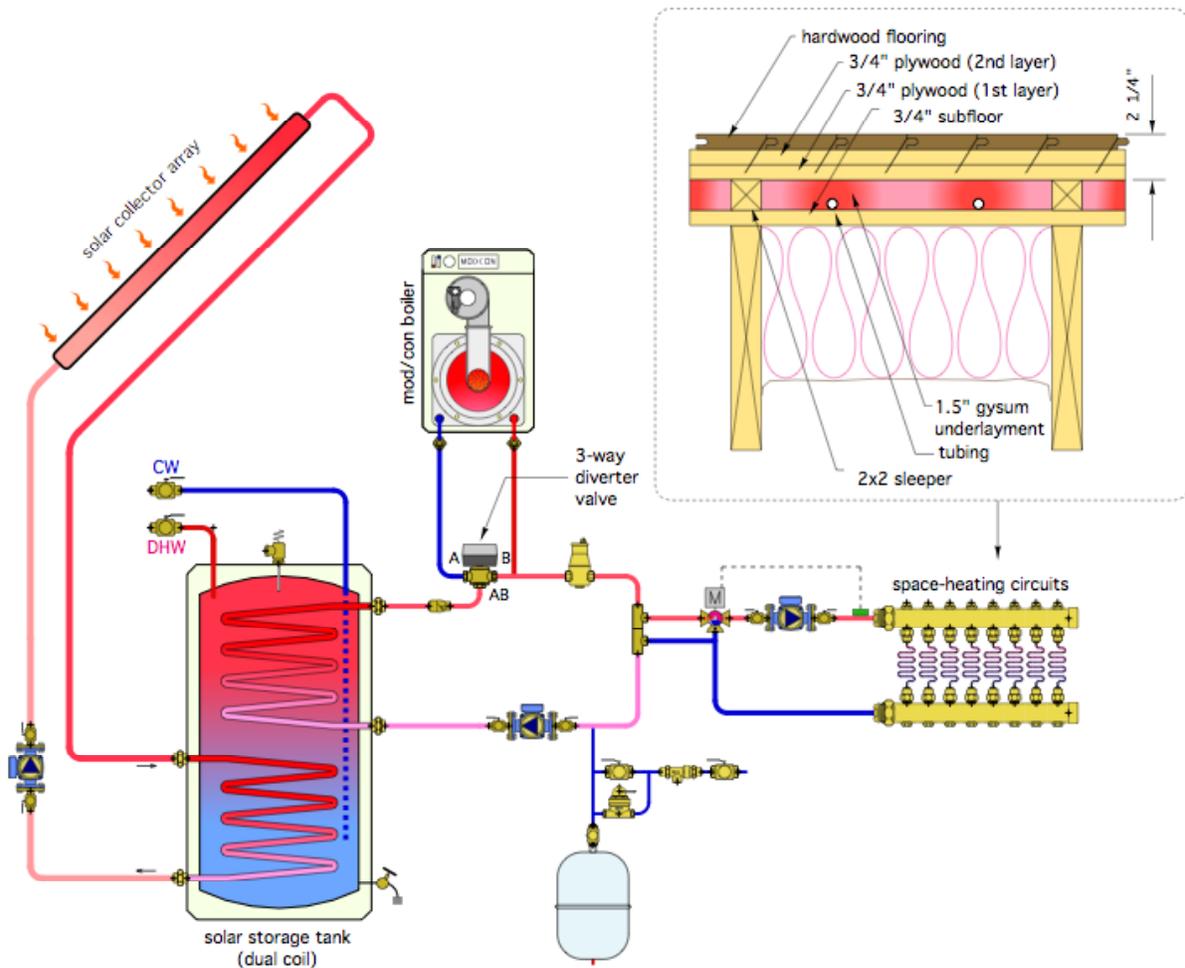


The Glitch

Overview: A solar combisystem is being planned to provide a portion of the space heating and domestic hot water needs of a new “Eco” house being constructed in Vermont. The house will have plenty of south-facing windows to help warm it on sunny winter days.

The owner loves the idea of warm floors, but also wants nail-down hardwood flooring. The flooring contractor plans to install that floor as shown in the cross-section below (because he saw this detail in a major home building publication).

Exercise: Look over the schematic and the planned floor installation detail. Do you see any problems lying in wait?

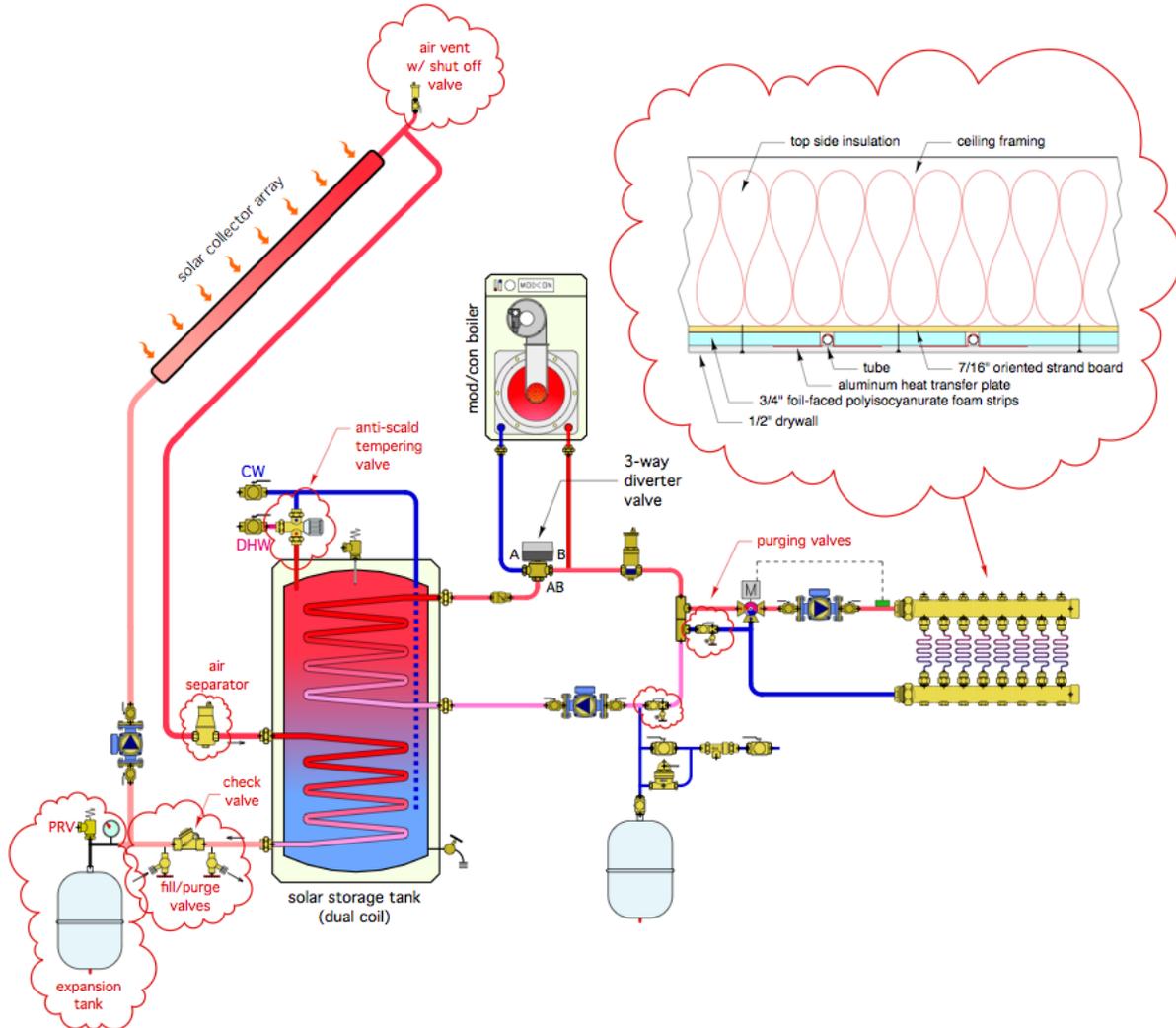


The Fix

The flooring installation detail shown did appear in a major building publication. It's the result of asking a flooring specialist (rather than a heating specialist) how the flooring should be installed over a radiant panel.

The flooring installer doesn't want any issues with keeping that floor flat, so he specifies two overlapping layers of 3/4" plywood for the underlayment. This adds considerable thermal resistance between the water in the tubes and the top surface of the floor. This significantly increases supply water temperature, especially at design load conditions.

Although such a floor would probably operate adequately at design load conditions if supplied with water in the 160 °F range, such temperatures are quite presumptuous for a solar system using flat plate collectors during a cold Vermont winter. The solar energy contribution to space heating in such a system will be very limited.



A low mass radiant panel (such as the ceiling panel shown in the Fix drawing) would be a far better choice. Its low thermal mass responds quickly to internal heat gains, which are likely in a house with lots of south-facing windows. This panel also has much lower thermal resistance than the construction shown in the Glitch drawing, and thus will operate at lower supply water temperatures. This means higher collector efficiency and greater energy yield from the solar subsystem.

The original piping schematic is also missing several essential components in the solar collector circuit. It also lacks an anti-scald tempering valve on the domestic hot water piping and purging valves in the space heating system. These components are identified in red on the Fix drawing.

The moral: Don't forget the essential details of hydronics and radiant panel heating just because the system includes some solar collectors.

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