Farm Buildings

In the UK there are about 180,000 farms which are stocked with over 11 million cattle, 6 million pigs, 20 million sheep and 155 million poultry and grow over 5 million hectares of arable crops. Most farms have a farm house for the farmer to live in and a range of buildings suitable for the various enterprises on the farm.

Traditionally farms were small and because they supported a number of activities, had a mixture of buildings suitable for housing animals and storing crops and machinery. Many farms had stables to house working horses combined with a barn to store straw used for bedding. Cows were housed all winter tied up by the neck in stalls, two to a stall. In the 18th century pigsties became common and the pigs were fed on waste from butter and cheese manufacture.

Over recent decades farming has become more intensive and specialised and buildings very much larger.

Construction methods

The choice of building materials and components and the way they are put together has a considerable bearing on the appearance and performance of a building.

Traditional buildings were constructed of local materials, such as stone, timber, slate, thatch and clay (fashioned into bricks and tiles), and they blended well into the rural landscape. Because of their method of construction it has often proved difficult to adapt them for modern farming practice where good access and unrestricted space is required for the operation of large machines such as tractors, telescopic loaders and fork lift trucks. However it has been possible to maintain many of these attractive buildings by changing their use and converting them into domestic housing,

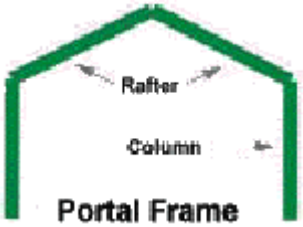
craft and tourist centres and offices. Although the outside appearance has been kept, inside the space has been radically altered to meet the requirements of modern society.

The history of modern farm building can be traced to the development of wide span roof trusses and the use of steel or asbestos sheets. Traditional buildings of the early 1800's were limited to economic spans of 6m for livestock and 8m for arable. The late 1800's saw the introduction of steel as a roofing material and now spans of 40m+ are achieveable. This reduced the weight and cost of roofing and allowed very large buildings to be economically constructed. There are three main forms of building construction:

- Frame construction
- Load bearing wall construction
- Pre-fabricated timer frame construction

Frame construction

This type of building, sometimes described as a 'umbrella' building, is usually constructed of steel portal frames (steel columns and rafters), spaced 4.8 to 6 m. apart and with a clear span of 10 to 30 m. The infill walls between the columns are filled with brick or concrete blocks and/or steel, fibre-cement or timber cladding, and the roof covered with steel or fibre-cement.



The number of advantages of this structure are:

- **Rapid construction.** The frame can be normally be erected in a day and the roof cladding in a week which then protects the site from the weather and allows walls, floors and internal fittings to be completed without interference from poor weather conditions.
- **Clear space.** Since the internal layout is independent of the walls and roof, any arrangement of internal divisions and fixtures can be accommodated.
- **Versatility.** The use of the building can be changed at any time to meet changing farming policies by simply removing or adding divisions.

This type of structure is commonly used for the bulk storage of crops such as grain or potatoes, the housing of dairy or beef

cattle, indoor riding centres and the storage and maintenance of farm machinery.

Load bearing wall construction

Load bearing walls support the roof and are usually made of bricks or concrete block. Stone is normally too expensive, but artificial or reconstituted stone can be used. This construction method is used for most domestic housing and smaller farm buildings. It is not easy to change the use of this type of building because walls, internal divisions and the roof are integral parts of the structure.

Because of the smaller scale of these buildings they are used for calving pens, horse stables, milking parlours and dairies.

Pre-fabricated timber frame construction

Wall panels in lengths of 2.5 to 3m are made in a factory with a timber frame and cladding of timber, plywood or fibre cement. The panels are then bolted together on site on a dwarf wall to form external walls and internal divisions. Simple timber roof trusses are erected on the walls and the roof is clad with, aluminium, steel or fibre cement. The structure are light, relatively cheap and are commonly used for the housing of poultry, pigs or horses. Since they are designed for a specific use, they are difficult to convert for alternative purposes.

Farm Buildings

As well as a farm house for the farmer and cottages for farm staff there will be a range of other buildings depending on the farm enterprises:

- Housing for livestock to protect them from external elements such as rain, snow, wind and to reduce temperature fluctuations.
- Storage for crops, machinery, fuel oils, chemicals, fertilisers, manure and livestock feed.

- Housing for the processing equipment for grain, vegetables, fruit and livestock feed.

As farm practices change so does the type and use of buildings. A good example of this is the processing and storage of grain.

Barns that were used to store grain had two sets of doors facing each other. Between the doors lay the threshing floor where the grain was separated from the chaff. Opening both sets of doors caused a draught which winnowed the chaff away. The word threshold is derived from the threshing floor. Corn was threshed throughout the year whenever it was required.

In 1784 Andrew Meikle's invention of the threshing machine necessitated a wheelhouse to house the horse that powered the threshing machine. Such houses are circular buildings in which horses were yoked to a shaft. The horses trod a circular path to power the threshing machine in the barn next door by means of simple gear.

In the next century steam power replaced horse power. This meant a small engine house and chimney had to be built beside the barn. By the end of the century some had been replaced by small petrol engines. Indeed before the introduction of the petrol engine many farmers relied on a mobile steam engine which served a number of farms.

Today farmers use a combine harvester which harvests and threshes the grain which is then stored in a grain store with grain drying facilities.

Dairy Farms

Fresh milk is produced all the year round. Dairy cows are housed indoors during the winter, usually in a portal frame building either fitted with cow cubicles where the cows can lie down individually or housed in small groups in loose straw yards. Two or sometimes three times a day the cows are herded together in a collecting yard, moved in groups of six to twenty depending on herd size into the milking parlour and after milking returned to their lying area or to the field. Milk is stored in a cooled storage tank in a dairy next to the milking parlour and is collected daily by a milk tanker for bottling or processing at a local dairy company.

In addition a dairy farm will have a feed silo for storing cattle feed, a silage clamp for storage of grass or maize silage, calving pens for the birth of calves, pens and straw yards for the housing of calves and young cows, a straw barn and storage for farm yard manure and/or slurry (liquid manure).

Pig units

Pig production is now mainly a specialist enterprise and buildings are provided for the breeding pigs (sows and boars), maternity pens for the birth of piglets and pens for growing pigs. To meet welfare considerations, most sows are now housed in groups in straw yards and growing pigs in small groups with access to straw. The buildings are heavily insulated to keep the pigs warm in the winter and cool in the summer and have mechanical ventilation systems to keep the air fresh and clean.

Poultry units

Egg and poultry meat production have become the most specialised and sophisticated of all livestock operations. The birds are housed in cages or on deep litter in purpose built units which are long and low, having high levels of insulation in the walls and roof and computer controlled ventilation systems. This level of environmental control is necessary to provide good health and welfare conditions for the large number of birds under one roof and to make the enterprise financially viable.

Arable farms

Large scale production of grain, potatoes and other crops has lead to the development of buildings, usually of the portal frame type, not only to store the harvested crop under environmentally controlled conditions, but to store the seed, fertiliser, pesticides, machinery and fuel oils.

One area of remarkable change in farm buildings is the storage of potatoes. Fifty years ago the potatoes, which were harvested in the autumn, were stored during the winter in field clamps made of straw and soil. When the clamps were opened up, many of the

potatoes had to be thrown away because they were rotting due to frost or water damage. It was very difficult to buy good quality potatoes in the spring and summer until the new crop was harvested. Now it is possible to buy good quality potatoes all the year round from the supermarket because of the sophistication of the modern potato storage building. The temperature and humidity in the stores are accurately controlled by a combination of insulation and mechanical ventilation so that the potatoes are in a perfect condition.

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