

# Designing Agricultural Buildings

Architects and building designers often quote the phrase “form follows function”. In the design of agricultural buildings this is certainly true. The most successful designs of agricultural buildings follow from an understanding of what the building is for. This then informs decisions on location, size and materials as well as what other structures and engineering may be required to make it work. These decisions are also influenced by legislation, the planning process, welfare regulations, health and safety, as well as economics.

## What the building is for

There are many very different building types; crop storage, livestock housing, machinery storage, food processing and growing plants (horticulture). The best location for the building may be decided by access to other related facilities, access for transport, availability of services, distance from dwellings, distance from watercourses or routes of public footpaths. The size and shape of the building may be decided by for example, the size of a hay bale, animal ages/sizes, the turning circle of machinery, the size and tipping height of a vehicle or the height of a growing bench. The materials for the building may be decided by the need for light or darkness, access, security, heat retention or ventilation.

Whether for a new business or in support of your existing one you should be clear about what the building is for and how you are going to use it so that you and your designers can make more of the right decisions.

## Location

It can often be an advantage to put a new building close to existing ones. This minimises the impact of a new building on the landscape and reduces additional transport costs. It can also reduce handling, either materials or livestock between buildings and can take away the requirement for a new access and track. It is still worth looking at new sites if they are available because it may improve bio-security, reduce travel distances and times from part of the farm, separate stock from hazardous materials, remove odours or noisy operations from dwellings and free up existing buildings for other development.

The best location will be the one which meets most of the requirements of the use and takes advantage of existing levels and features. This might mean good ventilation and ease of muck handling for a livestock building, good access and minimal travel distances for a grain store or a large level site with minimal potential for light pollution for a glass house. If possible, thought



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should also be given to potential growth, allowing space around the building for future expansion.

### **Shape and size**

For livestock, crops and machinery different uses require different sizes. A building for intensive poultry will be very different from a building for wintering a dairy herd. Likewise a building for boxed potatoes will differ from a bulk crop store. You will need to consider the optimum conditions for the livestock, crop or machine, but also the access requirements for staff and machinery for cleaning, loading, feeding or maintenance. The space requirement may also be dictated by the market you wish to sell into, the quality assurance schemes that are applicable, or the animal welfare standards that need to be adopted. Sometimes consideration needs to be given to a building which is easily adaptable, e.g. designing for a bulk floor storage system may rule out some more lucrative markets.

Generally the closer the shape of the building is to square, the cheaper it is to construct. However there are other considerations, for example standard bay sizes for a steel framed building which mean off the shelf components for purlins and cladding rails and maximum spans for rafters. This might mean a cubicle building is designed around the size of the cubicles, feed requirements, access to water and scraper width but fitted into a multiple of standard bay sizes.

### **Materials**

The materials used in your building need to be robust enough to stand up to the use inside and also to anticipated traffic outside. For a livestock building this means being strong enough to withstand the animals themselves as well as vehicles used for feeding and cleaning out. For crop storage this may mean being strong enough to take the weight/load of the depth of crop as well as withstanding impact from vehicles used to load and unload. There are also other considerations: in a livestock building you may need a material on the roof which will reduce condensation; for some bulk storage you may need to avoid galvanised steel. There may also be restrictions on the external appearance of the building either to fit in with existing structures or to reduce the impact on the landscape.

While economics are important it is equally important to think about security, both from human intervention and bio-security which may have an effect on the choice of materials.

### **Designing the building**

Time spent thinking through exactly what the building is for will mean that you and your designers ask the right questions about where to put the building, what shape and size it needs to be and the materials for its construction.

Acorus can help with the design of your building as well as guiding you through the planning process.

