

BARN AID SERIES

NUMBER 3, BARN EXTERIORS AND PAINTING

The National Trust for Historic Preservation
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BARN EXTERIORS and PAINTING



A new coat of paint is applied to the barn on the farm of Ron and Lois Seuntjens, Mapleton, Iowa.

In decades past when farmers or ranchers moved onto a new piece of land, the first thing they did was to build their barn, often before the house. The barn was built with care and foresight. Strong and flexible, these buildings were designed to be modified as farming changed over the years. In most areas the barn was constructed of wood frame and wood siding. Although wood-sided barns are most common, many materials have been used for barns. Barns made of stone, brick, logs, and even adobe are not uncommon. This brief, however, will

focus on the exterior rehabilitation problems of wood-sided barns and the single-most common complaint with this type of structure—painting.

Generally, the simple approach to restoring old barns is best.

Barn siding

Rehabilitating an old barn does not have to involve expensive changes such as new exterior siding. Generally, the simple

approach to restoring old barns is best. Wood siding is very durable, and provided it hasn't taken too much of a beating from livestock or the elements, it can usually be repaired. If you are handy with a hammer and a saw, you can probably repair your siding for a relatively low cost. If the damage extends to the structural framework of the barn, you may need the help of a professional contractor.

Traditional barn siding comes in a variety of styles. The most common are horizontally applied lap siding (such as clapboard and drop siding) and vertically applied board and batten siding. Board and batten siding consists of vertically placed boards which are applied flush with one another. The spaces between the boards are covered with a narrow board, called a batten. In some barns, particularly those originally designed for storing hay, space is left between the boards to allow for ventilation.

Siding problems

Most siding problems are the result of moisture penetration and rot. Often this damage occurs where the siding meets the ground on the outside or where feed and manure contact the siding on the inside. Some damage is caused by livestock either rubbing up against or

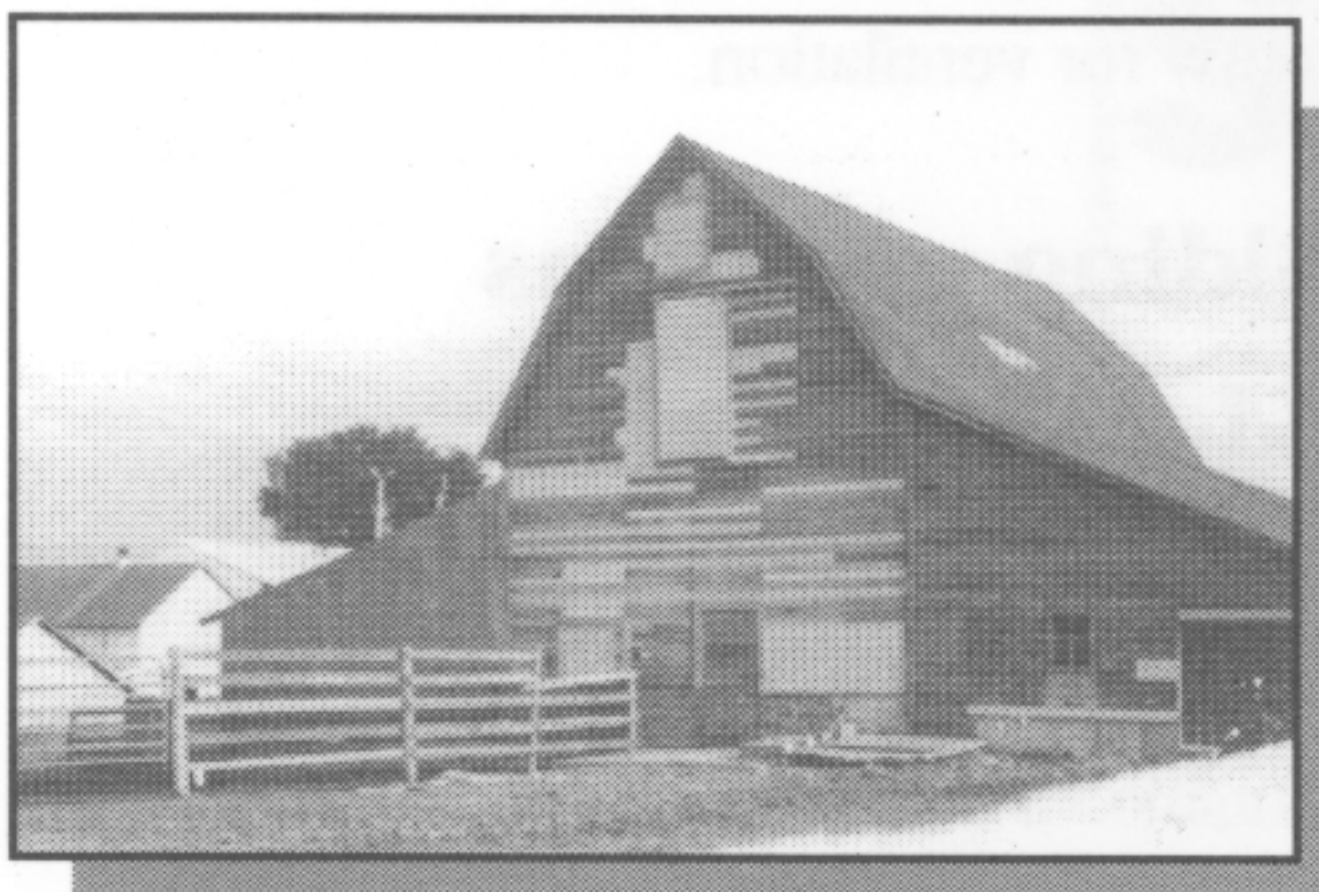
chewing on the siding. Faulty gutters and downspouts can allow water to drip or splash onto the siding. Decayed paint allows rain and snow to penetrate the wood, causing rot and further deterioration of exterior walls. If paint damage is extensive and large areas of wood are exposed to the elements, problems can extend to the structural system of the barn.

Most siding problems are the result of moisture penetration and rot.

Before beginning your exterior rehabilitation project, examine your barn for areas of rotted wood, damaged siding, cracked or peeling paint and mildew. Special attention should be given to eaves, windows and doors.

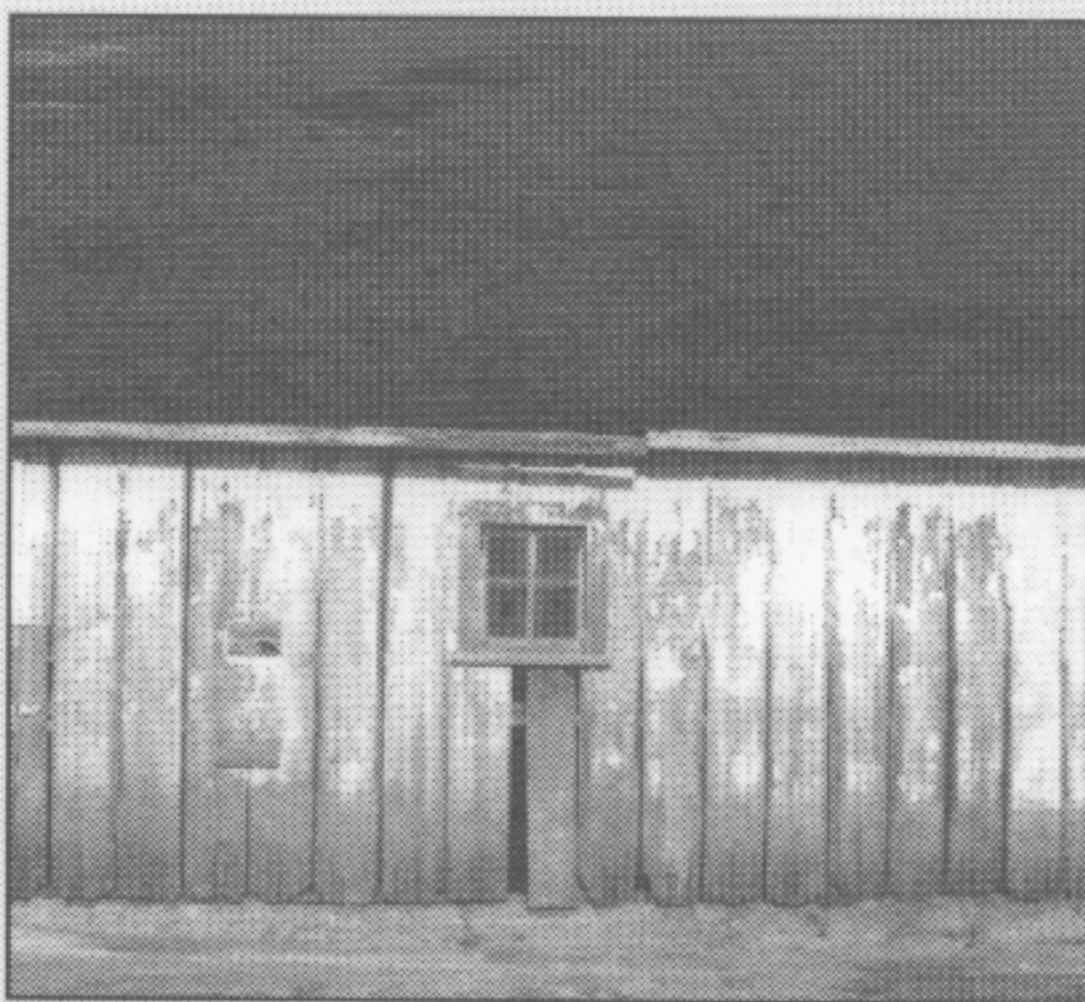
Correct moisture problems before beginning your siding repair job. Mend broken gutters and downspouts. Clear out soil or manure that has built up around the edges of the barn, and any vegetation that is growing too near the building. You may even need to regrade around the barn to make sure that water drains away from the building.

Once problems have been corrected, damaged siding, trim, windows and doors will need to be repaired before you begin your paint job. Painting over unstable areas, especially if the damage is caused by moisture, is a waste of time. If you don't address the causes of your problems you are setting yourself up for more painting in the near future.

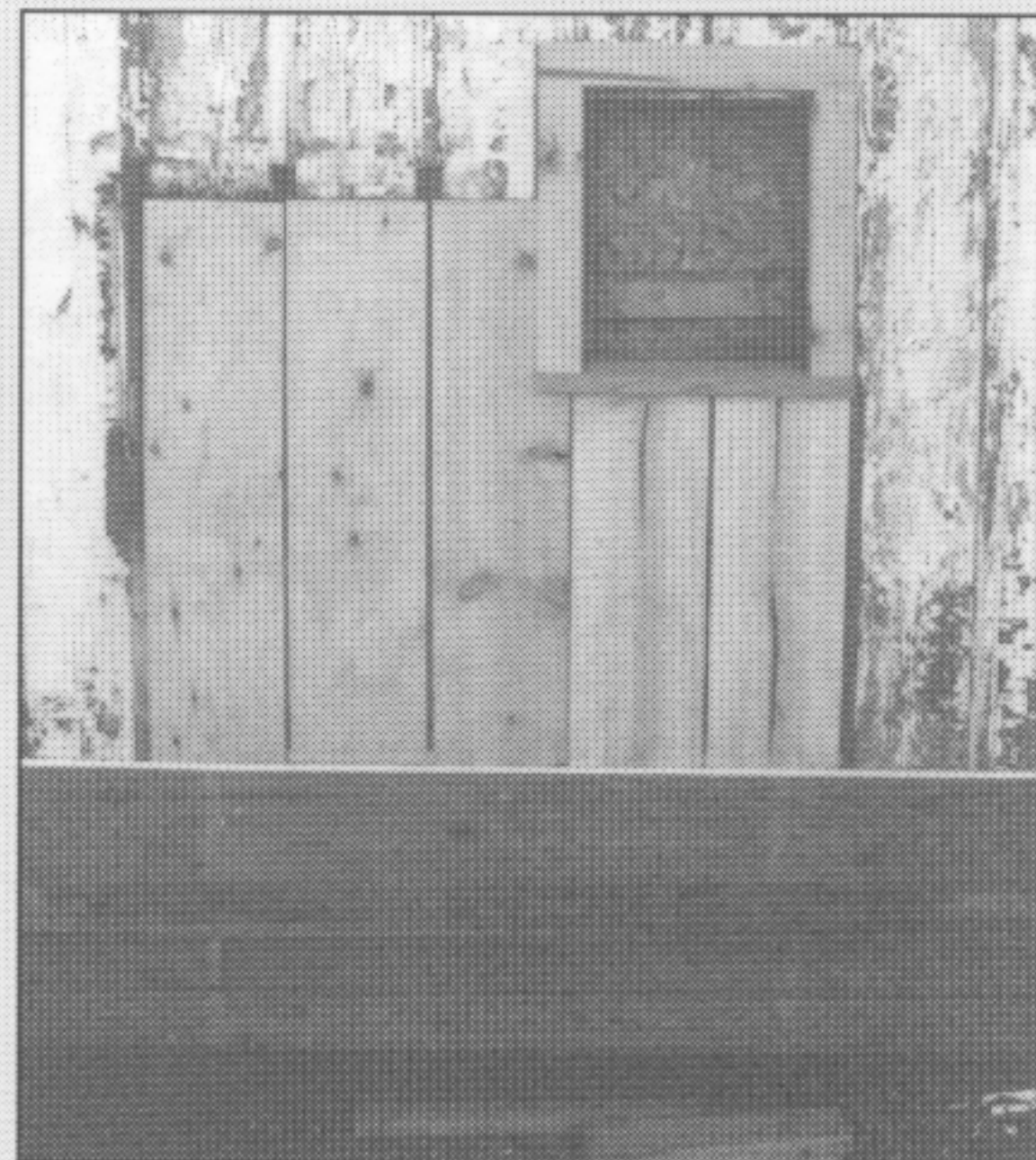


Barn with damaged siding replaced, ready for repainting.

Siding solution



Problem: The siding on this Iowa barn had been heavily damaged by weather and livestock.



Solution: Install a splashboard of pressure-treated wood along the high-use areas; replace broken siding and trim.

Siding repairs

Siding that is clearly rotted or broken should be replaced with new wood. Areas where paint deterioration is greatest should be closely examined for wood rot. Scrape away the paint and probe the area with a putty knife to make sure that the surface problems do not extend into the wood. If the siding feels soft or is heavily scarred and pitted, it should be replaced. If most of the damage is on the surface, then the problem can be solved with careful preparation before painting.

To replace damaged siding, cut out the damaged area back to the nearest stud or nailing surface. Usually there is no need to replace a whole section or wall of siding; just remove the pieces that are damaged. When removing lap siding, you will need to loosen the board above the damaged board. Damaged board and batten siding can be easily removed by removing battens and then the boards.

Replace all damaged areas with matching siding. If matching siding is not readily available at your lumber yard, you may need to have it custom milled. This adds significantly to the cost of the project, so try to keep replacement to a minimum. In areas of heavy livestock use you may want to consider installing a splash-board of pressure-treated wood, which is stronger and less susceptible to

moisture damage than ordinary siding (see above.)

Once damaged areas have been replaced, go over the whole barn and re-nail loose boards. Cracks in siding should be filled with exterior wood putty and sanded.

Replacement siding

Contemplating the problem of maintaining wood buildings, some farmers opt for metal or vinyl replacement siding as an easy solution to barn rehabilitation. Covering your barn with synthetic siding may give your barn a "remodeled" look, but several factors should be considered before taking this step, including cost, durability, appearance and preservation of the barn's original features.

Metal siding often covers up serious underlying problems while creating some new ones. Synthetic siding can trap moisture in the building and cause the structure to rot, particularly with a high-moisture use like livestock. Synthetic siding also covers up historic materials and alters the historic character of the barn. If you plan to use a preservation tax credit, synthetic siding may disqualify your project.

Cost is also a consideration. According to the Preservation Assistance Division of the National Park Service, a normal application of metal or vinyl siding is likely to cost from two to three times as much as a

quality paint job on wood siding. Most synthetic finishes can be expected to last about 15 years. Once painted, synthetic siding will require repainting at least as often as wood.

A common misconception is that application of synthetic siding will help insulate a building. According to the Federal Trade Commission, synthetic siding has little or no insulation value.

Windows, doors and trim

Preserving windows, doors and trim is an important step in restoring the exterior of an old barn. Unlike modern pole barns, most older barns have nicely detailed windows and doors. These features contribute to the historic character of the barn, as well as providing light and access.



Black-painted plywood placed behind glass keeps appearance of windows, which were covered on the inside to convert this barn for farrowing hogs.

Wood-sided barns usually have corner and eave trim that helps frame the building and seals the siding and eaves from the weather.

Doors and windows take a lot of abuse and often deteriorate faster than the rest of the building. Doors with loose or broken hinges and broken windows detract from the appearance of your barn and expose it to damage from the elements.

Replacing or even covering up openings might seem the easiest solution to broken doors and

windows, but remember these special elements give your barn its character. Wooden doors can be rebuilt with new hardware for a fraction of the cost of replacement doors. Wood windows can also be rebuilt.

If you do need to replace doors and windows, try to match them as closely as possible with the originals. A variety of wood windows are available to match historic styles. If you need to enlarge a doorway, consider building a new door that matches the original door, instead of opting for a ready-made overhead door. A metal overhead door on an old building sticks out like a sore thumb.

If you need to close openings for insulation purposes, you can seal doors and windows shut and insulate behind them (see below.)

Painting

Frequent repainting is one of the main excuses for tearing down an old barn.

Often one of the most visible signs of trouble with an old barn is peeling, cracking, weathered paint. Hard use, winter winds and summer sun wear away at old paint with each passing year and before you know it you have a serious problem. Frequent

repainting is one of the main excuses for tearing down an old barn.

Most people have painted so many times they consider themselves experts. Although painting may seem like the most straightforward of all farm repairs, there are some crucial tricks of the trade that can make all the difference in the quality of your paint job.

A quality paint job properly executed can last for up to fifteen years.

Advances in paint technology over the past fifty years have dramatically changed the quality and durability of this basic exterior treatment. A quality paint job properly executed can last for up to fifteen years and eliminate the need for regular paint repairs. By selecting a long-lasting, premium paint you can reduce the frequency of repainting while saving money over expensive replacement siding. Painting will help you maintain the beauty and historic character of your old barn while protecting it from damage and weathering.

Common paint problems

There are many different problems associated with paint on wooden surfaces. Exterior paint is constantly deteriorating due to weathering and abrasion, but the deterioration is usually not even. Before you begin to think about repainting your barn, you must decide how much paint you need to remove to prepare the surface.

Depending on the age of your barn, you may have several layers of old paint on the siding. If the paint is extensively peeled or worn, you may need to strip the building back down to bare wood to ensure a quality application of the new paint. In most cases, however, this is not necessary. Contrary to popular opinion, new paint generally adheres just as well to properly prepared old paint as it does to bare wood. Even when the paint is in very poor condition, and peeling and cracking off, it is rarely necessary to strip the wood completely bare before the new

paint is applied. One of the keys to a cost-effective paint job is understanding when to strip off old paint and when to leave the old paint in place.

Following are some of the most common problems with exterior paint. The problems vary from very minor, requiring only a simple preparation before repainting, to more serious problems, which require partial or complete stripping. By spending the time to address these problems before you begin to apply a fresh coat of paint you can ensure that your new job will last through the years.

General grime

One of the most common problems with paint on a barn and other working buildings on a farm or ranch is general grime and mildew. Barns are heavily trafficked structures with people, animals, and equipment moving in, out and around the building on a daily basis. Farm work is often dirty work and this shows on the exterior of the barn. Over the years paint becomes caked with mud, manure, wet feed and dirt. Although this may make your barn look terrible, it is generally not a major concern.

Before you paint, all exterior grime should be thoroughly washed off. This can usually be accomplished with a simple hosing of the walls. If the dirt is ground in or if there is mildew along with the dirt, walls can be washed with a solution of household detergent and water and a bristle brush.

Mildew tends to grow only in moist conditions. If you find areas of mildew you should try to locate the source of the moisture and correct the problem before you repaint. Dirt, manure or feed close to a wall could be a source of the problem. Inadequate drainage can also lead to mildew growth as water is splashed against walls causing moisture retention.

Chalking

Chalking is a powdering of the paint surface caused by exposure to

the sun and the elements which degrades the resin in the paint. As the resin decays, a film of chalky powder forms on the surface of the paint. Chalking is the normal way that paint deteriorates. It usually happens slowly and evenly and is not considered a problem.

In areas where sun exposure is higher, chalking can become excessive and cause build-ups of chalk on the surface that remain even after a hard rain. Paint that has experienced chalking for many years can be painted over as long as the chalk is completely washed off before any new paint is applied. Chalking can be removed by following the same procedure for cleaning mildew or grime. Hose off the walls and scrub areas where there is excessive build-up with a solution of detergent and water.

Cracking and "crazing"

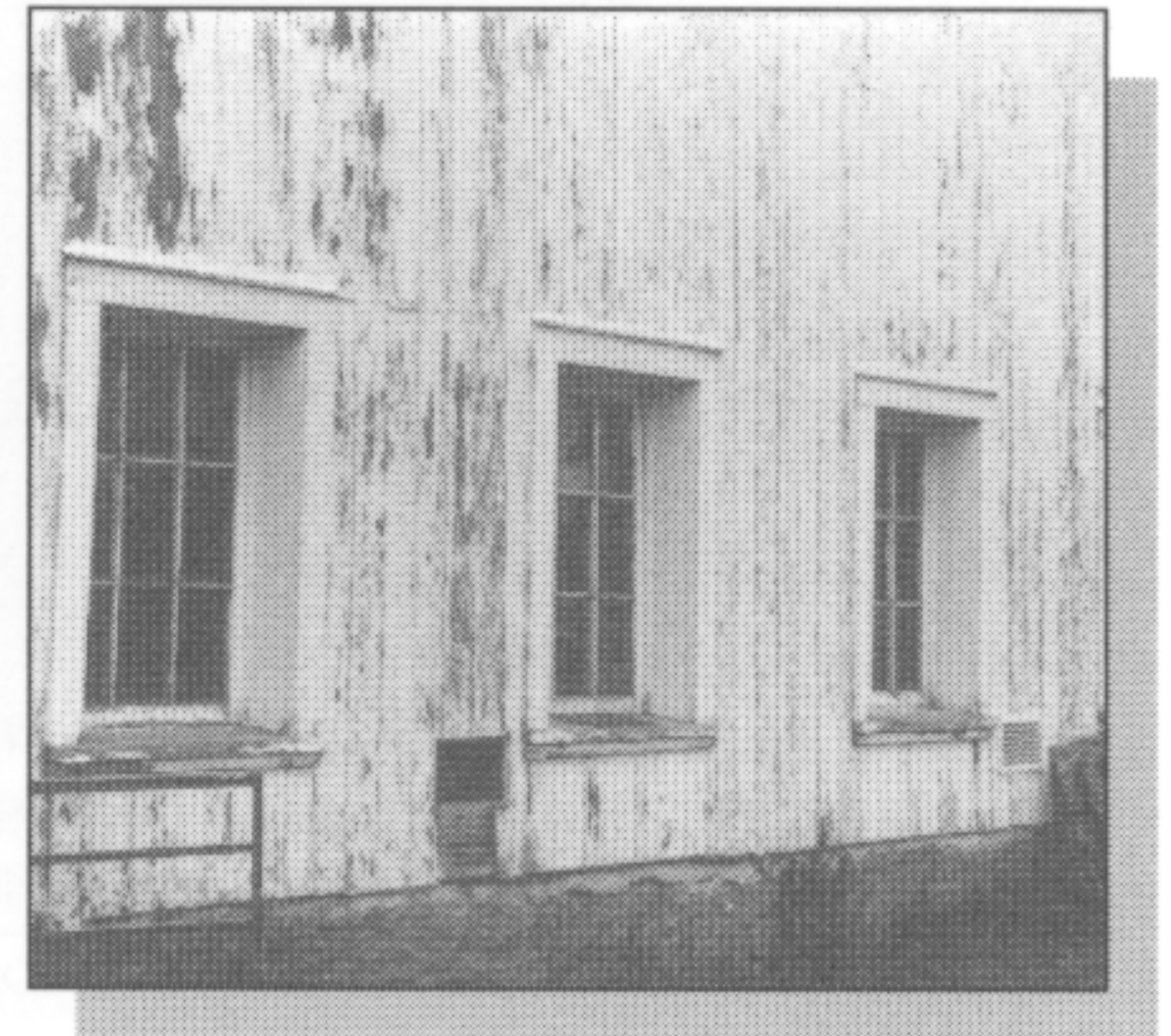
Cracking and "crazing" are more serious problems that require careful attention. Paint cracks when it becomes hard and brittle and is no longer able to expand and contract with the wood. As this happens the paint becomes increasingly vulnerable to weather changes. Cracks in the paint may extend through many old layers of paint, exposing the underlying wood.

A similar condition is "crazing." Characterized by hundreds of tiny surface cracks, this condition usually is easier to treat because the tiny cracks do not penetrate the underlying layers of old paint. The solution to both of these problems is to smooth the surface before repainting by sanding it thoroughly either by hand or with a power sander. The new paint will adhere to the sanded surface as long as there is no peeling.

Peeling

Peeling paint is more of a problem because the paint must be removed before the surface can be repainted. Peeling can be caused by a variety of problems. One of the most common causes of peeling comes from applying latex paint on top of

oil-based paint. Latex paints cannot properly bond with oil-based paints unless an oil-based primer is used in-between. Old latex paint can be scraped off the surface of the siding without removing all the old layers of paint.



Paint on this barn had peeled down to bare wood, especially on window sills.

Methods of paint removal

Most old barns were crafted with pride with finished window frames and other details. Harsh stripping methods can damage these elements and destroy the unique character of your barn. When removing old paint, try to remove only paint that is truly deteriorated. In addition to helping your barn maintain its character, this approach will save time and money as you avoid unnecessary work.

The basic method of paint removal is scraping by hand, using either a putty knife or a paint scraper. After loose and damaged paint is removed by scraping, the remaining paint should be sanded to even out the surface.

Scraping is a tedious process, especially on a huge, old barn. You may be tempted to use some form of power tool to complete the job, but all forms of power and chemical paint removal have drawbacks. Some methods can severely damage old wood and leave the barn in worse condition than before.

Sandblasting in particular is a poor choice for old wood. The blasting will leave the wood pitted and scarred to the point that paint will

not hide the damage.

Water blasting, or power washing, also can damage the wood but can be a good alternative if your barn has extensive peeling. Use the lowest pressure possible to do the job (no more than 600 p.s.i.), to avoid forcing water into the wood. Hand scrape any loose paint that remains after power washing, and make sure the wood is completely dry before painting. Paint will not properly adhere to wet or damp wood.

Rotary attachments such as wire strippers for drills and rotary sanders with stripping disks can also cause very serious damage to wood. If you want to remove paint with a power sander, choose an orbital or belt sander with a medium grit sandpaper. Keep the sanding surface parallel to the wood to avoid scratching or scarring the surface of the wood. Use protective equipment, especially goggles, when using any type of high-speed paint removal tool.

There are a number of paint strippers available to the public that work with varying degrees of effectiveness. Great care should be exercised when using any of these solvents, as they can cause serious injury if used improperly. Shutters, vents and other smaller details can be professionally dipped in a solvent bath to remove paint that would otherwise be too difficult to reach

This process is best done at a shop by trained experts with the skill and equipment to handle large quantities of toxic chemicals.

An alternative to chemicals is heat. Heat works well to loosen old paint in preparation for scraping. There are a number of heat guns and heat plates available. Generally these are only used for small areas of detail such as window frames and are not suitable for larger areas of siding. Never use a blow torch to loosen paint.

Safety issues

Of all the work you do on your farm, painting may seem like the least dangerous activity. While this is generally true, there are a number of hidden dangers in painting. Removing paint from old barns can expose you to dangerous levels of lead and other toxic substances. Many old barns were painted with multiple layers of lead-based paint. When sanding, scraping or removing old paint by any other means you should take precautions to cover your nose, mouth and eyes with approved safety gear. Lead is particularly dangerous for children and pregnant women who should not be in the area during paint removal.



Power washing removes loose, peeling paint.

Painting the barn



Before

Ron Seuntjens' 58 x 64-foot barn required extensive siding repair and several new doors before painting could begin. Once repairs were complete, the barn was power washed, scraped, and painted with an oil-based primer and a latex topcoat. The barn required 25 gallons of primer and 20 gallons of topcoat. The paint was brushed in as it was sprayed to ensure good penetration. The premium paint used on this barn cost about 25% more than ordinary barn paint, but it is guaranteed for 15 years.



Five years after painting

Painting your barn

Once you have cleaned off grime and mildew, and removed and sanded peeled or cracked paint, you are ready to begin to repaint your barn!

If you have removed most or all of the paint, or if you have replaced some areas with new wood, you will need to apply at least one good coat of primer before you paint. Even if you did not extensively remove old paint you may want to consider a primer coat to help the new paint bond and seal out moisture.

When choosing paint there is one important thing to remember: You get what you pay for. Top-quality

exterior paint can be expensive but may come with a ten- or even fifteen-year guarantee. Cheaper paints will age much faster, requiring you to repaint more often. In the long run it is usually more economical to pay for the high-quality paint up front and save money and time later. If your barn is smaller and you don't mind painting every five to seven years, a cheaper paint might be a good alternative.

Primer coat

Because barn siding tends to have a rough and uneven surface not particularly suited to rollers, your options for applying the primer and paint will probably be limited to

brushes or power sprayers. Commercial quality power sprayers work well and are very efficient for painting large surfaces. They are available for rent or purchase and may be worth considering depending on the size of your job. If you use a power sprayer make sure that you wear appropriate safety gear such as a mask and goggles. The paint comes out of the sprayer in a very fine mist that can penetrate nasal membranes and cause respiratory problems and eye damage.

Whichever method you choose, make sure to apply a good even coat with special attention to cracks and irregularities in the surface. For the best job, paint should be brushed into the wood as it is sprayed.



Primer is applied to barn with power sprayer, then brushed into the wood to ensure thorough penetration.

Choosing paint

Primers

Oil-based: long lasting with good penetration and good coverage; must be used as an undercoat for latex paint being applied over old oil-based coats.

Alkyd primer: opaque finish; faster drying than oil, with greater resistance to mold and moisture.

Specialty primers: A number of companies produce special primers to cover stains and mildew and seal wood in high moisture areas. In areas of high animal traffic one of these primers is recommended.

Topcoats

Latex: easy to apply and water soluble; has very good flexibility and resistance to peeling, cracking and chalking. Premium latex paints guaranteed 10 years or more generally cost 25% more than standard paint.

Alkyd-based: dries quickly and covers well. These durable paints are resistant to blistering.

Oil-based: durable and long-lasting paint; adheres well to uneven surfaces; best for covering mildew and stains; tends to shrink less than latex paint; best option for painting in cold weather.

Why are barns red?

The tradition of painting a barn was not widespread in America until the nineteenth century. The practice appears to have started in Virginia, where a combination of lamp black, turpentine and linseed oil made a light grey mixture which acted as a preservative for the wood. Occasionally, iron oxide (rust) and clay would be added to give the paint a red or orange color. Further North, farmers varied their paint recipe somewhat to get a stronger, more enamel-like mixture that lasted longer than the Southern version. The primary ingredients were skim milk, lime and linseed oil. Iron oxide was generally used instead of lamp black and turpentine, and consequently barns in the North were almost exclusively painted red. Red is still the most popular color for barns, with white a distant second.

- Scott Robinson

Caulking

A key element of a quality and lasting paint job is caulking. Caulking is often neglected because it is time consuming and tedious. But time spent in caulking can save you maintenance headaches later. Seams between siding boards, window frames, and other joints allow moisture to penetrate and collect in areas vulnerable to rot and decay. Sealing these areas can help insulate your building, protect against rot, and improve the appearance of the barn. A number of companies market "twenty-year" latex or silicone caulks that are both durable and flexible.

Once the primer has thoroughly dried, seams and cracks can be caulked. If you decide that it will be too much work to caulk the whole building, then concentrate on the problem areas around livestock pens, windows, doors, vents and eaves.

Topcoat

With your barn primed and caulked, you are ready to apply your fresh topcoat. The topcoat can be applied by brush or with a power sprayer. Depending on the coverage of your first coat, you may want to consider applying a second coat, especially in trouble areas.

Painting trim and windows

Traditionally, windows, doors and trim are painted a different color

from the rest of the barn. Red barns are usually trimmed in white, while white barns are often trimmed in green or black. If you are spraying your barn, mask detail areas such as windows, doors and trim before spraying. After the walls are finished you can either spray or brush the trim to finish the job. When painting windows, take time to mask the glass. It will save you work later and ensure a clean, professional job.

Estimated costs

The cost of painting a barn varies according to the size and height of the barn, the condition of the existing siding, the quality of paint you chose, and labor costs in your area. If you do all the work yourself, an exterior rehabilitation of your barn can be very economical. If you choose to have the work done by a contractor, the price will still be considerably lower than the cost of covering the barn with synthetic siding. In a 1996 sampling of 29 barn rehabilitation projects, the average cost for covering a barn with steel siding was \$6,353, while the average cost for painting a barn was \$1,544.

A gallon of paint covers approximately 450 square feet. Primers cost \$18-25 per gallon, while topcoats run \$16-20 per gallon. Caulk costs \$1.50-3.00 per tube.

For more information

Organizations and agencies:

State Historic Preservation Office (SHPO): Advice on maintaining the historic character of your barn and information on the National Register of Historic Places and rehabilitation tax credits. Some SHPOs also maintain a list of rehabilitation contractors, craftsmen and architects. Contact the state government directory for your state.

Cooperative Extension Service:

Assistance with specific building projects and plans. Contact the land grant university in your state, or your county Extension agent.

BARN AGAIN! Program: General advice and assistance with barn rehabilitation projects. Contact the National Trust for Historic Preservation: (303) 623-1504.

Publications and videos:

BARN AGAIN! - A Guide to Rehabilitation of Older Farm Buildings, National Trust for Historic Preservation and Meredith Corporation, 1988. Cost \$5, from the National Trust.

Barn Again!: Celebrating the Restoration of Historic Farm Buildings, Nebraska ETV Network/University of Nebraska-Lincoln Television, 1991. Order from GPN: 1-800-228-4630.

"Preservation Brief #10: Exterior Paint Problems on Historic Woodwork."

"Preservation Brief #20: The Preservation of Historic Barns."

"Painting Historic Buildings: Materials and Techniques. An Annotated Bibliography." Available from Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Phone (202) 512-1800.

"Paints and Painting, AED Agricultural Engineers' Digest," Midwest Plan Service, Iowa State University, Ames Iowa 50011.

"Old Barn, Young Muscle," Successful Farming (February, 1989).

"Paint That Sticks," Successful Farming (February, 1994).

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The Barn Aid Series is designed to provide farmers and other barn owners with technical information on specific problems related to the restoration and reuse of older barns. Comments on the usefulness of this series are welcomed and should be addressed to BARN AGAIN!, National Trust for Historic Preservation, 910 16th St., Suite 1100, Denver, Colorado, 80202. (303) 623-1504, Fax (303) 623-1508, e-mail mpro@ossinc.net.

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