



Selecting the Type of Farm Building

Consider the following to help decide the type of building that will best serve your needs. Considering these factors and applying ideas from sources referred to in the right-hand column of the center-fold table will help provide a functional and economical building.

Use a plan—Show dimensions, basic construction details, door locations, windows, and other features to others so they can make a materials estimate, cost estimate, authorize a loan, or suggest improvements. An agreed-on plan should be a part of the signed contract to avoid misunderstandings.

Cost—Estimates from at least three different suppliers will help establish realistic costs. Use a plan so estimates are based on materials of similar quality and quantity. Check that delivery location and construction labor are comparable.

Width, length, height—Length over three or four times the building width is highly questionable. A round building encloses the most space for the least exterior surface area. A square building is nearly as efficient but widths over about 80 feet (especially clear span) can be a limiting factor. Most heated buildings have 8- to 12-foot-high walls and a flat ceiling to conserve heat. An inside clearance more than 16 feet is seldom needed except for hay storage barns and some machine sheds.

Design loads—A building must support its own weight, loads from stored products (hay, grain, etc.), snow, and wind loads. A minimum snow load of 25 pounds per square foot on the roof should be used for design purposes. This may increase to over 100 pounds per square foot for high snowfall areas and elevations. Wind load depends on wind speed, building height, and shape. An 80-mile-per-hour design wind speed is adequate except for along the coast and the Columbia River to past Pendleton. Design wind speeds as high as 125 miles per hour are used for those areas.

Other loads—In addition to snow and wind, a building must resist rodents, birds, machinery bumps, fire, weight of stored products, repeated pressure washings, poor ventilation, manure, airborne corrosion, lightning, and noise problems.

Durability—A written certification or warranty of design loads and material life should be available through the supplier. Words such as "water-resistant," "lifetime," "X% more" (than what?), "economical," "fire-retardant," and "guaranteed," can be misleading in building advertising and sales. Comparison to existing structures and reputation of the supplier are major checks.

Service—A reputable supplier or builder can supply references to previous work that has been done. Follow-through on time and reliable service by a good dealer is worth extra. Dealing with someone locally is more convenient than with someone hundreds of miles away, especially if the project is a large, complex building setup where delays can be costly.

Doors—Extra framing is needed for, say, 16- to 24-foot wide doors in sidewalls of clear span buildings. Using only end wall doors can give access problems in long buildings (over 80 feet). Provide a small walk-through door and a drive-through door for regular use.

Windows—Locate in the upper part of walls (not in the roof) for fewer leakage problems, more lighting, passive solar heating, and better cross ventilation. Provide a view from inside the shop, milking parlor, and house out to the farmyard for convenience.

Foundation and floor—Both affect building alignment, general drainage, dust control, manure handling, rodent access, etc. Pressure-treated poles need to be embedded at least 4 feet. Usually a concrete foundation is used with stud or post frame walls. A minimum 4-inch-thick concrete slab on compacted fill is required for durability. Install thickened edges at door approaches.

Materials—Wood is economical, especially for small or irregular-shaped buildings. Steel is used with large prefabricated construction. Concrete is durable but heavy to work with. Quality lumber is becoming difficult to find. Metal is a uniform quality material, but corrosion and bending are problems. Durability for fire, water, ice, termites, carpenter ants, people, and corrosion is needed.

Insulation—A stud-frame, truss-rafter building is the most practical to heavily insulate since framework simplifies interior sheathing. Pole frame, post frame, rigid frame, arch roof, and concrete buildings are more applicable for uninsulated buildings. Cover insulation to protect against birds, rodents, moisture, and mechanical abuse.

Appearance—A pleasing shape and color that blends with other buildings on the farmstead is desirable for a new building. Large doors can be unsightly. Consider landscaping with trees and shrubs for shade, screening, and reduction of noise.

Alternate uses—Flexibility for more than one use can spread costs, but avoid building for so many uses that the structure is not good for any. A hay shed can be used for lambing, for example, but a machine shed usually is not durable enough to use for hogs.

Expansion—Consider how and where future additions can be made to the new building. This affects door locations, sidewall height, roof drainage, manure handling, and access.



Planning Farm Buildings

A farm building purchase is a major project that is not often repeated. Frequent changes in construction methods, building designs, and layout arrangements, plus the availability of new building materials make it advisable to review current literature prior to selecting a specific structure. This exercise will help the buyer obtain a more functional and practical farm building. Sources of plans and additional planning information are listed. These are available (costs range from \$1.00 to \$10 per item) from the Western Regional Agricultural Engineering Service (WRAES), Oregon State University, Corvallis, OR 97331 (phone 754-4021).

Before beginning construction, consider the complete farmstead arrangement, and where future buildings will be situated. Sketch alternate locations for buildings and major facilities to help determine the best locations to build now and in the future. At this stage of planning it may help to avoid details of each building planned. A simple oval or "X" will suffice to show where to locate a barn or pump house.



Types of Farm Buildings

When planning a specific building, consider the various types of construction (shown below). The various types of farm buildings have different names and it improves communication to refer to these with proper terminology.

Braced rafters are used in two-story barns to gain clear spans up to 40 feet wide. Rafters are usually on 2-foot centers.

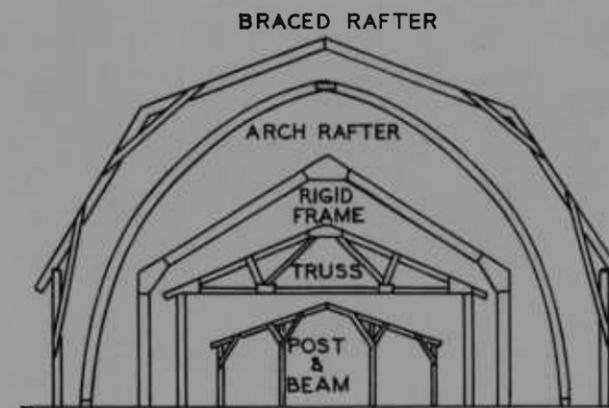
Arch rafter, round roof, or gothic buildings provide high, clear span areas up to about 40 feet wide. "Quonset" is a trade name for this type.

Rigid frame buildings have the wall and roof frames together in a single unit. Widely used with steel buildings, these can clear span to approximately 60 feet.

Truss rafters can be used with pole frame, post frame, stud, and other kinds of walls. These work well for buildings with ceilings as the lower chord provides the ceiling framework.

Post and beam roof support is simple to build. Clear span is limited to about 20 feet between rows of poles.

Prepared by Dexter W. Johnson and Hugh J. Hansen, Extension Agricultural Engineers, and Martin L. Hellickson, Agricultural Engineer, Oregon State University.



Extension Circular 1076

OREGON STATE UNIVERSITY
EXTENSION SERVICE

Extension Service, Oregon State University, Corvallis, Henry A. Wadsworth, director. Produced and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Extension work is a cooperative program of Oregon State University, the U. S. Department of Agriculture, and Oregon counties. Extension invites participation in its programs and offers them equally to all people.

June 1981

