

**HOMEOWNER TIP**

When was the last time you replaced the batteries in your smoke alarm and/or your carbon monoxide (CO) alarm? You should do that at least annually. Pick a date – your birthday, for example – and let that be the day you change the batteries each year. It could save lives.

In addition, you should test your smoke and CO alarms monthly, to be sure they are working correctly. Most units have a test button for that purpose.

**IN THIS ISSUE**

- ✓ WILD AND CRAZY ROOFS – IT'S NOT ALL GOOD NEWS!

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## *Wild and Crazy Roofs – It's Not All Good News!*

Have you noticed?

Roof lines are getting more and more complex and creative. The traditional gable roof (single ridge, symmetric slopes and vertical end panels) is quickly becoming a distant memory. While a gable roof may not be architecturally exciting, it is simpler to maintain and the risk of premature leaks is minimal.

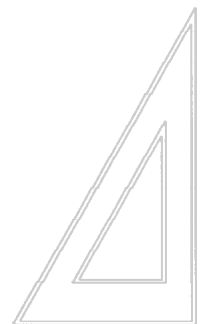


Nineteenth-century construction offered many complex roofs: hips, turrets, steep pitches, dormers and curved surfaces. Those roofs were covered with labor-intensive materials such as slate, clay tile and metal. These homes were and often are referred to as castles, mansions or estates. In deed, they are grand and elegant.

The 20th century saw a housing construction trend toward production and speed. The cape, ranch and colonial became popular, all with simple roofs, mostly gable (triangular section of the end wall of a building with a sloping roof) with an occasional gambrel (a gable roof with two slopes on each side and the lower slope being steeper). Roof materials were similarly simple; most were covered with asphalt shingles. Construction was quick and the skill required was not sophisticated.

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# CRITERIUM<sup>®</sup>



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Now the pendulum is swinging back the other way again. Our home is, after all, our castle. For some people, the visual statement our home makes defines our lifestyle more than ever. Thus, roofs are changing.

In recent years, new home construction has brought us more complex roof shapes. To respond to the demand, builders and developers are investing more in architectural design to produce more interesting and visually distinctive roof lines.

That's the good news.

However, during that same period, the skills of the average construction worker have not increased and, worse, have declined. Most builders will tell you that the biggest challenge facing the construction industry today is finding enough adequately skilled tradespeople to work on their projects.

So, we are designing our homes to be more challenging to build while, at the same time, facing a diminishing supply of people sufficiently skilled to meet the challenge of building those homes.



More complex roof lines require greater skill and attention in several areas. Perhaps the two most important are the design and assembly of the framing and the installation of the roofing.

Framing a complex roof means cutting and assembling many different size rafters (sloping timbers extending from the roof ridge to eaves). Even the cuts at the ends of rafters often have many angles and can be a test of skill for even an experienced framer. However, if two pieces of roof framing do not fit together tightly, movement will occur after the home is complete.

Also, assuring that adequate structural support is provided, especially at valleys (intersection created by two sloping roofs), hips (four-sided roofs), dormers (small gables projecting from a sloping roof) and ridges (horizontal line along the highest part of the roof), is important. Adequate structural integrity for a complex roof is especially important in areas of the country where significant weather (wind, snow, etc.) will test the roof system. Getting it right takes time and planning.

Our engineers at Criterium Engineers see many complex roof shapes that are not framed well. At best, this leads to distortion – sagging and deflection that will compromise the “lines” (appearance) of the roof, creating the perception that the home is not well built. At worst, partial or complete failure of the roof can (and has) occur.

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Installing the roofing material (shingles, etc.) is similarly challenging. A simple gable roof has only four edges that require attention to detail to assure good performance: two eaves and two gables. A complex roof can have many valleys, hips, ridges, rakes (inclination from a perpendicular direction) and eaves. Where multi-level homes are involved, a complex roof will often include transitions from the roof to an adjacent wall. Every such transition represents an area where it is critical to handle the details properly to minimize the risk of water entry. The more such areas, the higher the probability that something will not be done right and leaks will occur. Installing roofing well requires recognizing that the roof is a “system” that uses several different materials and requires skill and workmanship with lots of attention to detail. It is the successful result of installing flashing (sheet metal used to reinforce and weatherproof the joints and angles of a roof), underlayment (padding) and shingles properly. Also required is the proper positioning of shingles at valleys and other transitions. Roof leakage is almost always the result of poor execution of installation details; it is seldom a premature failure of the roofing materials.

Frank Lloyd Wright once said, “If the roof does NOT leak, the architect was not creative enough.” While such an attitude might be acceptable for an architectural genius such as Mr. Wright, it is hardly acceptable in our practical world where we expect reliable protection from the weather.

There are some other considerations in construction when your home has a “wild and crazy roof.”



Complex roof lines and shapes often create valleys that gather water from large roof areas. The resulting high volume of water that flows down the valley will cause rapid wear on that part of the roof. Also, the high volume of water will likely overflow the gutter. In addition, as that same high volume of water reaches the ground, it will splash back against the siding and other parts of the home, leading to premature rot and deterioration. Thus, the performance of a roof during a heavy rain should be considered when designing a complex roof shape. Such a problem is not easily corrected after the home is built.



Ventilation of attic spaces and other open spaces under roofs is important to the health of any building. A simple gable roof is relatively easy to vent, with some combination of ridge, soffit and rooftop vents. Complex roof shapes are more of a challenge. Each shape must be considered individually to assure adequate ventilation. Otherwise, overheating (which will lead to premature roofing failure) and restricted airflow (which leads to ice dams in the winter) are the likely result.

If you are considering a new home with a complex roof shape, you would be wise to find out as much as you can about how the roof was installed. Here are some questions to ask:

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Question #1: Is there underlayment?

*Answer: There should be.*

Question #2: Is there bituthane (waterproofing membrane) at the eaves?

*Answer: A minimum of 2 feet is recommended.*

Question #3: Do the shingles overhang the drip edges (lengths of L-shaped metal flashing placed along the eave of the roof to seal the space between the shingles and the roof deck from weather) as recommended by the manufacturer?

*Answer: This is typically shown right on the shingle wrappers.*

Question #4: Is there flashing at all transitions (valleys, dormers, etc.)?

*Answer: There should be, with a minimum of 9 inches to either side of the transition.*

Question #5: Is there a warranty against leakage?

*Answer: This is useful. Most roofing manufacturers only guarantee their product performance life, not against leakage.*

Question #6: Is the roof framed adequately and structurally sound?

*Answer: This may require review by a licensed Professional Engineer, but it is important, especially in a new home.*

Question #7: Is there evidence of leakage at the vulnerable locations?

*Answer: Look closely below valleys and around dormers, especially in a home that is a few years old.*

If you are buying a new home with a complex roof shape, you cannot be too cautious. A distinctive roof line can be exciting. However, leakage problems are quite troublesome and often not easy to diagnose or correct. Structural problems can be even worse to deal with. When in doubt, consult a building inspection engineer who has expertise in complex roof systems.

A well-designed and constructed complex roof can turn your average home into an elegant, dramatic "mansion." Poorly done, your castle may turn into your worst nightmare. Make sure you know the difference before you buy.

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nearest you, call  
1-800-242-1969

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