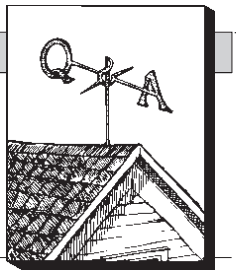

What Kind of Sheathing?

by Henry Spies

Q. *On a wood-shingled roof with a 12-on-12 pitch in southern New Hampshire, is it preferable to use spaced* boards or *solid sheathing with No. 15 felt?*

A. It is always preferable to use spaced board sheathing with wood shingles, regardless of your location. The spaced sheathing allows the shingles to dry from the back as well as from the front. Although the felt slows the drying very little, most sawn-wood shingles are installed without the felt. The felt is necessary with split shingles, of course.

Steam-Heating Efficiency

Q. *What is the best way to modify a steam heating system to improve its efficiency? What should be done first?*

A. Much depends on whether it is a one- or a two-pipe system. A two-pipe system probably should be converted to a pumped hot-water system. The radiators almost always are large enough, and the hot-water system is much more controllable—both from the standpoint of modulating the water temperature and being able to operate the radiators at restricted flow rates (rather than at the full "on" or "off steam position).

The boiler conversion is fairly simple, and if the existing boiler is in good condition, it can still be used. Conversion instructions (along with tables for calculating the substitution of baseboard convectors for old cast-iron radiators) are contained in

There is no easy way to convert a one-pipe system to something more efficient, so the boiler itself must be the point of attack.

Technical Note 13, "Modernization of Hydronic Systems," available for *$2* from the Small Homes Council-Building Research Council, 1 East St. Mary's Rd., Champaign, Ill. 61820. These instructions also have been reprinted in the bulletins of the Refrigeration Service Engineers Society.

There is no easy way to convert a one-pipe system to something more efficient, so the boiler itself must be the point of attack. If the boiler is in good condition and designed for the fuel currently being used, there may not be anything that can be done. If it is an oil-fired boiler of an older style, replacing the oil burner with one of the new burners that incorporates a flame-retention tip should help (it probably would increase the efficiency by about 10 percent).

There also are new gas-fired steam boilers that have efficiencies in the range of 83 to 85 percent.

An old coal-fired boiler that has been converted to either gas or oil probably should be replaced.

In changing burners, remember that a steam boiler must *never* be underfired—the burner size depends only on the boiler design, not the design heat load of the house. A burner too small for the boiler can reduce the efficiency to nearly zero.

Siting for the Sun

Q. *A speaker at a conference I attended recently said that you could reduce a house's heating design load 15 percent just by orienting it to get the maximum solar gain. Is this for real?*

A. I don't think the design load can be reduced by solar orientation, because we still must design for cold nights. However, you probably can reduce the annual heating cost by at least 15 percent.

We once ran calculations on a typical apartment building in our area. It had three floors (half of one below grade) with apartments on each side of a central corridor and was four times as long as it was wide.

We found that the annual operating cost, including heating and cooling, would be 40 percent less if the long axis of the building ran east and west than if it ran north and south. (Most of them in our town run the wrong way.)

Fire-Rated Wall Systems

Q. *Could you offer some guidelines for constructing fire-separation walls with a one-hour rating?*

A. This is a case when pictures are far better than words. The accompanying illustrations demonstrate some good systems.

Ventilating for Appliances

Q. *How safe is it to use gas ovens, ranges and other gas appliances in tight, super-insulated homes? What type of ventilation should be used—whole house, zoned or point source?*

A. Gas appliances can be a significant source of indoor air pollution in tight homes. The pollution can take the form of carbon dioxide, nitrogen oxides, sulfur dioxide, carbon particles and water vapor.

Major appliances such as furnaces or water heaters should be of the direct-vent type. Gas ranges and ovens should use electronic ignition rather than pilot lights. The ventilation

A point-source ventilation system will not provide adequate ventilation to the whole house, but it can remove pollution from a source such as an appliance. Zoned systems can be used if there is a predictable pattern of occupancy.

system should be turned on whenever an unvented gas appliance is in use. Electric appliances are preferable if the buyer will accept them.

A point-source ventilation system will not provide adequate ventilation to the whole house, but it can remove pollution from a source such as an appliance. Zoned systems can be used if there is a predictable pattern of occupancy so that ventilation can be provided to the area in use, but whole-house systems — particularly when used with air-to-air heat exchangers — seem to provide the greatest occupant satisfaction. ■

Henry Spies is with the Small Homes Council / Building Research Council of the University of Illinois. Questions for this column should be sent to Henry Spies at NEB, *P. O. Box 278, Montpelier, VT 05602.*