



# Humane Handling of Livestock

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This is the downloadable version of the online guide. As such, some of the features are missing, including video footage and web links. The online version may be accessed at [www.hsa.org.uk](http://www.hsa.org.uk)

## Introduction

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An essential part of all livestock systems is the effective, safe and humane handling of animals.

These guidance notes concentrate on the handling of animals in markets, during loading and unloading for transport and up to the point of slaughter. However, the same principles are also applicable to on-farm movements. During transport, at markets and slaughter, animals are handled by unfamiliar stockmen in unfamiliar environments. Under these circumstances even normally calm animals can become stressed and agitated, making them more difficult to handle than usual. This guide focuses mainly on cattle, sheep and pigs but can also be applied to other commonly farmed animals.



This guide explains the methods available for moving various species, how facilities should be set up and maintained, and highlights the associated animal welfare and operator safety implications. In addition to reading these notes, it is recommended that instruction and training is sought from qualified and experienced livestock handlers. It is also recommended that newly-trained operators work under experienced supervision.

Everyone involved with the handling of livestock has a responsibility for the wellbeing of the animals in their care. All livestock handlers should be familiar with legislation and codes of practice applicable in markets, during transport and up to the point of slaughter.

## Important Points About This Website

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This guide is intended to assist operators involved in handling livestock. Handling livestock can be dangerous. You are advised to follow your employer's recommendations and procedures with particular care. If you are in any doubt as to any aspect of the safe handling of animals or the operation of handling systems, you should consult your manager or the manufacturer. In no circumstances can the Humane Slaughter Association (HSA) accept any liability for the way in

which animals are handled or handling systems are used, or any loss, damage, injury or death caused thereby, since this depends on circumstances wholly outside the HSA's control.

The HSA aims to provide up-to-date and accurate information. If you have suggestions for improving any of the material included in this guide please let us know at [info@hsa.org.uk](mailto:info@hsa.org.uk) or using the contact details provided at the HSA website.

## Basic Principles

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The objective of humane animal handling is to move animals with minimum stress to both the animals and handler. Considerate handling reduces the risk to the animal of pain, injury and suffering. Unfamiliar surroundings, noisy and aggressive handling, and the proximity of unknown animals or people can cause even the calmest of animals to become difficult to handle and much more likely to cause injury to themselves, other animals or handlers.

Handling, especially by unfamiliar handlers, has the potential to be a highly stressful experience for animals. By working in a quiet, calm and considerate manner, handling can be carried out efficiently, with less effort and with less likelihood of the handler or the animals becoming stressed or injured.

### Stress

Some stress is a normal part of an animal's life, but it becomes a problem and causes suffering when it is severe or prolonged. The factors which can cause stress are called 'stressors' and these include, for example, noise, unfamiliar surroundings, unfamiliar animals and dogs.

Although many animals might be able to tolerate a single stressor for a short period of time, multiple stressors over a long period of time, or a severe single stressor, can produce adverse effects and compromise animal welfare.

The ability of an animal to cope with stressors depends on the:

- Genetic background of the breed
- Animal's past experience
- Type of stress factor
- Intensity and duration of the stress

For example, in markets, animals which have been frequently handled or have been in a similar situation before will be more able to cope with this situation compared to those that have not previously left the farm. It is important to remember that some degree of stress may be almost inevitable in handling livestock, but the aim must be to keep this to a minimum.

Prolonged stress must be avoided in all circumstances. It can reduce the ability of the animal's immune system to fight diseases, especially in young animals. In some breeds of pigs, stress can lead to sudden death.

In slaughter animals, the physiological changes associated with stress can affect the quality of the meat. When an animal is handled and slaughtered humanely, there are low levels of lactic

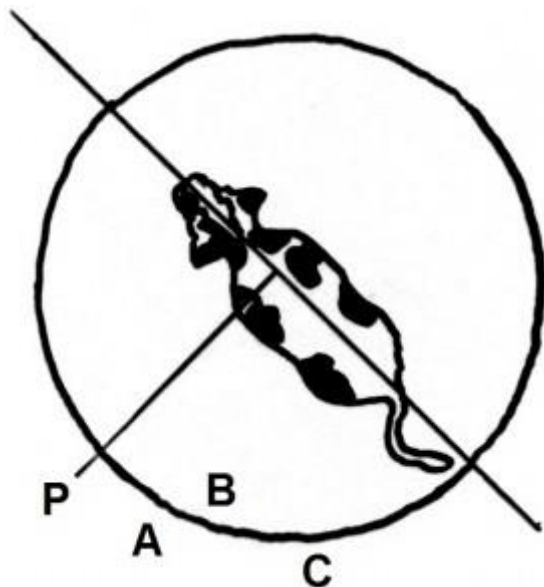
acid and high levels of energy left in the muscles. As such, the meat undergoes a number of reactions post mortem which result in tender, good quality meat. If the animals are stressed prior to slaughter the post mortem changes are affected. Stress immediately prior to slaughter causes a rise in the lactic acid levels. This affects the muscles and they become pale, soft and exudative (watery), a condition known as PSE, which is most commonly found in badly handled pigs. In animals which are exposed to long-term stress (i.e. 24-48 hours prior to slaughter), muscle energy reserves are used up and this adversely affects meat quality by causing a condition known as dark, firm and dry meat, termed DFD. This occurs mainly in cattle exposed to difficult journeys. Both PSE and DFD conditions lower the value of the meat.

## Flight zone

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The 'flight zone' is a concept used to describe a circle of space around an animal which, when entered, causes the animal to move away from you. The size of the flight zone will depend on the breed of animal and its previous experience. For example, hill cattle and sheep, which are not used to being handled, tend to have much larger flight zones than dairy animals which are handled daily. Non-domesticated animals such as bison and wild boar will tend to have much larger flight zones than their domesticated equivalents.

The actions of the handler can also affect the size of the flight zone: a noisy and aggressive handler will increase the size of the flight zone compared to a calm and confident handler who will be able to get much closer to an animal.



*Diagram of flight zone*

Knowledge of the flight zone helps when moving and controlling single animals or groups of animals. By positioning yourself on the boundary of the flight zone (position A), behind and to one side of the animal, the animal will not move. To move the animal forward, step into the flight zone (position B). To stop the animal moving forward step back out of the flight zone (position C).

If you enter the flight zone too far and get too close to the animal, it will start to move quickly in an attempt to get away. If the way ahead is free, the animal is likely to charge forward. However, if it is not, or if the route forward is not clear, the animal may turn and run towards you. If this happens you should step back out of the flight zone to stop the animal's movement and give the animal time to settle.

An important aspect of the flight zone is the point of balance (position P). This is found to the side of the animal, just behind the animal's shoulder. When you stand level with an animal at this point, the animal will neither move forward nor back. In the sale ring, if you position yourself at position A the animal should circle around you with little need for persuasion.

## Behaviour

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Understanding animal behaviour is essential for effective animal handling. With this knowledge the handler can move animals with better control and minimal effort. The key to good handling is thinking ahead of the animal at all times. Understanding how and why animals behave in the way they do in different situations helps the handler appreciate their actions and do the right thing at the right time to produce the required response.

The behaviour of an animal depends on a number of factors: its instinctive species-specific behaviour, the degree of domestication, the environment in which it has been raised and its previous experiences.

## Predicting behaviour

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An animal's behaviour depends partly on its ability to detect changes in its surroundings using its senses of touch, smell, sight and hearing. Once a change or a 'stimulus' has been detected by an animal it will assess the situation and react accordingly.

Animals will often produce the same type of response to the same stimulus, e.g. a young lamb will instinctively follow its mother when she moves. These in-built or 'innate' behaviours are usually relatively predictable, albeit modified by previous experiences. This knowledge can be used by handlers to encourage the animals to react in a given way.

Behaviours may be modified as a result of previous experiences and the animal's reaction to them. For example, if an animal has had a bad experience when loaded onto a lorry, loading the animal the next time will be more difficult, as the animal has learnt to associate the lorry with a negative experience.

# Species Characteristics

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Domestic livestock display different behavioural characteristics that reflect what they needed for survival in the differing environments in which they evolved.

## Sheep

Sheep are very social 'follower' type animals. From the first hour after birth when they start walking, lambs will instinctively move towards and follow large moving objects, usually their mothers. As they get older they will learn to differentiate and recognise their mother by sound, sight and smell.

Sheep are prey animals and have highly developed senses to keep them alert to danger. This includes wide, panoramic vision that allows them to continually monitor their environment for potential danger and see moving objects at long distances, though not in great detail. For example, they can see a moving dog (a potential predator) a long way off but will not react to one that is standing still. They always try to maintain visual contact with at least one other sheep and if they lose contact they will immediately try to restore it. An isolated sheep may run or jump at, and even knock down, a person between it and another sheep or the rest of the flock. Like cattle, they have good hearing and sudden noises startle them. Generally docile, sheep can be relatively easy to handle but their flighty, nervous nature can cause problems.

## Cattle

Cattle are social animals which naturally live in groups. They have a social hierarchy which becomes established over time; consequently any changes to the group can lead to aggressive behaviour and fighting as the social-order is re-established. They have a tendency to follow one another and are more easily moved and handled as a group than as individuals. In any group there will be a leader and once the leader moves the rest will usually follow. Being social animals, they don't like isolation and so will usually try to keep another animal within their sight. Despite their size and bulk they can turn and move quickly if handled badly.

Cattle have almost all-round vision (about 340°). However, they only see well in a relatively narrow field of view to the front. They cannot easily assess the identity, size or speed of unfamiliar objects in their peripheral vision and can easily be startled by sudden movement. Because they only see clearly directly in front of them, they have to stop and lower their heads and are likely to be suspicious of any new object until they have investigated it; this normal reaction can often make them difficult to move. In addition, they dislike dark, shadowy areas and can shy at the slightest thing. Cattle have a good sense of smell and dislike sudden loud noises. They can hear sounds at frequencies similar to, and higher than, humans.

## Calves

Cattle are 'calf-hiders': in the wild, cows will leave their young in nearby undergrowth and then go to graze, returning at intervals to feed them. In the early weeks of life, therefore, calves are not particularly active and do not follow their mothers. As they get older they develop the basic instincts of adult cattle but can be unpredictable. Their behaviour can be erratic and they are often stubborn and difficult to move. They dislike any sudden movement or noise and as with all animals must always be treated with consideration and patience.

## **Bison**

Bison are part of the family *Bovidae*, as are domestic cattle, and are generally not aggressive animals. However, they can be defensive. Their flight zones tend to be bigger than domestic cattle and they may be unpredictable if a handler enters their flight zone. They are usually peaceful and unconcerned but may attack anything, often without warning or apparent reason. Bison have poor eyesight but acute hearing and an excellent sense of smell. Bison are also unexpectedly capable of jumping over standard fencing.

## **Water buffalo**

Asian water buffalo have been domesticated for many centuries. Their behaviour and reactions towards humans are very similar to those of cattle. Entire males however should be treated with great caution as, like bulls of some traditional cattle breeds, they can become aggressive.

## **Pigs**

The pig's natural environment is woody undergrowth and its senses have evolved accordingly. Pigs have good, almost all-round vision (310°), similar to that of sheep, but they do not have good long-distance vision and, in certain breeds, the ears can restrict their sight.

Maintaining visual contact with each other is not a priority for pigs. They are more independently-minded and less inclined to follow each other closely, behaving as individuals or loose groups. However, they do maintain contact via vocal communication using a complex vocabulary of grunts and squeals. Pigs have good hearing and a very good sense of smell, using their noses to investigate their surroundings and find foods. This means they do not like to be hurried and driven forward, it is much easier to guide a pig in the right direction than force it. When pigs are exposed to rough handling they can express a fear reaction which can result in them piling on top of each other in an attempt to escape. In extreme cases this can lead to death.

## **Wild boar**

Wild boar have a larger flight zone than domestic pigs. Their behaviour is unpredictable, defensive and can be very aggressive. Handling wild boar effectively and safely requires patience, planning and escape-proof facilities. Even with regular handling these animals can still react aggressively towards handling and remain unpredictable. When transported to abattoirs, it is not advised to lairage them as they are very difficult to contain. Staff must always be aware of the dangerous and unpredictable nature of these animals.

# Facilities

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Handling facilities should be designed to minimise stress and avoid causing injury during handling. Designs which encourage natural behaviour will reduce the amount of effort required from the operator. In designing facilities, the requirements of both the animals and the operators need to be considered. It should always be remembered that, however good the handling system, the skill and attitude of the operator is critical in maintaining high standards of welfare.

## Animal factors

To minimise stress to animals during handling procedures, handlers should ensure that:

- The animal's natural behaviour is utilised
- The animals can walk at their own speed
- The surrounding environment is kept calm
- There are minimal distractions (including from noise and light)

To protect the animals from slipping and falling, handling systems should have floors made with non-slip surfaces (which are also non-abrasive). All other surfaces however should be smooth to help avoid injuries. The sides of walkways should have no protrusions or sharp edges and be built so there is a uniform appearance with no gaps or visible joints that might lead to baulking.

Animals prefer to move from darker to lighter areas. This should be taken into consideration, especially when loading animals for transport, as it is often darker inside transport vehicles than at the loading area.

In a well-designed and well-run handling system, animals will not become trapped or jammed and there should be no routine need for electric goads or other forceful handling aids. All systems should be designed to prevent injury and to keep animals calm whilst passing through them.

All systems should be designed to direct the animal down one clear route with minimal distractions. This will prevent confusion and stop the animals from turning and baulking, or refusing to move forward.

## Construction

Handling facilities should be robust, durable, hygienic and easy to use. They must be suitable for use in dirty, dusty, humid and/or wet environments and be able to be cleaned by power-washing equipment and disinfectant.

Handling systems will be more readily used by staff if they require minimal, simple maintenance and there is easy access to all parts.

Always keep the animal's perspective in mind and keep the handling system simple.

Further information can be found in the publication Design of Facilities at Livestock Markets.

## Loading and Unloading Ramps

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Loading and unloading livestock onto or off a vehicle can be the most stressful part of animal transportation. It is important that loading and unloading is performed in a quiet and competent manner. Few animals are transported enough times to become familiar with the process and even the calmest animal can become stressed and flighty when transported.

Loading and unloading facilities typically need to be compatible with a range of vehicles. This will mean that some premises may need to have more than one loading or unloading ramp. Whilst a gentle incline is appropriate for loading bays, unloading bays should always aim for the ramp created by the tailgate and the unloading bay to be as level as possible.

There is a variety of different designs for unloading bays. These range from flat concrete or raised steps (Figure 1) to more complex designs which have hydraulic systems that move up or down depending on the height of the lorry (Figure 2).



Figure 1

Figure 2

Figure 3 is an example of a ramp designed to cater to a range of vehicle sizes and to provide a relatively level surface when the tailgate is dropped.

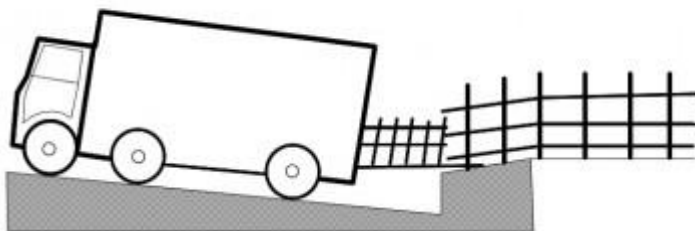


Figure 3

Whatever design is used, the side gates should provide a secure barrier and preferably be solid in construction to prevent distractions.

### **Specific requirements for loading bays**

Loading bays should be raised so that animals need only walk up a slight slope onto the vehicle. If the angle is over 10° the tailgate should have foot battens. EU regulations require that vehicle ramp angles should be no more than 20° for pigs, calves and horses, and no more than 26° 34 minutes for sheep and cattle.

### **Specific requirements for unloading bays**

Unloading bays should be designed so that fixed ramps are no steeper than 20°. The unloading area should be secure and provide a wide, clear, straight path from the vehicle to the pen where the animals are to be held. There should only ever be one clear and obvious route for the animals to travel down, which is free of non-essential personnel and other distractions. With some species, such as cattle, it is advisable to have the loading ramp slightly offset from the entrance to the raceway. This slows the animals down as they come off the vehicle and they are therefore less likely to injure themselves or others.

## **Raceways**

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Where possible, raceways and passageways should be built with solid, smooth walls to avoid distraction from other animals or people. Sharp corners and bends should be avoided and the sides of the raceways should be high enough to discourage animals from attempting to escape.

Distracting shadows, drain covers, large puddles and other obstacles, including people, should be absent from raceways where possible. Animals will investigate objects such as a hosepipe before stepping over it, slowing their movement through the handling system. In older buildings, the positioning of drains is not always a factor that can be changed: where this is the case they should be made as inconspicuous as possible.

When developing a handling system, consideration should be given to where sunlight may shine and shadows may form as these can have a significant effect on the reaction of animals and their willingness to move forward. The changing light in a building throughout the course of a day, or across different seasons, can be an influential factor in the movement of animals but is often overlooked. For these reasons, systems should be observed for any difficulties at a variety of different times.

### **Raceways for moving groups of animals**

Raceways leading to and from unloading bays, loading ramps and pens should be wide and straight to allow animals to be moved in groups. Where raceways contain corners, it is far easier to move animals through a system designed with curved bends rather than right-angled bends.

### **Raceways where animals are required in single file**

For the purposes of identification, entrances to sale rings or certain slaughter systems may require raceways to deliver animals in single file. As most animals will prefer to follow a lead animal or move in groups this can make handling more challenging; a good handling system at

this point will reduce the amount of coercion needed. Animals do not like standing in line and if left for extended periods they will become stressed and make attempts to escape. For these reasons, single file races should only be used towards the end of the system, and filled at a rate equivalent to the processing rate so that animals only wait for a short period.

For cattle, curved raceways (Figures 4a and 4b) work extremely well as they take advantage of their curious nature and their willingness to follow the animal in front. Gentle curves encourage animals forward and make it less likely that they will reverse through the raceway. Curves which bend tightly may be perceived as a dead-end and have the opposite effect. Sloping the floor upwards will also add benefits as most animals will happily walk up a slope but are less willing to walk down a slope, especially backwards.



*Figure 4a*



*Figure 4b*

## **Crowding pens**

An effective way to split cattle and sheep into single file is to use a circular pen with two gates that are hinged around a centre pole and which are able to pass around the entire pen (Figure 5). This design keeps groups of animals together until the last minute. Animals are moved around the pen by moving one gate around towards the other gate held static at the exit from the pen, which leads to a raceway or restrainer entrance. Caution should be taken when using this system to prevent animals crushing each other or climbing on top of each other if the gates move too fast or are overfilled. This design is also known as a 'forcing pen', although this term should never be taken literally.



*Figure 5*

## Sorting race

Another method for splitting groups of large animals, such as cattle, is to use a sorting race (Figure 6). These can either be single- or double-sided and generally hold four to eight animals. Animals are fed into a forcing pen, which is then moved gradually to encourage the animals down one of two raceways. Each raceway is divided into a number of stalls which have gates at either end. The gates are shut behind each animal to hold each animal individually. When required, animals exit the stalls by side gates so the order in which they entered is irrelevant. This method is easier and safer for staff as they are not required to move through the group of animals.



Figure 6

## Labyrinth

A simple way of splitting pigs into single file is a labyrinth system (Figure 7). This uses a long, straight race that is split into sections by gates that reach halfway across the raceway and are spaced 160cm apart on opposite sides of the wall. As groups of pigs walk down the race, some of them will be held back by the partition and some will move forward. The smaller group reaches the next barrier and again only some can move forward, breaking the group down again.

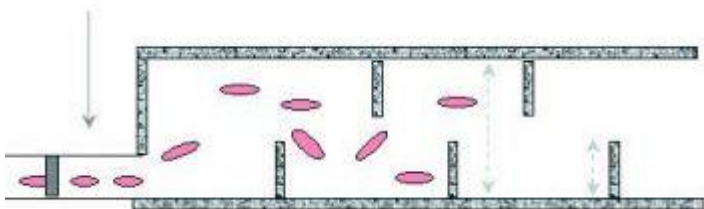


Figure 7

## Stepped race

Pigs can also be split successfully using a stepped race system (Figure 8). One side of the race is straight and the other is stepped, gradually reducing the width of the race. This system works in the same way as the labyrinth system, slowing down the movement of the pigs and reducing the group size in stages.

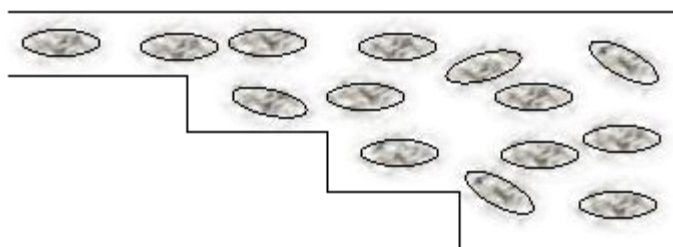


Figure 8

## Weighbridges

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When animals enter the market place, they usually have to walk over a weighbridge, either in groups or individually.

It is easier to walk animals over weighbridges in groups than individually. It can be difficult to encourage individual animals to enter the enclosed area of a weighbridge and this is made more difficult by loud clanging gates, poor lighting, the absence of a visible route forward and an unstable floor (both slippery and swaying). By the nature of the design, these problems are sometimes unavoidable, but action can be taken to minimise their effect.

These include:

- Applying baffles to the gates
- Providing a diffuse light source
- Using a curved, barred front gate which creates the illusion of more space
- Maintaining the weighbridge floor so that any movement is minimised
- Using a sorting race prior to entry to prevent animals waiting for long periods, and reduce the likelihood of baulking
- Keeping the weighbridge floor clean to reduce slips and falls

Animals should enter and exit from opposite ends of the weighbridge. This will make it easier to move animals through the system and reduce slips and falls.

The repeated or routine use of handling aids such as sticks or electric goads is not acceptable. If it is found that they are used regularly then it is an indication that the design of the handling system needs to be reviewed.

## Sale Rings

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When animals enter the ring they are almost always in a heightened sense of alert, this can make them flighty, unpredictable and in some cases dangerous. Every attempt needs to be made to keep the animals calm, this includes:

- Keeping the number of people in the ring to a minimum
- Only using experienced, competent and confident staff
- Having clear exit routes (with little opportunity for animals to charge out of the ring)
- Having no perceived escape routes
- Allowing a second animal in the ring if the first remains unsettled
- Considerate use of handling aids to direct the movement of the animal

For cattle, the sides of the ring need to be sufficiently high to prevent any animal from attempting to jump out. Curving the upper section of the ring side barrier inwards will discourage animals from attempting to escape.

The floor of the sale ring should be maintained clean so that it remains non-slip throughout the sale.

Speaker systems also need to be monitored to ensure they are not too loud, as this may unsettle the animals even further.

In cattle sale rings it is important there are suitable escape routes for staff, in case an animal becomes aggressive.

## Identification raceways

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Handling systems often need to include facilities to enable the identification of individual animals. Taking into account that animals are in unfamiliar surroundings and they may not have much experience of handling, this can be a stressful procedure. Good systems allow near continuous movement of animals and minimise long periods stood in raceways. Gates dividing raceways between animals can prevent them pacing up and down the raceway or charging into the front and rear gates and bruising themselves. Gates also reduce aggression between unfamiliar groups of animals.

Identification raceways should be designed to provide easy access to the animals' heads, with as little need for physical restraint as possible. Identification raceways often have neck yokes for more difficult animals, however, these should not be used on every animal. Using a neck yoke when not required is an unnecessary source of stress for the animal.

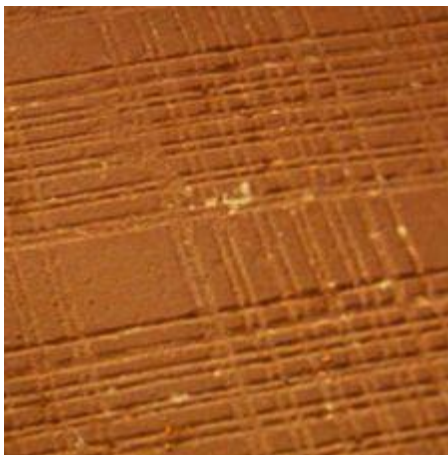
## Flooring

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When animals are in unfamiliar surroundings or handled by unfamiliar people they can become stressed and excitable. When stressed and excited, animal movement is likely to be quick and flighty. It is important to provide a secure surface for the animals to walk on, to prevent slips and falls.

It is important that floors are non-slip, non-abrasive and properly maintained.

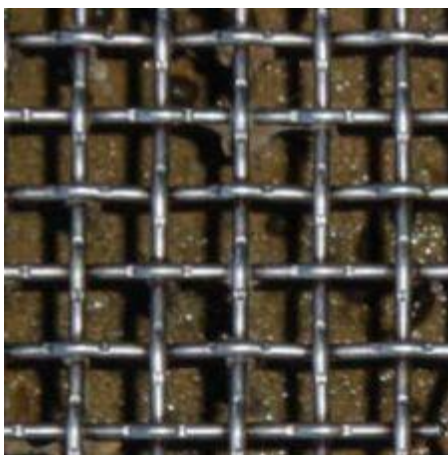
There is a wide range of options for providing non-slip surfaces which include: concrete grooving (Figures 9a and 9b), expanded metal flooring (Figure 10), concrete slats, rubber mats and non-slip floor paints. In addition, straw or wood chippings can be spread on top of the surface to help keep the floor dry (Figure 11).



*Figure 9a*



*Figure 9b*



*Figure 10*



*Figure 11*

The condition of flooring should be assessed on a regular basis. The occurrence of slips and falls should be monitored at the critical areas of the system, such as unloading bays, the main raceways, restrainer entrances and bends. Areas of the handling system where animals frequently slip or fall should be modified.

As with all parts of the handling system, it is essential that flooring is maintained in good condition and any repair work is carried out promptly. In addition, environmental conditions should be taken into account as these can affect the floor surface, particularly in icy or wet conditions.

Further information on non-slip flooring can be found in the publication *Prevent Slips and Falls by Managing Concrete Floors*.

## Penning

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Pens for different species and ages of animals require different design features. Careful planning is required in multi-species premises, where the same pens are used for more than one species.

The penning together of animals from different social groups is not advisable in any situation. Most farm animal species live in structured groups, even if this is a loose association, and they can recognise the other members of the group. In these groups there is a hierarchy and the individual animals each know their place in the group: knowing who to avoid and who to stay near. When mixed, this hierarchy is challenged and it can be expected that there will be increased stress, anxiety and fighting amongst individuals as new social orders are established.

Unlike the sides of raceways, which should be solid, having open sided pens (Figure 12) can be beneficial for some species, i.e. sheep and cattle, as this allows visual contact with other animals and helps keep animals calm. However, for pigs, solid sides are recommended (Figure 13). Unfamiliar pigs tend to fight and become aggressive if they are able to see each other in adjacent pens, therefore visual contact is not advisable. Additionally, pigs prefer to lie against solid walls, and rectangular, solid-sided pens enable more pigs to exhibit this behaviour.



*Figure 12*



*Figure 13*

For multi-species pens, the use of barred gates combined with stockboards can work successfully (Figure 14). Stockboards should be fitted up to pig head height, allowing sheep and cattle to see into other pens but preventing pigs from doing so.



*Figure 14*

The design of the entrances and exits of pens also requires consideration. Pens which have only one entrance are more difficult to empty as the handler first has to move through the group of animals before moving them out. Pens with two gates at the front which open both ways (Figure 15) are more appropriate as the handler does not have to pass through the animals. This is also a safer option for staff. Pens that open in a continuous line (Figure 16) are also very effective at allowing good movement of animals through the system. These pens can be filled direct from the unloading bay, allowing a simple and non-confusing route for the animals. Additionally, there is less requirement for human interaction and the system is more versatile as the pen size can be determined as they fill.



*Figure 15*



*Figure 16*

It is important that access to the water facilities is not blocked when gates are left open to increase pen size (Figures 17 and 18).



*Figure 17 - Drinker blocked by gate*    *Figure 18 - Adapted gate*

## Water and Food

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Water should be available to animals when they are confined in a pen for any period of time. It is also good practice to supply water to animals when they have travelled long distances. Water should be provided in containers which are accessible for the types of animals penned, e.g. nipple drinkers are only suitable for pigs and buckets must not be so deep that animals cannot reach the bottom.

When pens are used for multiple species, the water must be readily available to all species, but not in a position where it can be fouled. Contrary to popular belief, ruminants generally need

more water in the winter when they are on dry, concentrated diets, than in the summer when they are eating more fresh grass.

An adequate number of drinkers must also be supplied for the pen size, to reduce any aggression and bullying which can prevent certain animals drinking. Aggression and bullying is generally more prevalent in pens which contain animals from different groups, e.g. buyers' pens in markets; mixing should be avoided.

Food should be made available to animals if they are to be kept in pens overnight.

Pigs are single-stomached animals and it is possible for them to suffer from travel sickness, so feeding immediately before travelling can compromise their welfare rather than be a benefit. Cattle and sheep are not seen to experience this problem so food can be made available up to the point of travel with no major concern.

When feed is given to a group of animals in a confined space, it must be given in quantities and positioned in such a way that will avoid aggression amongst the group.

## Casualty Pens

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There must always be at least one dedicated casualty pen that is ready for immediate use and furnished with bedding, in case a casualty animal is found. These pens should have solid sides and isolated drainage. They should have a large gate, for easy access, and be located near the unloading bay so that casualty animals found at unloading do not have to walk far through the lairage. A trolley, or similar, may be useful for carrying animals to the casualty pens.

More than one casualty pen may be necessary to avoid mixing unfamiliar animals. The use of casualty pens as storage areas is not acceptable as this will result in a significant delay in dealing with casualty animals and cause further distress.

# Group Restraint

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Animals can be restrained either passively, by restricting the space available to them; or actively, by physically holding animals in position. Group restraint is a form of passive restraint that is particularly useful for smaller animals, i.e. sheep, pigs and young calves. Group restraint is beneficial for animal welfare, as not only is less individual handling required, but also animals are maintained in their social groups.

Smaller animals (sheep, pigs and young calves) can be restrained by moving a small group of them into a pen which is just large enough for the number of animals. The limited space allows the stockman to handle the animals effectively whilst they remain relatively calm in the presence of their conspecifics.

One principle to remember when operating a group restraint system is that, unlike most handling systems, the key to success is to stop movement. In the case of group stunning, the area available to the animals increases as the group is stunned and so they increasingly move around. In this instance, certain design features can help keep the animals as calm as possible.

The design of a group stunning pen depends on a number of factors such as:

- How many staff are working in the pen
- The species being stunned
- The stunning method being used
- The throughput speed of the abattoir

A wide funnel-shaped pen can encourage the animals to position themselves facing in one direction and reduce the ability of the group to turn around.

A simpler modification, which can prove successful in many cases, is to change the entry gate, or the wall next to the entrance, from solid construction to bars. On entering a pen, animals typically circle and try to exit the way they came in. Bars at the entrance allow animals to see out and encourages them to congregate and remain still. This enables handlers to catch or stun the animals effectively, with minimal distress, by positioning themselves behind the animals, in the blind spot.

The positioning of the shackle elevator can have a significant effect on the operation of a group stun pen. If positioned against a wall and off the ground there will be no hiding points where animals could place themselves out of reach. The suitable placement of the elevator can work like the wide funnel-shaped system described; helping to reduce animal movement.

To enable high standards of animal welfare, it is essential that there are enough shackles available, that there are sufficient pushers on the shackle elevator and that the elevator runs at a speed capable of removing stunned animals from the pen to the bleed point within 15 seconds.

Placing too many animals in a pen can cause problems by restricting access to the animals for both stunning and shackling, resulting in mis-application of the stunning equipment and delayed stun-to-stick times. Animals may also become injured by attempting to escape or as a result of crushing.

Group stun pens should be designed in such a way that the slaughterman can reach all areas of the pen. There should be no area where the animals are positioned so as to hinder the stunning process by compromising tong position or duration of the stun.

Further details of group stunning systems can be found in the leaflet Best Practice Guidelines for Group Stunning Systems.

## Individual Restraint

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There are three commonly used methods for restraining animals individually: static restrainers; restrainer-conveyors; and stun boxes/crushes. These methods are also categorised according to whether they provide active or passive restraint of the animal's head.

Animals should never be put in a restrainer unless there is someone to carry out the intended procedure immediately. Likewise, if there is any delay animals should be released from the restrainer as soon as possible. The operator must have easy access to any controls that release the animal.

## Methods for Individual Restraint

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### **Static restrainers**

Static restrainers are normally used for larger animals such as adult cattle. In order to encourage animals to walk into the restrainer, it should be well lit and the end wall should not be solid so that the animal does not perceive a dead end.



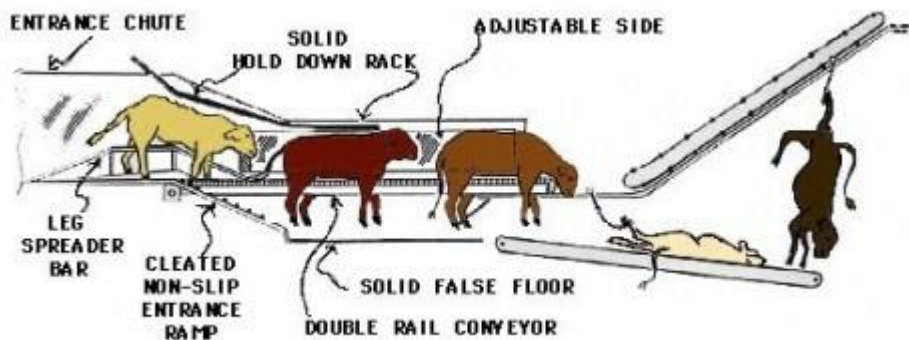
*Static restrainer*

## Restrainer conveyors

Restrainer conveyors are designed for high-throughput abattoirs, particularly for sheep and pigs. They can present animals for head-only, head-to-back or head-to-body stunning. There are two common designs for restrainer-conveyors: either two belts mounted in a V formation which grip animals from both sides and carry them to the point of stunning; or a narrow, single conveyor to support the belly of the animal.



*Restrainer conveyor - 'v' formation*



*Restrainer conveyor - belly rail (courtesy of Temple Grandin)*

Animals must be restricted to single file before entering restrainer-conveyors. The handler must be able to reach the entrance of the conveyor from the side in order to encourage animals into it without having to lean over animals waiting to enter, or having to push animals from behind. The speed of the restrainer is also important: it should be slow enough to allow accurate stunning, but fast enough to prevent animals being held for long periods of time.

## Stun boxes and crushes

Stun boxes and crushes are used for larger animals, such as cattle, and often incorporate a device to restrict head movement. This could either be an active device, which physically holds the head in position, or a passive device which simply encourages the animal to place its head in the correct position.

Studies have been conducted to assess the impact of head restraint systems in abattoirs on stun accuracy and animal welfare. Although active restraint increases the accuracy of stunning, this advantage does not outweigh the disadvantage of increased stress levels. Passive restraint systems, however, have been found to produce an increase in the accuracy of stunning with no increase in stress levels or the length of time animals spend restrained prior to stunning.

Active restraint of an animal's head is a stressful experience and should only be used if absolutely necessary. When active restraint is used, animals should be restrained for as short a time as possible.

The 'head-yoke and chin-lift' is an active restraint device that works in two stages: the yoke closes around the animal's neck and the chin-lift rises to push the animal's head upwards, resulting in complete immobilisation of the head. Another active restraint design, the 'cantilever neck-yoke', has two arms which lie flat against the side of the wall or crush and which move outwards and upwards to close around the neck, preventing the animal from moving backwards and restricting head movement to up and down.

A version of the 'cantilever neck-yoke' with one static arm and one moving arm, causes less stress to the animal and is considered a part-passive device.

Passive devices, such as the 'fixed shelf' do not physically restrain the head, but encourage the animal to place its head in the correct position.

An ideal head restraint design would consistently position the animal's head to allow accurate stunning, without compromising animal welfare. To enable this, the design should:

- Not increase the time spent in the stun box
- Be constructed so that the animal enters freely, without hesitation
- Be suitable for the stunning equipment and procedures
- Passively position the head, rather than physically restrain the head
- Not impair the removal of animals from the stun box
- Allow unhindered access for both stunning and re-stunning if necessary
- Release the head immediately after stunning

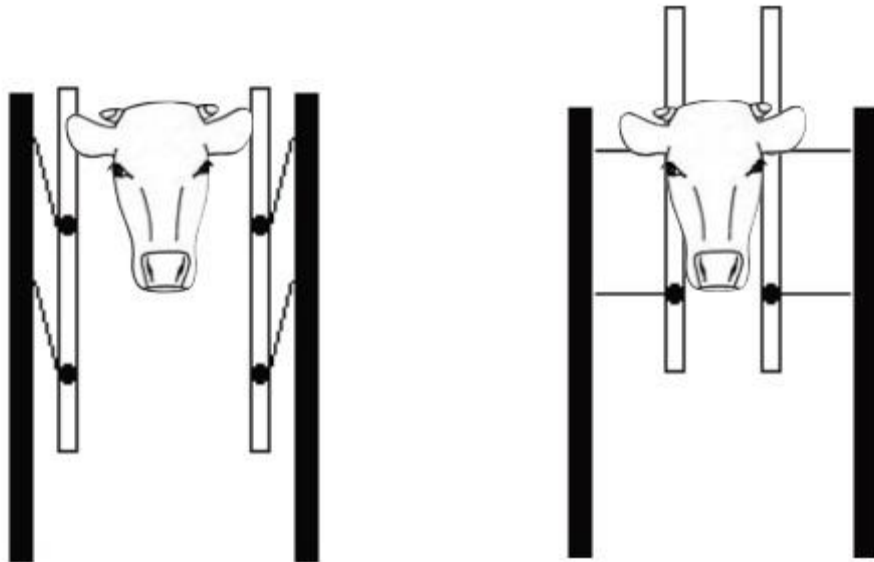
## Specific Requirements for Head Restraint

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### Active restraint – specific requirements

If an active restraint is chosen, a number of factors can reduce the negative impact on the animal. The arms should fit closely to the wall so that they do not distract the animals as they enter. The area in front of and above the head restraint should be brighter than the rest of the

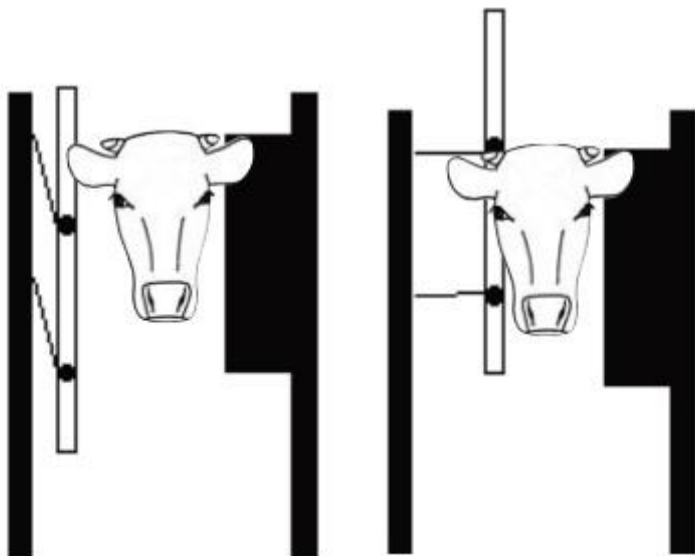
box so that the animal is encouraged to place its head in the correct position. To prevent spooking the animal, and ensure it is restrained at the first attempt without inducing undue stress, the restraint should have an immediate, quiet action when activated. The power source operating the restraint must work quietly with no sudden noises – a hydraulic power source can be preferable to a pneumatic source.



*Active, cantilever neck-yoke - resting position    Active, cantilever neck-yoke - restraining position*

**Part-passive restraint – specific requirements**

The part-passive system has the same requirements as the active restraints. The stationary side should be designed to not distract the animal.



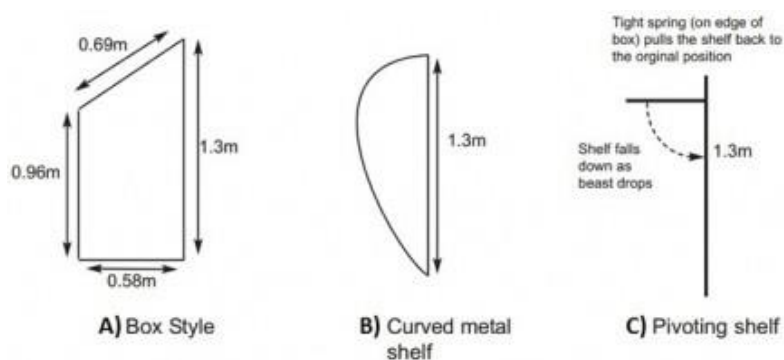
*Part-passive - resting position    Part-passive - restraining position*

## Passive restraint – specific requirements

In the majority of cases, passive restraint systems will be the most appropriate. They should be carefully designed to not distract the animal. For example, internal fittings can be used to hang shelf systems. A head shelf is often fitted into an existing box and as such there are often limitations to the design because of the way animals exit the box. There are various designs of shelves used for passive restraint: a solid box, a fixed piece of curved metal, or a metal shelf held by a counter balance (Figures A-C). When swing doors are used for the exit of a carcass, a fixed shelf is suitable. However, if the exit door fully rotates and is the full length of the box, a counter-balanced shelf may be more suitable as the shelf drops with the weight of the animal's head, facilitating removal of the carcass.

Animals can be encouraged into passive systems by lighting the area above the shelf so that it is brighter than the rest of the box and by closing any gaps which allow light in at the base or sides of the box, to avoid distraction.

Some lively animals have been known to use a shelf as a step to escape from the stun box, this can be prevented by careful placement of a bar across the top of the stun box, positioned above the withers. Shadows or contrasting colours in the box which may distract the animal from entering should be avoided.



### Passive restraint designs

## Rump-push

If an abattoir slaughters cattle of uniform size then passive restraint is an ideal system. However, if the size of the animals varies, the shelf becomes less effective as smaller animals have room to back away from the front of the stun box. A rump-push is a panel or gate which moves behind the animals to encourage them forwards. Rump-pushes can be operated manually, hydraulically or pneumatically depending on the power source available. Overall, a hydraulic system is usually best as this can apply the correct pressure and is quiet. The rump-push should ideally be positioned about 90cm from the floor.

When fitting a rump-push, it is important that it should:

- Be capable of applying suitable pressure, therefore positioning animals without causing pain or bruising
- Be positioned at a suitable height for the full range of sizes of animals encountered
- Not impair removal of the animal after stunning

## Head Restraint Options

	<i>Active</i>		<i>Part-passive</i>	<i>Passive</i>
	<b>Head-yoke and chin-lift</b>	<b>Cantilever neck-yoke</b>	<b>Hinged neck-yoke</b>	<b>Head shelf</b>
<i>Effect of restraint on animal</i>	Held securely in a fixed position	Backward movement restricted	Backward movement restricted	Downwards movement restricted
<i>Advantages</i>	<p>Animal held stable</p> <p>Allows accurate shot</p> <p>Good for training staff</p> <p>Can hold heavy animals</p> <p>Animal cannot move backwards</p>	<p>Animal held stable</p> <p>Allows accurate shot</p> <p>Good for training staff</p> <p>Animal cannot move backwards</p>	<p>Animal held stable</p> <p>Allows accurate shot</p> <p>Head held in a good position</p> <p>Animal cannot move backwards</p>	<p>Allows accurate shot</p> <p>No distraction to animal</p> <p>No power requirements</p> <p>No extra stress to the animal</p> <p>Not physically restrained</p> <p>No effect on throughput time</p>
<i>Disadvantages</i>	<p>Extra stress experienced</p> <p>Slower throughput time</p> <p>Increased time in stun-box prior to stunning</p> <p>Disruption of carcase removal</p>	<p>Extra stress experienced</p> <p>Slower throughput time</p> <p>Increased time in stun-box prior to stunning</p> <p>Disruption of carcase removal</p> <p>Cannot hold heavy, strong animals</p>	<p>The passive arm may deter animal from entering the stun-box</p> <p>The moving arm may stress the animal</p>	<p>Does not restrict all movement</p> <p>A bar may be needed across the top of the box</p> <p>A rump-push may be required to position the animal (power would be required)</p>

## Recommendations

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The HSA recommends passive head restraint systems as the best type of restraint available for conventional slaughter of cattle.

- The effectiveness of the head shelf can be improved by installing a rump-push, especially if the abattoir slaughters animals of varying sizes
- A good head restraint design will not cause additional distress to the animal whilst in the box, i.e. not increase the time spent in the box prior to stunning, not require additional handling or force to get the animal into the box, and will allow improved shooting accuracy
- If already installed, an active restraint should only be used when absolutely necessary, i.e. when animals are too fractious to manage
- Due to the greater stress caused by a head-yoke and chin-lift, this system can only be justified during slaughter without stunning, to improve accuracy of bleeding
- Staff and equipment should be regularly assessed to maintain high animal welfare standards

## Moving Animals

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Humane animal handling depends greatly on the skill of the stockman. Good animal handlers take into consideration the natural behaviour of the animals, react to animals in a calm manner and move them by persuading them forward. Animals can be unpredictable and difficult to move in an unfamiliar environment; good handlers understand this and adjust their approach accordingly.

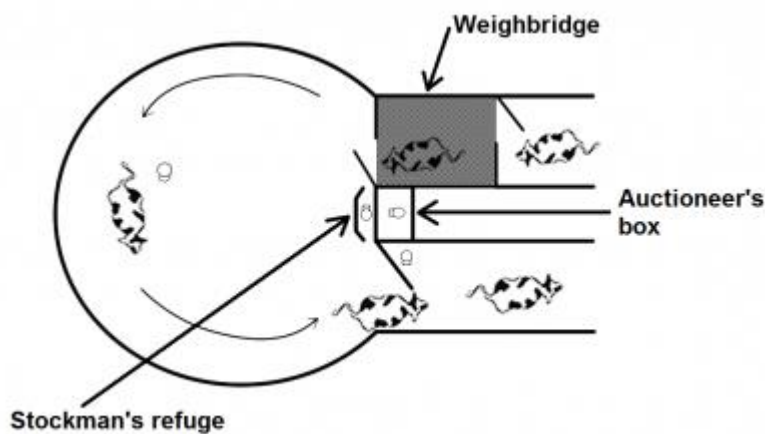
### **Moving animals to and from the pens**

Make sure all gates are secured in position and that raceways are clear of obstacles and distractions. Always move animals in manageable group sizes. Moving animals in smaller groups makes them easier to control and keep moving. If moving large numbers of animals together, any baulking becomes a major problem as it is difficult to reach the animals at the front of the group in order to encourage movement to restart. This can lead to frustration and the temptation to coerce the animals at the back. This is inappropriate and the use of electric goads in these circumstances would be illegal in some countries.

### **Sale ring**

Animals in a sale ring are more difficult to handle than normal. They are much more likely to be unpredictable, and normally docile animals can become dangerous. It is important that only essential people are in sale rings: no more than the stockman and/or the owner. Once in the sale ring, animals should be encouraged to move, but good handlers will be able to do this with very little movement from themselves. In the case of sheep and calves, where buyers tend to congregate in the ring to grade animals, this should be controlled by the operators and restricted to as few people as possible. Many markets now discourage this practice. Not only do people provide distractions and obstacles to the animals, they can also make the animals more nervous

and more likely to attempt escape and injure themselves. Under all circumstances, the entrance and exit of the ring should be kept clear of people so that animals can move freely in and out of the ring.



*Sale ring*

## Handling aids

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Handling aids are an important part of animal handling and often essential. They should only ever be used as an extension of the body and never to physically hit an animal. Use of handling aids can become habitual and it is important that all staff are trained and regularly reminded of the correct use of these instruments. A variety of handling aids are used and the choice of these is dependent on what the handler prefers, what is suitable for the animals being moved, and any legal and commercial constraints.

The use of any handling aid on any animal when the route forward is not clear is unacceptable and, with regards to electric goads, illegal in some countries.

### Sticks

Traditionally, sticks are the most common type of handling aid used by farmers, stockmen and hauliers. Although very useful when used intelligently as a guide and extension of the arm, the misuse of sticks has the potential to severely compromise animal welfare. Where sticks are used, they must only be made of wood and must not be modified in any way, such as the addition of a ferrule or nail to prevent wear, as these may cause pain and injury to an animal. Lengths of polypropylene pipe must never be used as sticks for animal handling, as even a light tap with this material can cause extensive bruising below the skin.

### Electric goads

There are legal restrictions on the use of electric goads in some countries and many assurance schemes ban the use of electric goads during transport.

Electric goads should not need to be used routinely and therefore should not need to be carried at all times or kept immediately to hand. If electric goads are used regularly then the handling system needs reviewing to find the cause of the problem. Electric goads should only be used once the situation has been considered and other methods to encourage the animal to move have been tried.

Electric goads should only be used on the hind quarters of adult pigs and cattle when there is a clear route forward for the animal: if the route is blocked then it is completely unacceptable to use an electric goad. They should only be applied for a maximum duration of one second, and multiple applications must be adequately spaced. Shocks must not be used repeatedly if the animal fails to respond.

The use of an electric goad should be recorded so that trends can be identified. Such records will help highlight any areas of the handling system that are in need of improvement to aid the passive movement of animals through the system.

## Flags

Flags are a useful extension to the body and make handlers look larger than they are. This means that animals are easier to guide in the direction you want. The flags can also be used to make noises behind an animal in order to encourage them forward.



*Flag*

## Rattles

A plastic rattle on the end of a long handle (allowing the sound to be produced close behind an animal) can be effective for moving sheep and pigs. The animals react to the noise produced when the rattle is shaken, without the need for physical contact with the animal. Rattles are particularly effective because they produce a sound with which the animals are not usually familiar.



*Rattle*

### **Boards**

A strong wooden, or plastic board (approximately 80cm x 60cm), with holes for handles, can be a particularly effective aid for moving pigs. Pigs can easily turn and charge towards the handler when feeling confined. Boards not only make the handler look bigger, and help to guide pigs in the right direction, but they also provide protection to staff.

See a board being used to help move pigs at the end of the flight zone video clip.

### **Plastic bags**

Similar to rattles, large plastic bags can be shaken to make a noise with which animals are not usually familiar. In addition, the movement of the plastic bag makes handlers look larger than they are, further helping to encourage animals to move forward.



*Plastic bag*

## Identification

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For traceability, many animals have to be identified as they enter the market or lairage, or as they leave the farm. Where individual identification requires manual handling of the animal, this should be done by trained staff. Restraining facilities should be used effectively and quietly so as not to stress the animals.

Sufficient lighting will be necessary for identification, but this should not be in the eye-line of the animals as it may deter them from entering the restrainer.

## Operator Considerations

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### Equipment

Human safety needs to be considered in order to minimise risks from animals and equipment within a handling system. When considering any changes to animal handling systems, consultation should be held with the livestock handlers who use the system in order to incorporate their practical knowledge and experience.

Systems should:

- Be safe and easy to use by staff without specialist technical knowledge
- Be tamper-proof
- Minimise user fatigue
- Optimise the number of staff involved in the handling
- Allow accessibility at the required places
- Help stock handlers work effectively and efficiently
- Accommodate 'worst-case operators'

For every system designed, there should be procedures in place for staff to give feedback to management. This feedback should include reports of maintenance requirements, breakdowns, areas where handling problems occur and suggested improvements.

### Environmental factors

Systems should:

- Be quiet during operation (minimal air hissing, metal clanging, etc.) and incorporate noise absorbent materials where possible
- Provide adequate lighting, ventilation and thermal comfort

# Design Checklist

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When thinking of designing or improving a system, the following points need consideration:

## **Animal Factors**

Is it suitable for all the animals for which it may be used?

Is the risk of injury minimised?

Does it avoid the need for goading?

Can animals walk at a natural pace?

Does the system prevent confusion?

## **Human Factors**

Is it safe for humans?

Is it easy to operate?

Is handling made easier?

Can all parts be reached?

Have handling staff approved it?

Do staff understand the reasons for it?

Does it cater to worst-case operators?

## **Usability and reliability**

Can it be easily:

- Installed?
- Operated?
- Inspected?
- Maintained?
- Cleaned?

## **Environmental Factors**

Have you considered (for operator and animal):

- Heating?
- Lighting?
- Ventilation?
- Noise?

## **Flexibility**

Will it adapt to future:

- Building changes?
- Operational changes?
- Breeds/sizes?

At stun, does it present:

- Suitable group sizes?
- A steady flow of animals?

## **Conformity**

Is it legal?

Has it been tested?

## **Cost**

Is it affordable in terms of:

- Installation?
- Running costs?
- Maintenance?