your home
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Why can't we build a perfect house?

HOMEOWNER QUIZ

For a successful painting project, what matters most?

A. The proper materials
B. Thorough preparation
C. The right applicator (brush, roller, etc.)

Answer on page 4.

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The operative word here is WE. WE can't build a perfect house because WE are human beings and human beings are not perfect. This is part of a continuing YOUR HOME series that looks at the various challenges faced during the life of any home.

And, of course, there is the question, "Exactly what is a perfect house?" Many people expect a perfect house, whether buying a brand-new house or a used house. That expectation only brings disappointment. There simply is no such thing as a perfect house.

We suspect that Mother Nature and Mother Earth get a good laugh at our futile efforts to build the perfect house. While there are probably endless reasons why building the perfect house is a futile goal, we believe these four to be the most fundamental.

1. We build our homes on the ground! Mother Earth (the ground) is unpredictable. (See Part One of our series – Volume 18, Number 4.)

2. We build most of our homes with wood. Wood is organic. Mother Nature did not design wood to be a predictable, reliable building material. It is dimensionally unstable, changing shape as it ages and as temperature and humidity change. (See Part Two of our series – Volume 19, Number 1.)

3. We use human beings to build our homes! Human beings are not perfect. Further, there seem to be fewer skilled human beings available to help build homes. (See Part Three of our series – Volume 20, Number 1.)

4. We build our homes outside! That's the worst practice of all! The same Mother Nature that gives us imperfect wood with which to build our homes then throws unpredictable weather at us while we build.

Unlike most of the products we buy, homes are not built in a controlled manufacturing environment. (The exception, of course, is the manufactured housing industry which still represents only a small portion of the residential construction industry in the United States.) Homes are built in the *real* world.

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During the construction process, the weather is unpredictable from day to day (sometimes even hour to hour!), materials must be stored in less-than-ideal conditions and workers are subject to temperature extremes. Considering the effect weather can have during the four to six months it takes to build an average home, it could be argued that it is rather extraordinary that we do as well as we do with most of our home construction. It may not be perfect, but it's pretty good, overall.

In our experience, in today's world, perfect means, among other things, without visual flaws. In an average home, that means: no cracks, no blemishes in flat, painted surfaces, no separations in the joints between separate pieces of wood trim, doors that open and close smoothly from season to season, etc. For each homeowner, the definition of a perfect house is likely to be different.

However, let's get back to the weather. The weather creates an unpredictable environment for building a home; it can affect things in many ways. The National Association of Home Builders estimates that Americans spend between $65 billion and $75 billion annually on maintenance, repair and replacement, often due to the premature failure of a material exposed to outdoor weathering. Here are just a few:

Low Temperatures Can Cause:

Frozen ground. Foundations built on or in frozen ground may move after the ground thaws. As the ground thaws, it typically consolidates (settles) and the building moves. Interior finishes and other things crack, doors don't open and shut properly, windows are tight, and other functional problems develop.

Premature deterioration of concrete and masonry. In cold temperatures (~40 degrees F), concrete and mortar do not cure properly as going from a wet mix to a solid mass is a chemical process. Proper protection (insulated blankets and heated enclosures) and additives are needed to assure quality concrete in cold temperatures. Without proper protection, the long-term performance of the concrete will be compromised. Spalling (the top layer crumbling), cracking and other premature deterioration are likely.

Brittle materials. Many roofing materials cannot be installed in cold temperatures. They become brittle and crack. Self-sealing shingles will not seal. Underlayment tears more easily. There are often no alternatives for cold weather roofing except providing sheltered, heated work areas to keep the materials warm.

Many materials are dimensionally sensitive to temperature; they get smaller when it's colder. If these materials are installed without allowing for future growth when it gets warmer, visually disturbing distortions will occur. In addition, some materials (flashing, etc.) may actually fail as temperatures climb after cold weather installation.

Frozen water may actually be captured in some materials. This will affect their performance as temperatures rise and the water thaws.

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High Temperatures Can Cause:

Concrete is sensitive to extreme temperatures, both high and low. The ideal temperature range for curing concrete is between 55 degrees F and 90 degrees F. Above this, rapid evaporation of moisture can cause shrinkage cracking before and during hardening. Typically, when the temperatures start to exceed 90 degrees F, it is important to protect concrete as it cures. Moistening the aggregate with cool water and cooling the water used will help maintain the temperature at the proper level. Otherwise, it is likely that premature deterioration will occur.

Virtually every construction material will expand and contract with changes in temperature. Dimensionally sensitive materials (wood, glass, concrete, most metals) improperly installed in hot weather will also result in visual distortions and aesthetic compromises. Most manufacturers have standards and guidelines for high-temperature installation of their products or temperature limits within which the product must be installed.

Rain/High Humidity/ Moisture Can Cause:

Shrinkage. Expansion and contraction of wood are perfectly normal during changes in the weather. When the air is exceptionally warm and humid, solid hardwoods will absorb moisture and expand. Likewise, with much cooler, drier air, the wood will give off moisture and contract. Increased moisture content in wood and other porous material means more moisture released as that material dries after construction. That means shrinkage. Cracks and distortion are likely to develop in the first 1–2 years of the life of that home. When laying a hardwood floor, a gap should be left at the wall for expansion. Wider plank flooring should have the back sealed before installation. Hardwood paneling should be installed with an expansion gap to allow for natural expansion and contraction.

Rot and mold. As damp (or wet!) materials dry, moisture is released inside the home (or captured in wall cavities, between layers of sheathing, under floors, etc) which, if not adequately vented, can lead to rot and/or mold.

Material deterioration. Some materials (for example, certain types of plywood) are not moisture resistant; if they are exposed to moisture, they will be damaged. If those components are then installed in the home, problems will develop. The type and seriousness of the problem will depend on the material and the amount of moisture. Wood flooring should not be installed over damp concrete or wet plywood.

Protecting materials and components from moisture during construction is one of the most important considerations. A home should be completely closed in (including all window and door installation) before lumber, hardwood or flooring is delivered. Unprotected wood products should never be stored, trucked or unloaded in the rain or other wet conditions.

Sunlight Can Cause:

And you thought sunlight was good! Many materials are sensitive to prolonged exposure to ultraviolet light.

Some house wraps, for example, should not be exposed to UV light for extended periods, typically not more than three to six months. If they are, the intended

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performance of the material will be compromised. If the permeability of a house wrap deteriorates, it is more likely that moisture will be captured behind the sheathing or siding.

The manufacturer's literature for most building materials will provide information about limitations on exposure to UV light.

Wind Can Cause:

Structural failures. Improperly braced framing exposed to high winds during construction may move or fail entirely.

Torn house wrap or underlayment. If wind-damaged material is not properly replaced, its performance will not be as expected. Water intrusion is among the likely consequences of not replacing wind-damaged material properly. This is especially important around windows and doors, where the proper replacement of the damaged material may actually require taking the window or door out and reinstalling it.

In conclusion, weather plays a big role in successfully building a good quality home. The consequences of unexpected or unplanned for weather events during construction must be considered before continuing the construction process. Otherwise, a wide variety of problems can occur.

Even in the best of conditions, like it or not, weather is part of the construction team. And, weather is unpredictable. Thus, weather is one more reason why we cannot build a perfect house.

Over the course of this series, we have explored the variables that influence the goal of building a perfect house. Four conditions, which we have limited or no control over, can greatly influence the outcome: the ground underneath, the wood we use, human beings, and the weather are all unpredictable. If you would like copies of our previous articles, please visit our Web site.

The best defense against surprises caused by these conditions is knowledge. Before, during and after a home has been constructed, regular inspections will help identify potential or new problems. A licensed Professional Engineer with experience in building evaluations is your best choice for an inspection.

Answer: B. Thorough preparation.

It is vitally important to thoroughly prepare any surface before painting (or repainting). Scraping and sanding to remove *all* loose or unstable material is the first step. Priming and sealing is the next step. Only after the preparation is complete can the final coat of paint be applied. It's hard work, but it is important if you want to avoid blistering, peeling and flaking!

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