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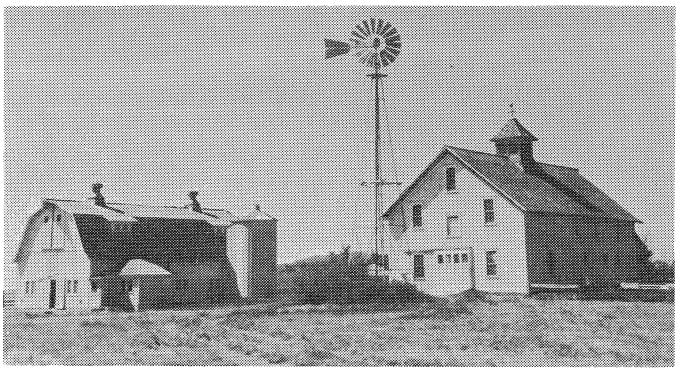

Using Old Farm Buildings

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In cooperation with the National Trust for Historic Preservation, Washington, D.C. and the State Historical Society of North Dakota, Bismarck, ND.

The adage "time marches on" surely has special meaning for those of us who are anxious to maintain facilities that will make a contribution to our livelihood. The current interest in centennial celebrations of statehood, farms and ranches, villages, towns and cities is captured by this bulletin and its major sponsor, "The National Trust for Historic Preservation."

One hundred years would seem to be a long time in a real sense, but if we were to look at facilities in the "Old World" we would note that 900-year-old churches and 400-year-old barns are common. How do we, in our rapidly changing society, provide for the updating and modernization of facilities to provide utility and service in addition to historic preservation?

Interestingly, the new tools now in the hands of the engineer allow space age technology to come to the aid of the past. Computer assisted planning, feasibility and structural analysis make renovation and preservation more viable now than in the past.

This bulletin is prepared by the faculty in agriculture of North Dakota State University as a "real-life" representation of our centennial motto: "For the Land and Its People."

H. Roald Lund
Dean, College of Agriculture and
Director, Agricultural Experiment Station

Old Farm Buildings that have outlived their original purpose can still be put to practical use. An enterprising manager, with planning and carpenter help, can change an unused building into a useful facility, thus saving money and the old building.

Two major reasons for saving older buildings are historic value/appearance and practicality. Some owners like the appearance of old buildings. Others may wish to preserve family heritage. Producers who are renting a place or trying a new enterprise may want to use available buildings to minimize investment. New facilities can then be developed later at a permanent site, when size and exact design requirements are better known.

Typical concerns when considering use of an old building are: (1) How can it best be used? (2) What will it cost? and (3) Is it practical to do? Experiences of other operators provide helpful ideas about construction procedures, layout, materials, costs and suggested changes. This publication illustrates 16 actual renovation projects completed by North Dakota operators. These were selected to show various construction methods and uses adaptable to most old farm buildings. Large blueprint sheets of most drawings shown are available at $1 per sheet from Extension Agricultural Engineering, NDSU, Fargo, ND.

When remodeling buildings, safety is a number one concern. Accidents are too common when working with jacks, old lumber, low clearances, protruding nails, etc. To avoid problems, wear proper clothing, correctly use the proper tools, have adequate help and provide insurance coverage.

Evaluate alternatives before deciding to remodel or construct new facilities. Although it may not be large enough or include modern conveniences (such as electricity, pressurized and frost-free water system, waste handling system, heating, ventilation, etc.), an existing building in healthy structural condition can be practical to use. To decide this, compare investment, location, overall construction and design in terms of operational goals. A large capacity, low-labor, minimum maintenance, new building may be needed. Recycling an old building can preserve local history and may earn tax credits. Check with historical organizations for information about special tax incentives and other types of assistance which may be available to reduce costs of utilizing an old building. County extension agents and building materials suppliers can assist with building codes, plans for general construction, floor plan suggestions, waste handling, and local design information. Most extension agricultural engineers at Land Grant universities have old building plans on file. Plans and alternatives on paper are very useful for effective communications, especially if a lender is involved with the building.

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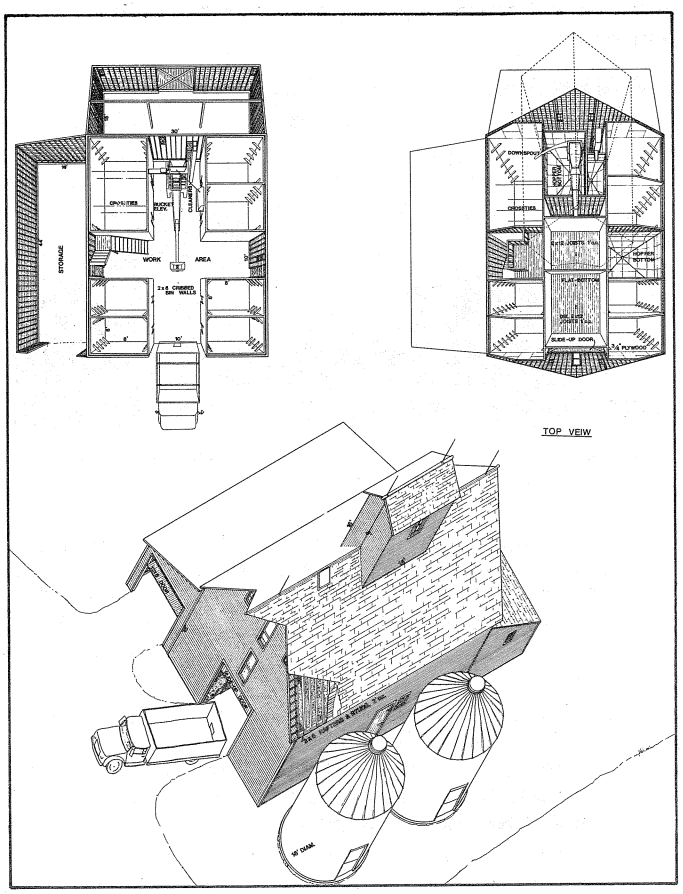
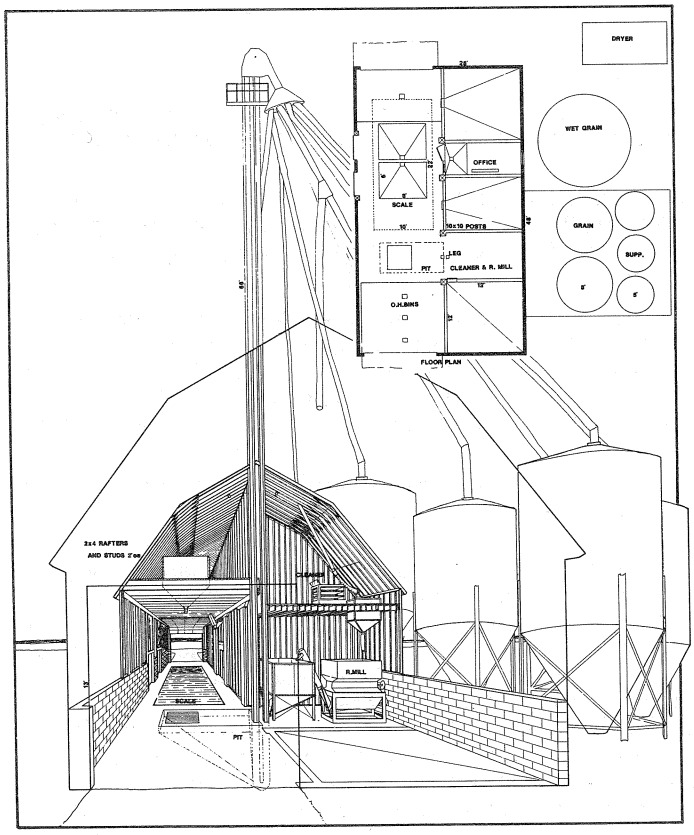
SEED CLEANING AND GRAIN STORAGE

This operator wanted to preserve and yet make practical use of his 30'x44' two-story gableroof barn originally constructed for dairy in 1890. Nearly 10,000 bushels of storage (plus the two 2500-bushel round steel bins) and work space for sieve-type, rotary-disc and movable, gravity-table seed cleaning machines were provided in the 1957 remodeling. Rehabilitated, it now permits one person to clean and treat seed, utilizing off-season winter labor. The 16' wide side lean provides storage for bags and equipment--the end lean collects screenings from the cleaning equipment. A 40' high, 1200 bu/hr bucket elevator moves grain up from trucks (which are backed in and unloaded into a 7' long, movable, 8" auger to the bucket elevator) to storage bins or cleaners, and drops it through a hand-moved, overhead downspout into storage. Uncleaned grain is stored in the eight ¼'x8' full-height, flat-floor bins of 2"x6" cribbed-wall construction. Cleaned grain is stored in five metal-lined, hoppered, overhead bins that are supported by 6"x6" joists on 2' centers. The flat-bottom bin above the alley is supported with 2"x12" joists on 1' centers. The original rock foundation was replaced with reinforced concrete, new sills were installed and the building was lowered back into place at a cost of $12,000 materials plus owner and neighbor labor. Equipment costs for cleaners, conveyors, etc. were extra.

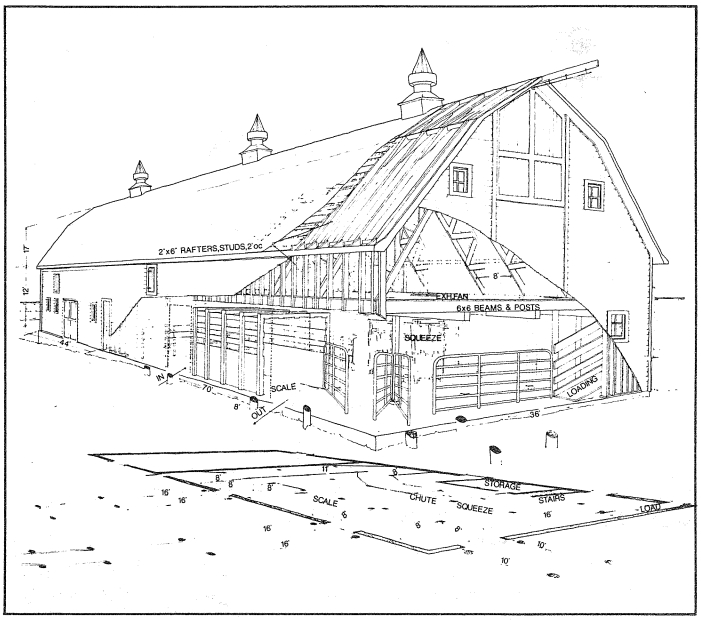




GRAIN/FEED PROCESSING AND STORAGE

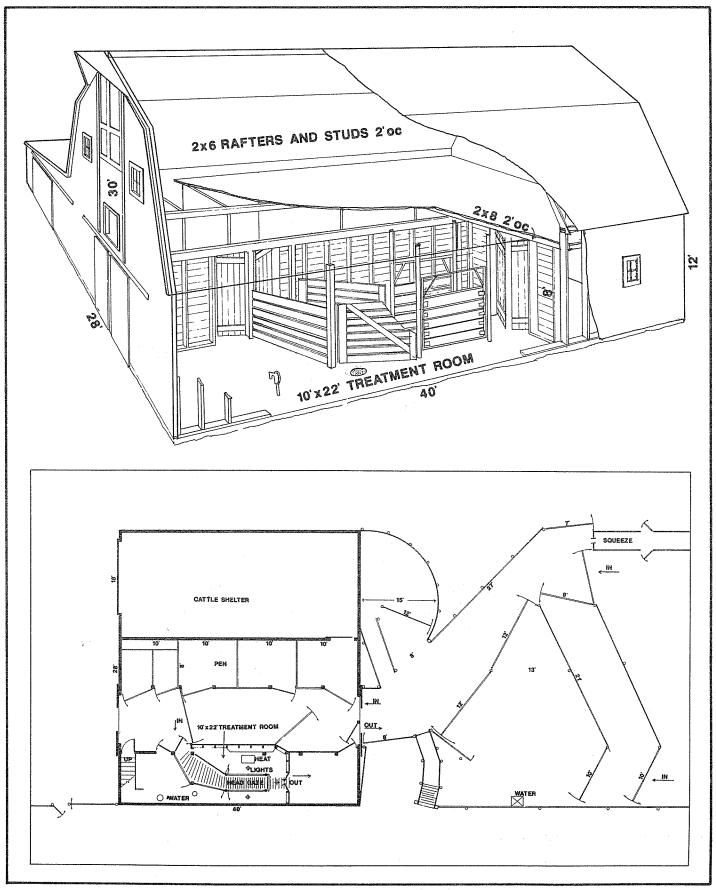
Originally near a bonanza grain farm and no longer used for dairy, this 28'x48', two-story barn was moved in 1965 onto a new, 56" high, 12" wide, concrete block foundation to provide a much-needed centralized grain system for a 1000-head cattle feedlot and grain farm operation. The interior was completely rebuilt and a new concrete floor with weigh scale installed. The corner 12'x12'x22' high bins (walls are 2"x6" studs on 1' centers with plywood liner) with sloped floors each contain 2500 bushels. Overhead bins hold 400, 1000 and 1800 bu. each. A 37,000 lb capacity, 10'x22' platform scale in the 14' wide by 13' high drive-through is used for weighing purchased grain and cattle and determining daily feed use. Cattle weights are checked by moving cattle from outside pens onto the scale via the side doors. The 20 hp. ground-level rollermill processes barley, corn, oats and other feeds. Grain and feed are elevated overhead from the 6' deep, hoppered dump pit via the 66' high, 1000 bu/hr bucket elevator, which also can fill the outside round steel bins. The two 6'x8'x8', metal, side-hoppered, overhead bins (supported by 3"x12" beams about 1' apart) above the driveway hold 800 bu. of feed ready to load feedwagons. A cleaning mill located above the rollermill can separate grain for seed. Costs were about $15,000 for moving the building and materials for the foundation, floor, and walls. Construction labor was extra as were costs for the scale, bucket elevator, grinder, steel bins and dryer. Three phase electric wiring, which is practical where several large motors are used, is dust-tight for safety.

LIVESTOCK HOUSING AND HANDLING



In 1912, lumber was hauled by wagon team to construct an original 36'x70' horse and cattle barn. A 44' long addition was added later for more livestock. A farmstead landmark and often used for benefit dances during WWI, it was unused for about 10 years until the owners recognized a potential use for it in their family cattle feedlot operation.

Knowing the weights of livestock purchased, to be sold or being fed in the feedyard is essential for efficiency. Treating sick cattle or processing new cattle needs to be done on time. Farming along with feeding means limited operator time is available during daylight and/or good weather. To cope with this situation, a 20,000 lb capacity, 7'x16' platform scale for weighing was installed in 1975. This scale, sorting pens, chute and loading system were planned and installed indoors so one person could, day or night and regardless of weather, "handle" cattle with the family 1200 head feedyard system. Since this is the only scale and handling system in the area, neighbors now often use this facility to weigh and sort their hogs, sheep and cattle. The second-floor mow space is used for miscellaneous storage and aids temperature and moisture control in the 8' high main barn space. An exhaust fan in the ceiling over the headgate quickly moves out branding smoke and odor. The interior mow-support posts see double use for gate and pen partition support. The indoor loading ramp stays dry and clean. The alternate, groundlevel chute is convenient for stock trailers. Cost was about $7,500 for new concrete floor and equipment plus owner labor. A new, comparable-size barn would have cost twice this and an area historic feature probably torn down. A practical use for an old building helps to justify the necessary maintenance and insurance costs.

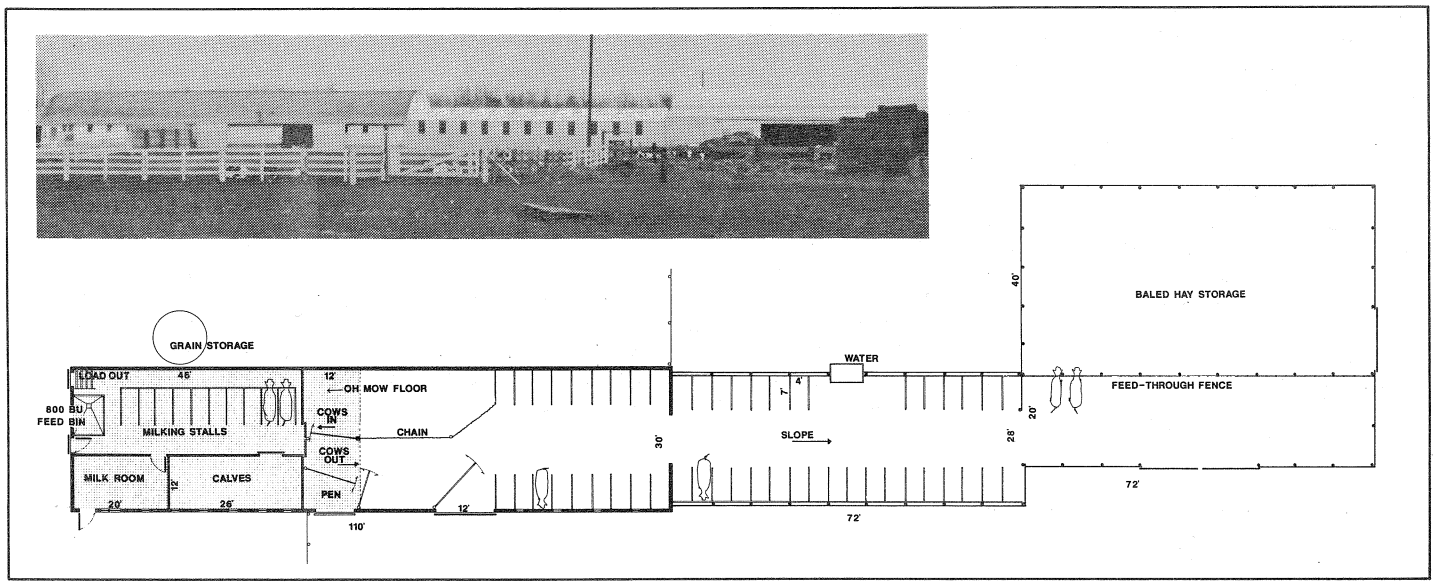


BEEF CATTLE MATERNITY AND HOSPITAL

Wet, cold weather during spring calving is a common ranching situation and complicates the need to mother-up new calves or treat calving health problems. To help overcome these problems and provide severe weather shelter space for cattle and saddle horses, an old 28'x40' two-story barn with an 18' lean was put to use in 1978 for about $1000 in materials plus the operator's labor. Extra rafter and wall bracing was needed to prevent further wind damage to the 30' high, unprotected mow space used for storing baled straw and hay for emergencies. The mow also insulates and reduces heat loss, drafts and condensation to aid conditions for cattle penned below. The three 8'x10' calving and hospital pens are convenient to the 10'x22' treatment room. Mow support 6"x6" posts and beams also support pen partitions. Offset electric lights and a 1500 watt radiant heater over the chute-headgate and vet supplies area (in the enclosed treatment room) provides light on cattle body areas usually needing treatment and quick heat that helps aid veterinary work in cold, wet weather. Sorting, treating, loading or otherwise handling cattle can be done by one person in this system. A future extension onto the old barn could enclose the older, large capacity, outdoor squeeze, sorting-crowding-loading chutes and provide more complete flexibility.

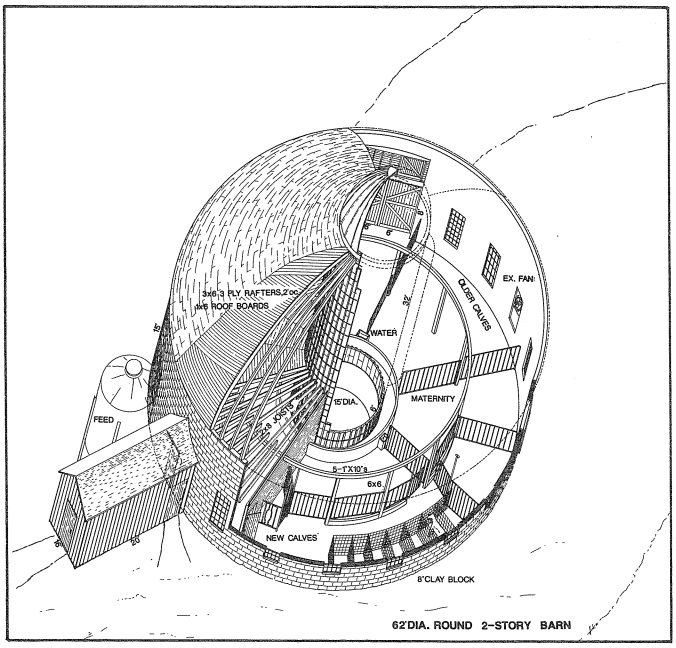
DAIRY MILKING, HOUSING AND FEEDING

Loose or freestall dairy housing systems permit low-labor group handling, feeding and tractor-powered manure cleaning. Although management is critical, investment is less per cow than with conventional stanchion housing. A loan of $5000 along with owner and neighbor labor was used in 1955 to construct this 30'x110' wood archroof barn with ten floor-level milking stanchions, milk pipeline and milkroom at one end along with overhead bedding storage. Open, loose housing for 28 cows was provided at the other end of the barn. Youngstock were housed in another barn and most feeding then was done outdoors. In 1965 a 40'x72' clearspan, pole frame hay storage with 20' wide lean for self-feeding was erected 72' away from the archroof barn for $3500 cost plus owner labor. This allowed indoor storage and feeding of rectangular hay bales to reduce waste and labor. In 1968 a 28'x72' truss-rafter, poleframe building with natural ventilation system was fitted into the space between the archroof barn and the hay storage/feeding building. Indoor/outdoor watering and freestalls were included in this part and in the original loose housing area for 40 cows. Over 13 years, a complete dairy milking, housing and feeding system was developed with minimal investment.



DAIRY CALF HOUSING

Several dairy operations, when expanding, have used the old stanchion barn for housing calves to be grown up for herd replacements. The overhead mow provides hay and bedding storage plus insulation for animal air-temperature control. Mow-floor posts also support the numerous pen partitions. Few operators, however, have a round barn with its special floorplan layout arrangement problems. An area historic feature, this 62' diameter clay blockwall barn was converted in 1972 for under $1000 when the milking herd was moved into a new, larger, freestall housing, indoor feeding and elevated milking parlor setup. Calf barn investment was thus held to a minimum and an old farm building preserved for practical use.



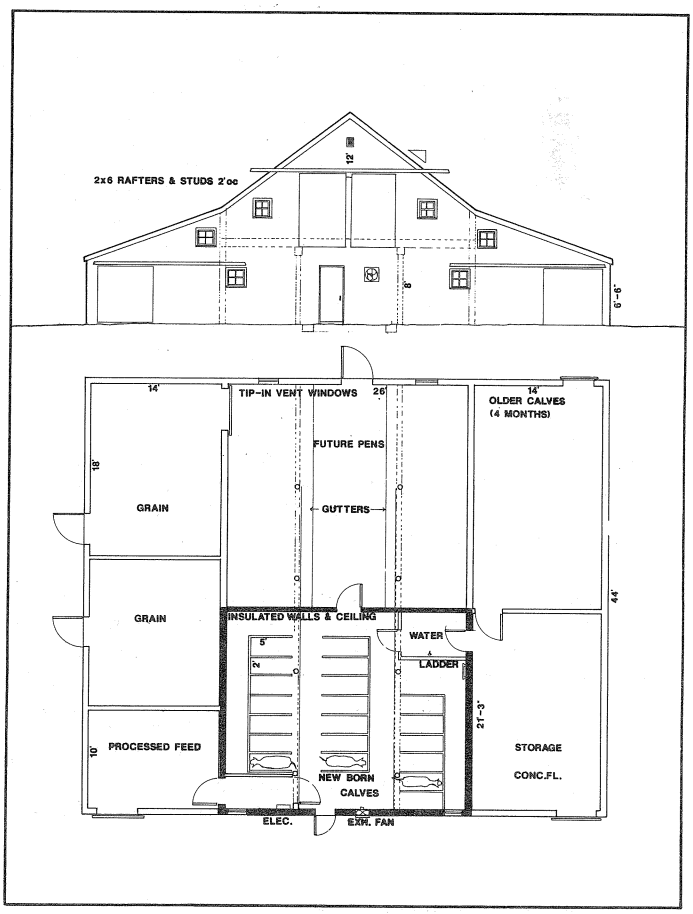
Originally constructed in 1926, cowstalls faced in toward the feedmanger/alley that surrounded a central wood silo. A gutter and work alley next to the exterior wall had an overhead track-litter carrier system for hand-cleaning manure. Moisture deteriorated the original hemispherical-shaped roof. It was replaced with a lower-profile, arch-roof in 1950. The 15'x32' concrete-stave silo replaced the wood silo in 1948. The windows were replaced with higher insulating-value glass block in 1960. An exhaust fan ventilation system is used for cold weather. Door openings are adjusted for air movement in moderate weather. Straw bedding and indoor hay/grain feeding is done by hand. Pens are cleaned periodically with a skid-steer loader through the 12' wide rear door. The maternity pen permits cows to calve indoors with close supervision. Newborn calves are placed in individual, floor-level, bedded pens for six weeks to control sucking on each other. After getting onto a hay/grain ration, calves are moved over to larger and larger group pens with adjoining outdoor pen space.

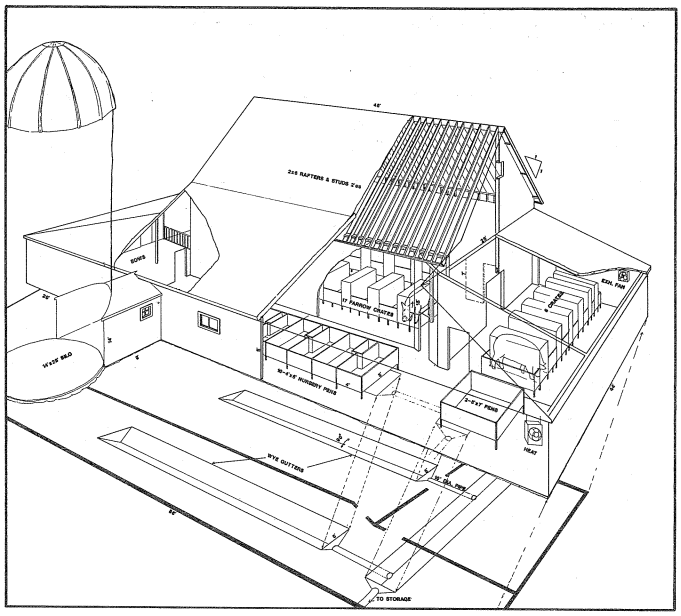
CALF HOUSING AND GRAIN STORAGE

For less than $1000 sheathing and insulation cost plus mostly owner labor, a 1957 gableroof, drop-sided, 26'x44' dairy barn with 14' wide leans was adapted to calf-youngstock-grain storage when a new, separate, housing system was constructed in 1984 for an expanding dairy operation. Twenty individual, bedded, floor-level stalls for the newborn calves were home- built from ½" exterior grade plywood and located in the main barn space.

Feeding and manure cleaning is done by hand for the small calves. Heated water is available for mixing dry milk replacer feed. A tractor loader is used for periodic cleaning group pens in the 14' wide lean. The overhead mow provides baled straw and hay storage plus insulation to prevent indoor condensation. A continuous-running, variable-capacity, exhaust ventilation fan along with a portable, oil-fired, hot-air heater and movable heat lamps maintain a 40°F winter temperature for the small calves. Fresh air enters the barn through manually adjusted, small openings in the ceiling near the crosswall.

Older, grouped calves have access to outdoor pens and their barn space temperature fluctuates with outdoor conditions. About 2,000 bu of grain can be stored in the one, 14' wide, concrete floored lean. The 10'x14' feed storage bin is filled with a tractor-powered grinder-mixer and used for convenient hand feeding calves.





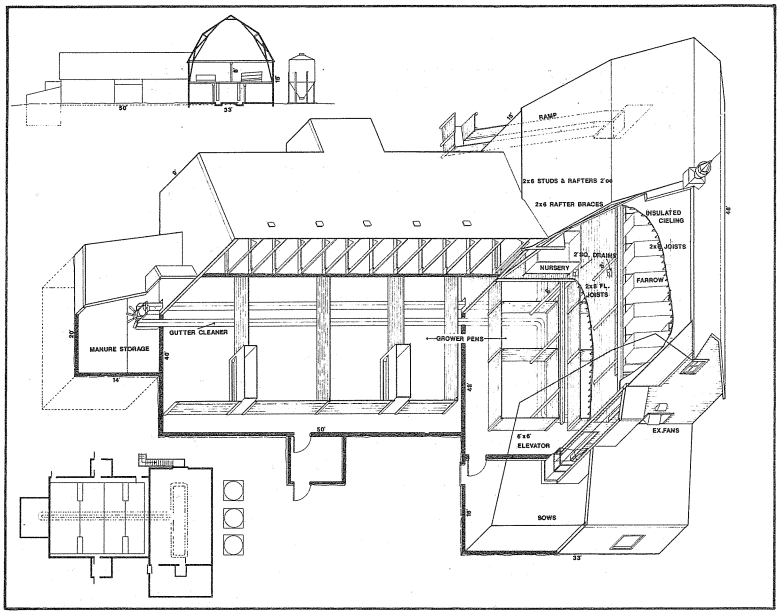
SWINE FARROW AND NURSERY

In continuous family-farm use since constructed in 1904, this two-story, 28'x48' barn was used for horses and dairying until 1972. Meanwhile, three leans and the 14'x34' silo were added to accommodate more livestock resulting in an overall 44'x86' building. After switching into hogs in 1973, the barn was eventually converted in 1978 to floor-level farrow crates and nursery pens using daily straw bedding and manual manure handling. Later, an intensified farrowing schedule became necessary to supply the 1800 pigs per year needed for a separate new hog finishing barn which was added to the family farm operation. This development, plus increased farming labor demands, compelled the owners in 1982 to install labor-saving, raised, slatted-floor farrow crates and nursery pens along with gravity-drain, wye gutters in the floor for liquid manure handling to a nearby, centralized, outdoor, earth-banked manure storage.

Hoppered, round steel feed storage bins by the barn are filled with a tractor-powered grinder-mixer. Electric-motor powered feed conveyors distribute feed to feeders within the barn. Separate hanging 100,000 BTU hot-air, propane-fueled heaters supply heat in the farrow room and the nursery. Exhaust ventilation fans continuously draw fresh air from the straw-filled mow down through small manual adjustable ceiling inlets which mixes with air inside the barn to control moisture and odor.

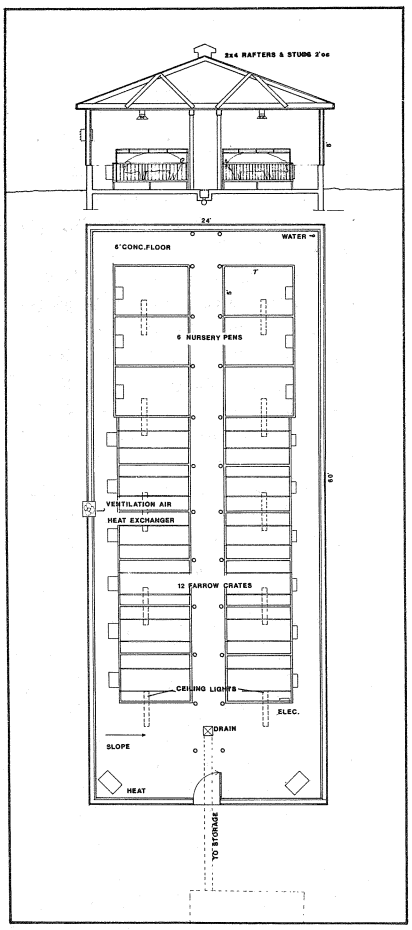
This type of renovation is a low-cost, practical use for many such two- story barns. The out-of-pocket expense, estimated at $22,000 in this case, is mostly for equipment that can be moved again later should a new barn be constructed or the swine operation discontinued.

TWO-STORY SWINE BARN



Many owners of large, two-story barns have pondered utilizing the second floor of their barn for livestock space. Animal access and manure handling are special problems. In 1978, this operator obtained at no cost a 33'x48' two story barn, moved it and installed an 8' high, post-beam supported ceiling with insulation above it **over** the mow floor. The walls were also insulated and sheeted inside. This insulated second-floor space is heated with an 80,000 BTU heater and exhaust-fan ventilated to provide controlled environment space for four homebuilt wood farrow crates, six farrow pens and a nursery pen located on the old mow floor. Smooth 4'x8' fiberglass sheets were glued together and installed over a sloped framework to seal the mow floor and direct manure to two 2'-square drains located near the center of the room. The drains convey manure down to the gutter cleaner in the ground floor below. The gutter cleaner conveys all manure to the 14'x20' manure storage at the end of the 40'x50' one-story insulated pen barn addition constructed new for growing out pigs.

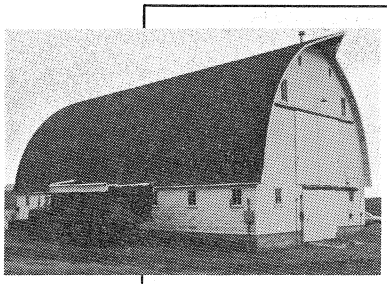
Operator access to the upper farrowing room is by the outdoor ramp at the one end or the electric motor-powered, cable winch-operated 6'x6' home built platform "elevator" at the other end, designed mainly to move up pregnant sows and move weaned pigs down to grower pens directly below the farrow room. Commercial feed stored in the hoppered feed bins was separately conveyed by 4" diameter electric motor powered augers to feeders in the barn. This was later changed to on-farm feed processing to reduce costs. Moving the barn, installing a new foundation, concrete floor and upstairs fiberglass floor, insulation, interior sheathing, ceiling, pen equipment and heating--ventilation system for the two-story barn cost $10,000 with owner labor extra. The 40'x50' addition cost $22,000 when constructed new with the manure storage.

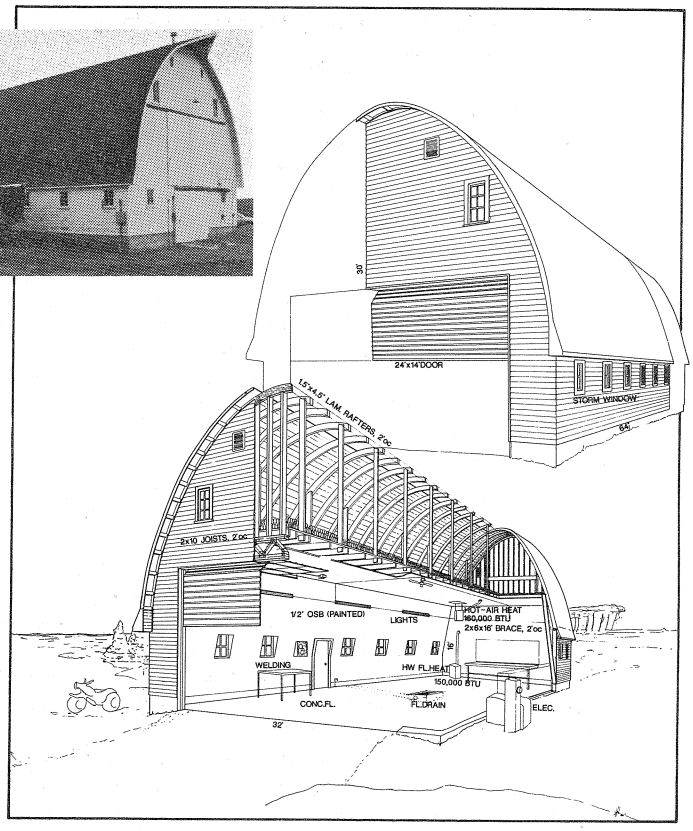


SWINE FARROW-NURSERY

Constructed about 1918 for swine and later used for machinery, then chickens, this 24'x60' gableroof barn was finally moved in 1979 onto a new concrete foundation and floor. It now houses 12-5'x7' farrow crates and six 5'x7' nursery pens with mesh-type slotted floors raised 15" above the floor. This capacity could service up to a 50-sow farrow and feeder pig operation. The ceiling and walls are insulated with batt insulation protected by polyethylene vapor retarder and interior sheeting. Supplemental heat is provided by two 3KW electric hot air heaters. Ventilation is supplied by a variable-speed heat exchanger. No bedding is used with the slatted floors. Manure is pressure-washed to the floor drain in the center alley where it drains via a 6" PVC pipe to a 1500 gallon underground tank that is periodically pumped and hauled to cropland by tankwagon. Total costs including materials, equipment, electrical, waste handling and moving amounted to about $20,000, which is about 70 percent the cost of a new barn.

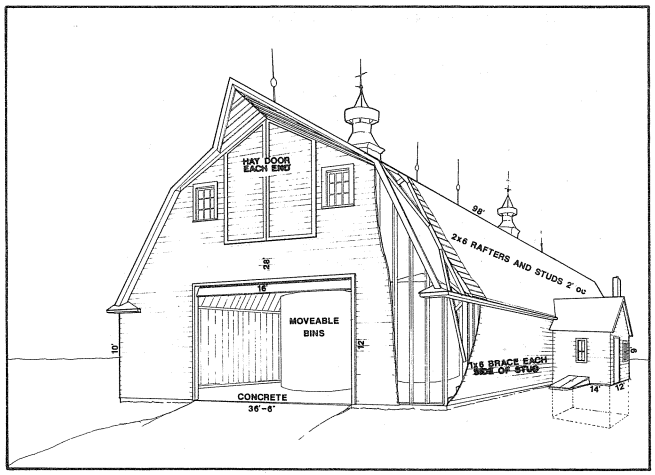
FARM REPAIR SHOP





Owners of this unused 1951 two-story archroof 32'x64' barn rebuilt it in 1982 to an insulated-heated shop now used year-round. Walls were insulated with 6" batt insulation and sheeted inside with ½" oriented strand board (OSB) and painted with white enamel for brightness and cleanability. The mow floor was cut loose and raised by jacking to provide the 16' high interior space needed for modern machinery. The large 24'x14' insulated overhead door (shown) is on the backwall, preserving the barn's historic appearance (see photo) from the farmyard. This door arrangement also removes the usual farm shop doorway machinery, spare parts, etc. clutter out of view from the farmyard. To maintain strength, the lower walls were reinforced with a 2"x6"x16' brace gusseted over with ½" plywood on each 1.5"x4.5" glued laminated rafter located every 2'. Insulation was blown in the upper walls and 14" thick over the ceiling. The new 5" thick concrete floor was sloped to a 2' square grated central floor drain that siphons water out through a 4" PVC drainpipe to an outside belowground 4'x6' seepage pit. Oil floats and must periodically be skimmed out of the floor drain while sediment is handcleaned out to avoid plugging the disposal system. The building is warmed by about 90°F propane-heated water circulated through four 200' circuits of ¾" diam. polybutylene pipe placed in the concrete floor--one circuit in each quarter of the floor. The foundation exterior must be insulated to conserve floor heat. Double 80- watt bulb fluorescent light fixtures are located on 10' spacings around the edge of the ceiling. About $15,000 was spent for concrete, insulation, bracing, sheeting, heating, electric wiring and lighting. Labor was extra.

MACHINERY/GRAIN STORAGE



Deteriorating lower walls and floor were threatening the collapse of this very large 36'x98' otherwise stout pioneer-farm, two-story barn (circa 1915). Ranching and grain farming had replaced dairying and the owner urgently needed machinery and short-term grain storage. In 1965, having to reckon with little money and yet wanting to preserve and use the pioneer structure, the owner invested about $2200 plus his own labor and a local carpenter's to renovate the building. The barn was jacked up to remove the rotted lower wall, and a new wall sill plus foundation with concrete floor was installed. The mow floor lumber was used to rebrace the walls. The 12'x14' side building was originally the milk processing area, with heater and wind-powered electric battery storage below. It now provides comfortable storage for selected agricultural pesticides. The result was a sturdy, usable, preserved building that has seen continued productive use for machinery storage, temporary grain storage, emergency calving shelter and other utility needs.

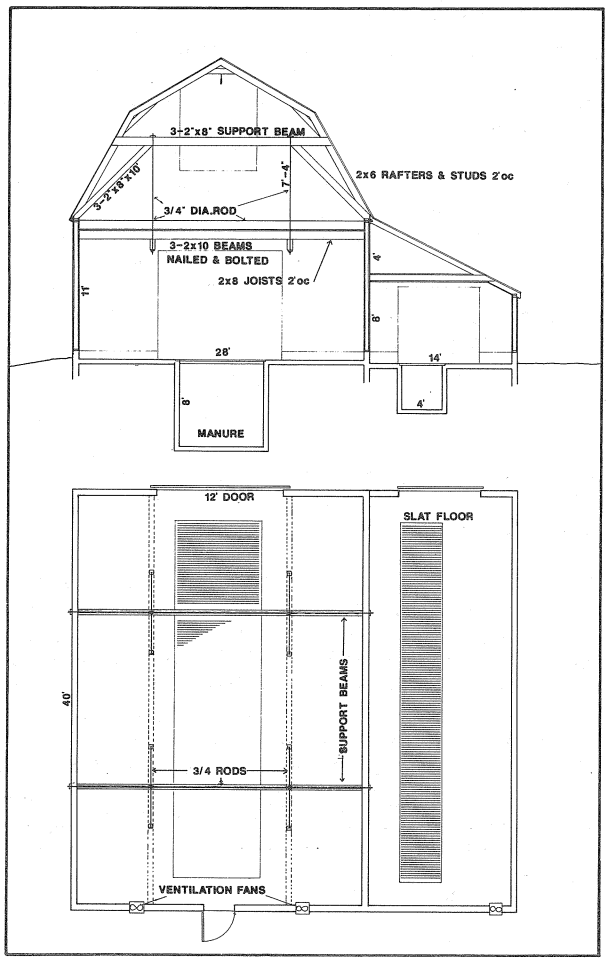
The practicality of lowering such a large old, building is questionable and requires skill and safety. A practical alternative would be to preserve maximum interior space, building strength and exterior historic appearance by raising the mow floor and supporting it with overhead trusses or beams.

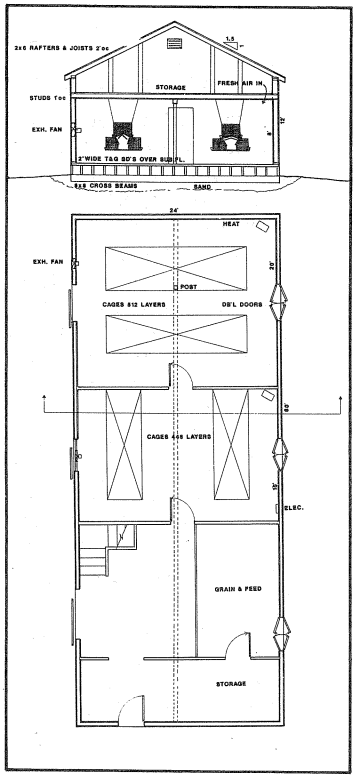
CLEARSPAN SUPPORT FOR HAYMOW FLOOR

Most two-story barns are constructed with close-spaced posts and beams to support the overhead mow floor load. These posts plus low (usually about 8') ceiling clearance interfere with flexibility. This is especially troublesome if the building is to be adapted to modern tractor machinery. The scheme illustrated shows the use of simple, built-up beams of 2" lumber which support ¾" diameter rods angling down each way and firmly anchored under the two mow-floor main support beams. The mow support beams were reconstructed using 3-2"x10"s nailed and bolted together with 28 ga. metal sandwiched between them. The mow floor was jacked up 4' higher and refastened to the studs just below the top wall plate to provide 11' clearance on the ground floor.

New lumber, used rods, carpenter and owner labor altogether cost $2500 in 1968 when the 1913 original 28'x40' dairy barn with 14' lean was converted to machinery storage. In 1977 it was further remodeled for feeder pig production. This remodelling included installation of the below- slatfloor liquid manure storages, insulation, sheeting, lighting and a supplemental heat and ventilation system for 14 farrow crates in the main barn and four nursery pens in the lean. Plans are now underway to readapt the barn to a repair shop.

In other situations, especially for larger buildings, larger and heavier truss rafter/beams have been similarly installed to support the mow floor. Added bracing is important to secure the support beams and concentrated wall loads. Careful design and installation is essential for this type of support post removal and use of clearspan support for a haymow floor. The building size and construction greatly affects the clearspan construction. Construction plans for old (and new) farm buildings are available through county extension offices or extension agricultural engineers at state Land Grant universities.





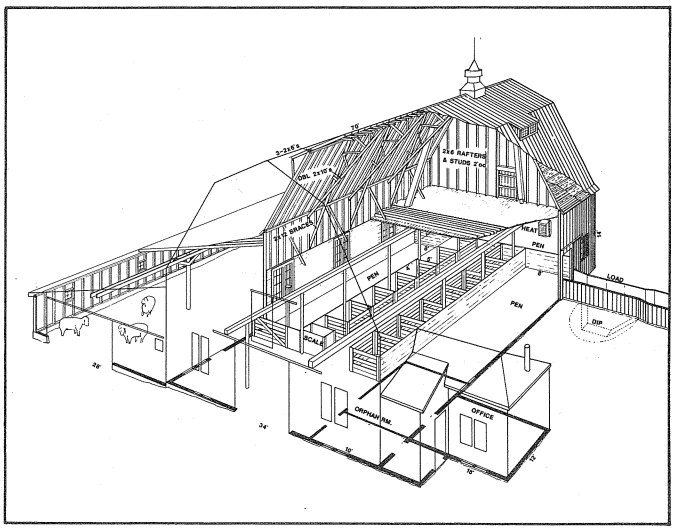
POULTRY EGG LAYING

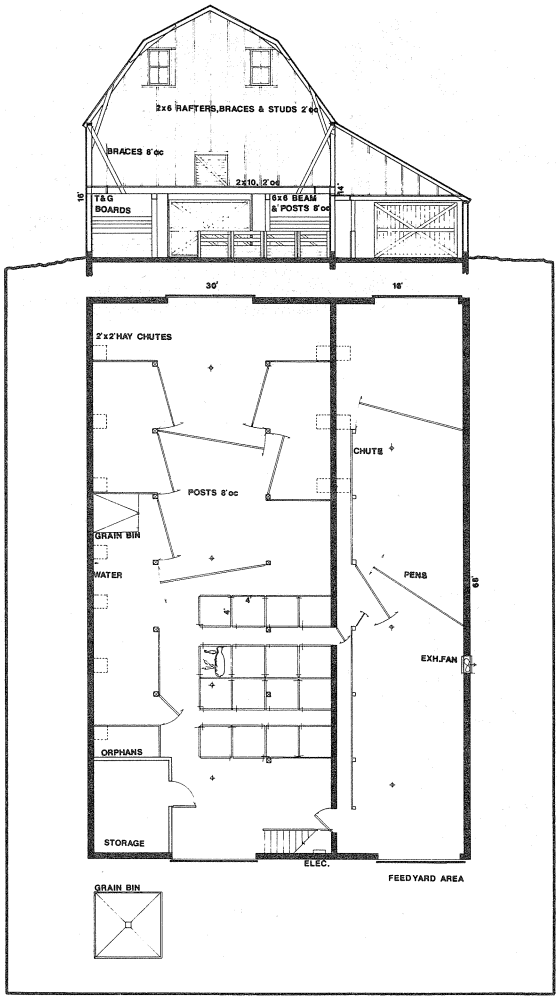
Originally used for storing coal and selling freight at a railroad site in a nearby town, this stoutly made 24'x60' building was made available at no cost in 1980. Originally supported on raised, spaced concrete piers, it had a sturdy wood floor with 3"x12" joists on 1' centers. This type of construction helped keep down raising and moving costs to $2200.

The building was moved and placed on spaced 8"x8" pressure- preservative treated crossbeams laid on a layer of built-up gravel to avoid cost of permanent concrete. Four sets of used step-type layer cages for 960 hens were fitted into the two rooms. A local restaurant market was developed and kept steadily supplied with farm-graded fresh eggs as 512 layers were started in one room while the 448 in the other room were in full production or vice versa. Heat can be supplied in the rooms by portable catalytic heaters during subzero, windy weather. A small exhaust ventilation fan in each room is set to operate at 65°F with a larger fan set to operate at 80°F. Fresh air enters through several small adjustable ceiling inlets near the wall by the double doors. Manure is dropped onto a layer of straw placed under the cages. It is hand-scraped out the side wall double doors every other day and a clean layer of straw put down.

EWE LAMBING - NURSERY

Redesigned for practical sheep research in 1968, this 34'x70' doublewalled barn was originally constructed for 32 cows in stanchions with four 8'x12' maternity and calf pens. To preserve appearance, minimize maintenance and assist the insulation, the barn exterior was sheeted with white painted metal in 1979. Ewes, wintered outdoors, have access to the 28' wide lean which was constructed in 1970 for $8,000. Lambing in early January, shorn close-up ewes are penned overnight in one of the 8' wide pens in the main barn. Ewes with newborn lambs are penned in 4'x5' jugs for two to three days until lambs are mothered up. Straw and hay bale storage in the overhead mow provides temperature and moisture control in the heated, exhaust-fan ventilated lambing barn and reduces troublesome pneumonia problems. Orphan and bum lambs are penned in a separate room near the office to provide special care. Ewes with lambs are accumulated together from the jugs into eight-head ewe-lamb groups and then to 32-head ewe groups in two adjustable-size pens in the lean. From there the groups are moved to another barn and pen spaces to grow until weaned. Indoor pens are manually bedded with straw. Manure cleaning is done with a skid-steer loader. A 2'x6'x5' deep concrete tank was constructed in the old upright silo pit to dip sheep for convenient, effective tick control. The chute is also used for loading out sheep.

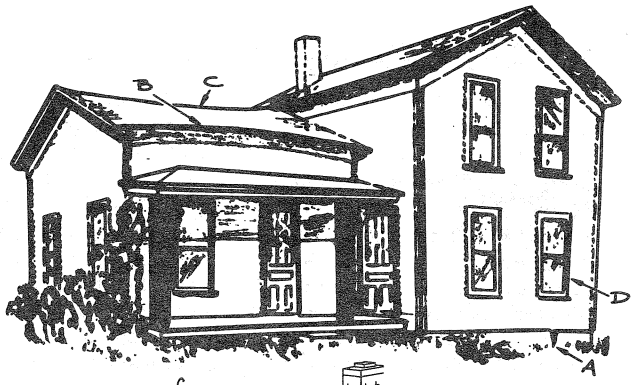




EWE HOUSING AND LAMBING

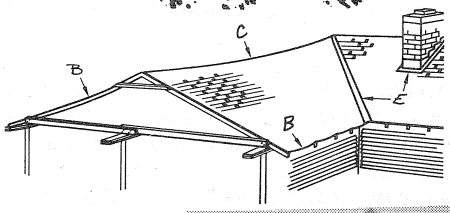
Constructed in 1910 for draft horses and cattle, this 30'x68' gambrelroof barn with 16' lean was revamped for sheep in 1980 to provide needed income and use existing pasture and winter labor. Few structural changes were needed, but about $2000 was spent for insulation, ventilation, sheeting, gates, pens, equipment, etc.--plus owner labor. Some 250 ewes are now fed outdoors and sheltered in the lean overnight. Hand-feeding and watering is done in pens during early-spring lambing when ewes with newborn lambs are penned individually for several days to bond together. The chute assists penning ewes for mothering-up lambs and is also used for treating and sorting during the year. The overhead mow extends over the entire barn space to provide straw and hay storage plus ceiling insulation. A portable oil-fired 140,000 BTU heater supplies temporary supplemental heat in severe weather. Ventilation air moves naturally up and out through the manually adjustable 2'x2' mow-floor hay chute openings and fresh air enters the barn space through daily adjusted windows in the walls. An exhaust fan forces air out of the lean. Pens are bedded with straw and feeding-watering done manually. The interior walls are sheeted with 1" boards. The two hoppered grain bins are filled via a portable auger. A low profile utility tractor with front-end loader is used for periodic manure cleaning.

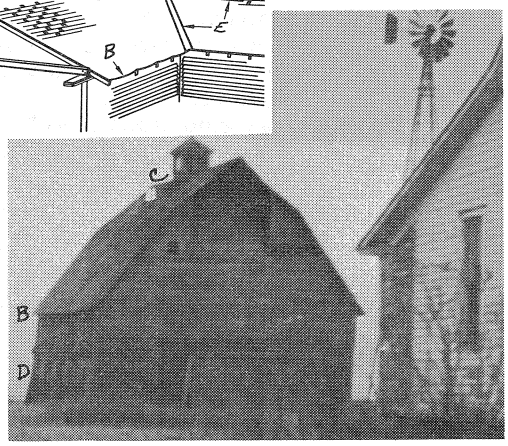
RENOVATING OLD BUILDINGS



Construction of buildings includes the foundation, wall, roof and interior components. When considering renovation, assess what is already in place and how changes will affect related components like access for vehicles/people/animals, electricity, waste handling, water, feed, etc. (see p. 1, evaluation).

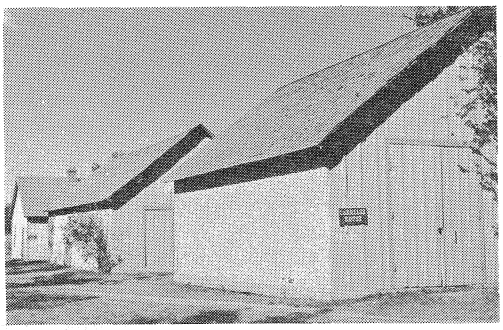
Foundations settle or heave because of concentrated overloads, freezing/thawing differences around the building and degeneration of the foundation material. This results in a building badly out-of-square as evidenced in the drawings by (A) large cracks, (B) eaveline distortions, (C) sagging roof ridges and (D) loose-fitting or stuck windows and doors. Most houses have several interior crosswalls which aid wall and roof strength. Few such interior walls are in large, open farm service buildings. Inadequate bracing and/or deteriorated framing and fasteners, too, cause sagging and uneveness at eaves, roof ridges and rafters. A strong crosstie or floor and ceiling joists are needed to prevent walls from spreading outward. Flashing (E) is needed at roof intersections to prevent leaks yet allow for contraction and expansion.

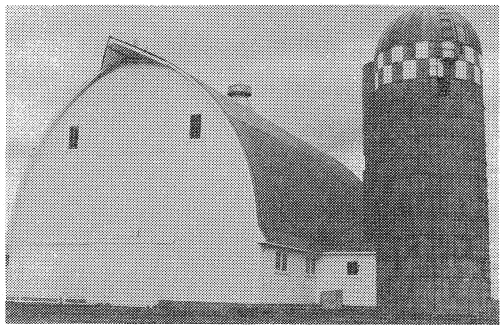




Foundation faults distort the framework of a building, causing problems with moisture and air leakage, loosening of framing and sheathing, and the fit of doors and windows. Usually it is necessary to raise the building's wall and sills to reinforce or replace a continuous foundation. A post-beam type foundation is a practical replacement. Sometimes old foundations can be straightened by jacking them back into place and restrengthening. Similar techniques are needed to replace individual interior posts and other support frames.

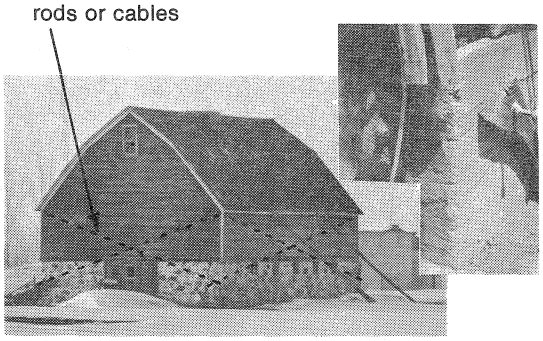
Walls need periodic repair and repainting to tighten and improve appearance. If it is still serviceable, utilize the existing siding to preserve the building's original appearance--if severely deteriorated, carefully sheeting over it with painted metal or other large weatherproof sheeting is a practical alternative. Energy saving and comfort is improved by installing removable insulated panels, storm doors or windows over existing doors and windows.

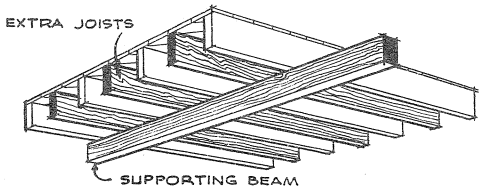




Material used in old farm buildings that are still around today was usually of durable quality if correctly installed and the building properly maintained. The above photos show appearances of such farm buildings. The stables (left photo) at the Chateau Marquis de Mores homesite, Medora, N.D. are nearly intact after 100 years of wind, sun, blizzards and public exposure. Many old buildings yet in hard use (right photo) have a pleasant appearance and remain serviceable because of regular painting, shingling and repair.

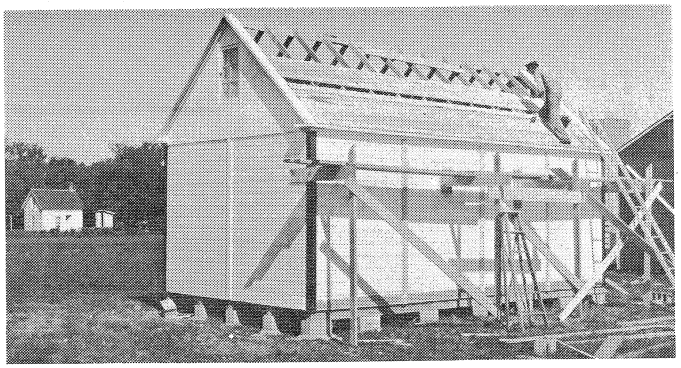
Roofing receives constant wear from wind, moisture and sun and usually needs replacement on old buildings. Leakage is more likely to occur at eaves, valleys and around projections





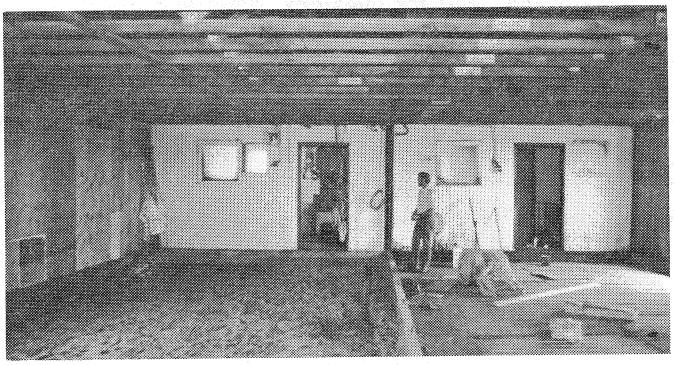
A beam or extra joists can strengthen weak floors.

Sagging buildings can sometimes be repaired rather simply. Cracked and sagging foundations can be reinforced in place with foundation buttresses (left photo). In addition to, or in place of, brace posts (right photo) use 1/2" diameter or larger rods or cables from corner to corner (note dashed lines) on walls to straighten buildings. Long threads at ends or with trunbuckles near the center permits a gradually 'drawing' the building back into a vertical, square shape. These can be left in place (photo inset) or corner braces installed.



through the roof. Removing the old roofing reduces roof weight, permits securely fastening new roofing to the roof framework and replacement of rotted roof boards or purlins where needed.

Interiors of buildings include flooring and inside surfaces. Severely cracked, heaved or deteriorated floors usually need to be removed and replaced. Rot, rodent and insect damage affect interior durability and future service. Thick insulation is important for controlling condensation and providing reasonable temperature control in cold or hot weather--especially for baby animals and with farm shops. Protect insulation with a correctly-installed vapor retarder plus durable sheeting. Heating, ventilating, water, electric wiring and waste handling systems may be required or in need of replacement.

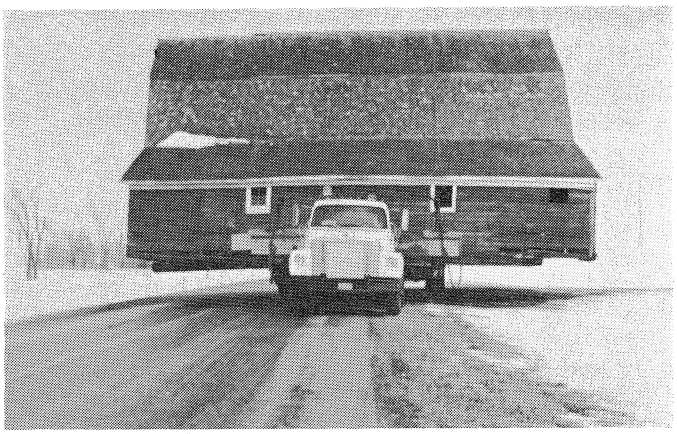


Investment Tax Credit Available

An added benefit of preserving an old farm building is the investment tax credit for rehabilitation of historic buildings. It is one of the few investment tax credits still available. A 20 percent credit is allowed for certified rehabilitation of buildings listed on the National Register of Historic Places. A 10 percent credit is also available for buildings that are over 50 years old but not listed on the Register.

To qualify, a building must be used for income-producing purposes. (This excludes the house you live in but includes most farm service buildings.) Rehab costs must be greater than $5,000 or the adjusted cost basis of the building, and 75% of existing exterior walls must be retained.

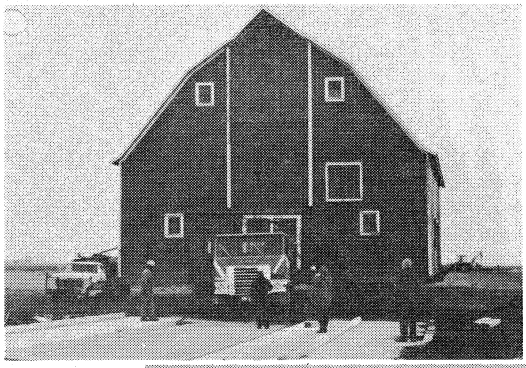
For more information about this and other preservation incentive programs, contact your State Historic Preservation Office.



MOVING OLD FARM BULDINGS

Moving an old farm building to a new site is sometimes a practical alternative compared to new construction --although it is better to use an old building "as is" and where it is. Often there are used buildings in the community which the owner wants to get rid of. Usually a single-wall farm service building weighs much less than a plastered, double-wall house and moving damage is tolerable. Their larger size sometimes presents overhead and highway width clearance problems. This requires special permits and preparation. Farm buildings can be moved on skids or timbers overland short distances--especially on frozen ground with little snow. Heavy duty wheels to carry long, thick building support beams are needed for moving a building over several miles.

Professional building movers are available in most areas. Consult at least three different movers to obtain price estimates, licensing, insurances, timing and to determine special problems such as overhead wires, railroad crossings, communication lines, roadway use and associated permit needs. For additional suggestions, visit with local persons who have had buildings moved.



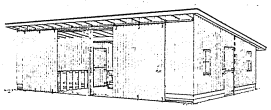
A new dairyman expanding on very limited capital in 1983 advertised for and located this unused 38'x64', two-story, tie-stall barn. Although over 22 miles away, and across two railroad crossings plus a large overhead electric powerline, the moving costs were held to $7000 because of a skilled, well-equipped mover. A new concrete foundation, floor, gutter cleaner, waterline installation, electric wiring, milking equipment and labor brought the total cost to $30,000. This provided space for 30 cows, a 16'x20' milkroom addition and overhead hay storage.

Continued from front page

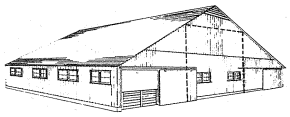
The following list is useful for estimating renovation needs. The least amount of renovation is usually the most practical. More information is available in the publications listed below.

1. Foundation repair
2. Sill, stud and post replacement
3. Material for windows, doors
4. Siding and roofing repair
5. Insulation and vapor retarder
6. Supplemental heaters, fuel storage
7. Ventilation, fans, inlets, controls
8. Floor repair/replacement
9. Pen partitions
10. Feed storage and conveying
11. Water system, waterers
12. Electric wiring, lighting
13. Wall and ceiling sheeting
14. Painting
15. Waste handling
16. Landscaping, drives, fencing

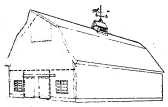
Farm Buildings have different shapes and sizes. It simplifies communicating with contractors, suppliers, lenders and others to know building terms and roof shapes. A few are listed here--more information is available in the publications listed.



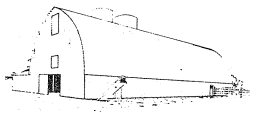
Shed or single-slope roofs are usually 30' or less wide. Common uses are for machinery storage, livestock or feed shelter.



Gableroofs have two equal slopes and usually span over 24', although truss rafters and added post-beam roof supports (note dashed lines) are used for increased widths to over 40'. Typical gableroof buildings are used for grain storage, livestock, poultry and farm shops.



Gambrelroofs usually are 26' to 36' wide with overhead post- supported mow or storage space and livestock below. Gambrelroof (often incorrectly called 'hiproof') rafters have varied construction and design.



Archroof buildings are usually clearspan and used for livestock, grain and machinery storage. Widths from 26' to 50' are common. Like gable and gambrelroofs, archroofs vary in slope and construction. A second floor is an option.

MORE INFORMATION ON USING OLD FARM BUILDINGS

1. "Catalog of Farm Building Plans & Planning Handbooks", Midwest Plan Service, Iowa State Univ., Ames, IA. 21p., 1987.
2. "Small Farms Livestock Buildings and Equipment," MWPS-27, Midwest Plan Service, Iowa State University, Ames, IA. ($6) 83pp. 1984.
3. "Farm and Home Concrete," MWPS-AED26, Midwest Plan Service, Iowa State University, Ames, IA. ($1.50) 8p. 1986.
4. "Foundations for Farm Buildings", Farmers Bulletin No. 1869, U.S. Dept. of Agric., Washington, D.C., 32p., 1976.
5. "Renovate An Old House", Home & Garden Bulletin No. 212, U.S. Dept. of Agric., Washington, D.C., 21p., Rev. 1984.
6. "Living on a Few Acres," **1978 Yearbook of Agriculture**, U.S. Department of Agriculture, Washington D.C.
7. "Born Again Barns," **Successful Farming**, 1716 Locust St., Des Moines, IA.
8. "Remodeling Ideas for Farrowing Facilities," **Pork Industry Handbook**, Leaflet, #P1H-78, Animal Science Department, Purdue University, Lafayette, IN. 1981.
9. "Housing Your Sheep Flock," Circular A2830, University of Wisconsin, Madison, WI. 1977.
10. Cable, Carole **Adaptive Reuse--Barns** (Update of Biblio. #A134). Architecture Series: Biblio. #A705, Vance Bibliographies, P.O. Box 229 Monticello, IL, April 1982.
11. Mountains/Plains Regional Office, National Trust for Historic Preservation, 511 16th St., Denver, CO 80202.
12. State Historic Preservation Office. In North Dakota contact: Division of Archaeology and Historic Preservation, Heritage Center, Bismarck, ND 58505.

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