobile homes are built – and how they fall apart.

Mobile Home Construction:

Look at the mobile home construction diagram for details.

Mobile homes are constructed upside-down – or at least the floor is. The floor joists are nailed together, the ducts and water lines are attached, a thin layer of insulation is draped over the entire floor and a cover (the belly wrap) is installed. The steel frame is attached. This whole assembly is then turned right-side-up and the rest of the house is assembled. After the remainder of the structure is completed, the mobile is hauled down the road to a property where it is set up on blocks or on a concrete foundation and becomes a home.

What You'll Find Down There

When you slither around on your belly with your flashlight, you will probably find degradation of the belly. As an example, you may find evidence that the kitchen sink froze at one point and the plumber was called out to replace the burst pipes. You may find that he tore open the belly, ripped apart the insulation, and fixed the plumbing, but failed to repair the belly wrap. This left the plumbing and floor exposed to the elements. Maybe the water lines froze and the plumber just ran new pex piping along the ground instead of up inside the insulation. Sometimes animals will tear open and make nests in the belly. Findings like these are significant as the home is left vulnerable to heat loss and pipe freezing whenever the belly and insulation are compromised. A careful inspection of the belly is important.

Look for these common issues:

- Holes in the belly, especially under sink and tub drains. Make sure the plumbing is fixed (if you rent, this is the responsibility of the landlord) and then measure the size and location of the openings in the belly.
- Openings where the water lines go up to sinks and tubs and holes where wires go up into walls.
- Degraded floors under the water heater caused by leaks.

 *Repair tasks in this fact sheet may be completed by a homeowner, but do require basic construction skills and tools. For a better understanding of what is involved with belly repair, watch a video at: <http://wxtvonline.org/2010/06/mobileinsulation-belly/>*



Figure 1. Mobile belly at the factory
Source: DOE



Source: DOE

- Combustion air inlet – make sure it is open if the water heater is vented atmospherically.



Source: DOE

- If the ground beneath the home is wet, why? Wet ground could be caused by plumbing leaks or drainage issues around the house. Moisture beneath the home is an issue that needs to be resolved.
- Direction floor joists run and the depth of the insulation.
- Condition of the mobile home skirting. Does rain water get behind it? Does it leak air when the wind blows?
- Animals or animal damage. Get rid of them!

While you are in the belly, make a map of the underside of your mobile home. On this drawing, note the location and size of each hole in the belly. Once outside, you can make a plan, cut your patches to size and assemble your tools.

Making Repairs

The following steps are recommended to repair the belly:

1. Fix any problems with plumbing and wiring.
2. Plug any holes where utilities go up into the home. Use materials that will stop air leaks and will prevent blown insulation from entering the house.
3. Repair the ductwork, especially those connections and holes that can't be addressed from above. (See the factsheet on duct repair) We recommend attaching insulation to the bottom of the main trunk line. You may also want to insulate below any water lines.
4. Remove any degraded or unattached material.
5. Repair the belly wrap following the general directions below.

To repair large holes in the belly wrap (generally in the central part of the belly between the two main steel beams) use the following procedure: First, measure the space needed to be covered. Cut a piece of Tyvek that is at least 1 foot larger than the hole on all sides. If the hole is really large,

wrap one edge of the Tyvek around a long 1x2 inch furring strip. Screw the 1x2 to the bottom of the floor joists next to one of the steel I-beams. Drape the fabric under the main duct trunk line so that space for insulation remains. Wrap the opposite edge of the replacement fabric to another 1x2 furring strip, then screw it to the joists next to the other metal frame. Glue and stitch the other two sides of the replacement fabric to the existing belly.



Source: DOE



Source: DOE

In some cases, it makes sense to screw or nail rigid insulation board to the bottom of the floor joists. This is especially true if the joists run the long direction of the mobile and the main duct is within the joist cavity. Here, cut a piece of insulation board about 18-inches wide and attach it directly to the joists under the duct using screws with fender washers.

Small holes are repaired in a similar fashion. First, cut the replacement fabric at least a foot larger than the hole. Spray adhesive or place adhesive caulk around the perimeter of the hole. Place the replacement fabric over the hole, pressing it on to the adhesive so that it sticks. Finally, staple the replacement fabric to the belly wrap every 2 to 3 inches using a clinch stapler.

When all the utilities have been repaired, all cavities into the home plugged and all holes in the belly repaired, you can proceed with blowing insulation in the floor cavity. Blown insulation does require specialized equipment, so you will need to contract this work. While the insulation is being blown, check underneath occasionally to make sure that the patched belly wrap is holding. Close and secure the skirting access hole. You may want to repair the skirting if necessary to make sure that rain water running down the siding doesn't get into the skirting material or the floor framing. Use Z metal flashing to divert water out and add sufficient screws to close any air leakage gaps.