

OBSERVATIONS OF CATTLE RESTRAINT DEVICES FOR STUNNING AND SLAUGHTERING

T Grandin

Department of Animal Science, Colorado State University, Fort Collins, Colorado 80523, USA

Abstract

Proper design of restraint equipment is essential to prevent stress on animals during handling, stunning and slaughter. A small design mistake which may appear to be insignificant to the engineer can be extremely detrimental to animal welfare. Operators of restraint equipment must be properly trained. Cattle will place their heads into stanchion (yoke) or chin-lift types of head-restrainers if they are gently moved forward by a rear pusher gate. Cattle confined in an upright ASPCA pen for religious slaughter will remain calmer if the apparatus is gently closed around them. The vertical travel of the belly lift should be restricted to 71 cm (28 in) — it should not lift the animals off the floor. The rear pusher gates should be equipped with a separate regulator to prevent excessive pressure from being applied. Stunning or ritual slaughter should be carried out within 10 seconds of the animal's head being restrained. The modified ASPCA pen described in the paper was seemingly humane when operated by people concerned about animal welfare.

Keywords: *animal welfare, head-restraint, religious slaughter, slaughter, stunning*

Animal welfare implications

When head-restraint is used it must be accompanied by adequate restraint of the bovine's body. A rear pusher gate seems to be essential if an animal is going to put its head in the restrainer. Stunning or ritual slaughter should occur within 10 seconds after the head is clamped. Proper design and operation of head-restraint devices is essential.

Religious slaughter presents many problems both to the religious authorities and to the animal welfarists. In the United States religious slaughter is exempt from all humane regulations (Grandin 1990), for example in some United States plants cattle are hung up by one back leg as a method of restraint prior to kosher slaughter. However, the author believes that the described modified pen is relatively humane when it is operated and supervised by people who are concerned about animal welfare.

The attitude of management is the single most important factor which determines how animals are treated. Good equipment provides the tools which make it possible to handle and slaughter animals in a humane manner, however it is useless unless it has the management to go with it.

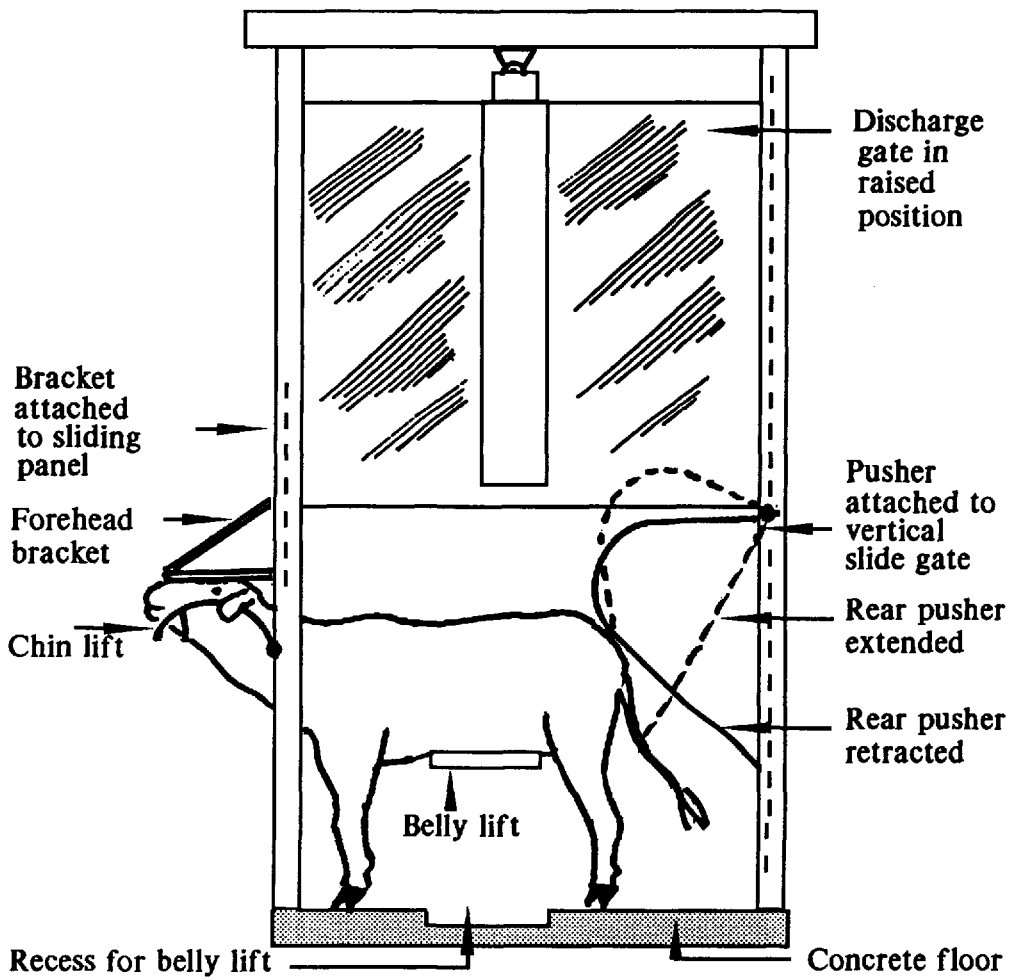


Figure 1 Modified ASPCA upright slaughter pen
Animal in position with the rear pusher gate shown extended to the correct position.

Introduction

New legislation has been introduced in the UK which requires, from July 1992, that cattle stunning pens should be constructed so that they restrict the movement of the head of the animal confined in them and thus permit more accurate stunning. Ewbank *et al* (1992) found that the forced use of a chin-lift type of head-restraint was more stressful than stunning a free standing animal. The author is in general agreement with this finding but believes that the particular stunning box and head-restraint device which was described in the paper were badly designed. Ewbank *et al* (1992) report that an average of 34.2 seconds was required to force the animal to place its head in the head-restraint, and only 14 per cent of the animals voluntarily placed their heads through the head opening. Observations by the author on four different American Society for the Prevention of Cruelty to Animals (ASPCA) upright pens for religious slaughter indicated that over 90 per cent of the cattle voluntarily placed their heads through the opening in the front of the box. The author has also seen an Australian stanchion (yoke) type head-restraint stunning box with a rear pusher gate in operation where nearly all the cattle immediately placed their heads into the restraint stanchion. The use of rear pusher gates seems to be essential in both the ASPCA and Australian designs to prevent the animal from becoming agitated and backing out.

The author has had extensive experience with design modification and use of ASPCA upright slaughter pens and is presenting the following descriptive account to show that:

- chin-lift types of head-restrainers used in well designed slaughter pens can be efficient and humane;
- correctly designed upright slaughter pens¹ can, if correctly employed, help to ensure relatively humane religious slaughter.

Equipment and its use

A modified ASPCA upright pen was installed in a commercial slaughter plant which conducted kosher slaughter and was operated at a line speed of 75 head per hour. This new pen had been changed in several ways to reduce stress on the cattle, see Figure 1. Vertical travel of the belly lift was limited to 71cm (28 in) from the floor of the box to the top of the lift. Restricting the travel prevents the belly lift from applying excessive pressure to the animal's thoracic area.

The pen was also equipped with a separate pressure regulator on the rear pusher gate to prevent the application of excessive pressure. The hydraulic and pneumatic controls were also redesigned to give the operator more precise control over the amount of pressure applied to the animal.

¹ The new UK legislation also makes it obligatory from 5th July 1992, for religious slaughter to be carried out in an approved upright pen.

The floor of the pen was constructed from concrete. Cattle will often balk at a change in flooring type or texture and the use of concrete makes the floor in this ASPCA pen look the same as the race floor.

Dunn (1990), working with an upright slaughter pen, had reported that some cattle balked and refused to step over the belly lift. To facilitate entry into the pen in this modified ASPCA design, the belly lift was constructed so that it descended into a recessed cavity and the top of the lift then became flush with the concrete floor surface.

To prevent the cattle from seeing people when they placed their heads through the head opening a solid barrier was constructed around the front of the box.

For additional information on the basic ASPCA design and for details of the head holding device consult the original US patent (Marshall *et al* 1963).

The ASPCA pen was operated by the author for a total of 35 hours on 15 different days. During the hours of use different operating techniques were tried out to determine the method which would be least stressful. The cattle were feedlot steers and mature cows. Most of the animals were European and English breed crosses — some were English x Brahman crosses.

Results

The operation of the chin-lift head-restrainer

The behaviour of the cattle was similar regardless of breed. Quiet handling in the leadup race is essential. Agitated animals are difficult to gently restrain. The most efficient way to operate the pen was from the rear towards the front. Descent of the rear entrance gate should start slowly and then speed up. This prevents the animal from being suddenly bumped by the slanted rear pusher gate that is mounted on the sliding entrance gate. Less pressure will be required to induce the animal to move forward if pressure from the rear pusher gate is applied intermittently. Restraint of the body helps to prevent the animal from fighting the head-restraint. Most cattle stood quietly and did not show visible signs of agitation when pressure was applied slowly to their bodies by the rear pusher gate and the belly lift. When treated in this way the majority of animals voluntarily put their heads through the opening on the front of the pen. Excessive pressure caused the animal to show visible signs of discomfort such as squirming and vocalizing. If the animal was suddenly bumped by the apparatus or it was jerked up tight quickly it would often actively resist.

The animal should be firmly held by the rear pusher gate and the belly lift before the head-restraint is applied.

Head positioning can be done more gently if the forehead bracket is adjustable for height. The controls for the forehead bracket and the chin-lift should be located near the front of the box so that the operator can see the animal's head. A good operator can learn to move both the chin-lift and the forehead bracket at the same time to ease the animal's head into position. Care also must be taken to avoid pushing the animal too far

forward into the chin-lift. If the animal resists upward movements of the chin-lift by turning its head it can be induced to slip its head into position if the operator stops movement of the chin-lift for 1 to 2 seconds.

The restricted travel of the belly lift reduced discomfort by eliminating extreme pressure applied to the chest. Lifting the animal off the floor causes definite discomfort.

To prevent visible signs of agitation the animal's head should not be clamped hard between the chin-lift and the forehead bracket until ready to be stunned or cut. Cattle showed visible signs of distress such as squirming, putting their ears back and vocalizing if they were clamped over 10 seconds in the head holder. The head holder is much more aversive than the body restraint. In the event of plant breakdowns an animal should stand quietly in the box with its body lightly restrained, by the belly lift and the pusher gate as long as plant employees stay away from its head.

Religious slaughter

After the shochet made the throat cut the forehead bracket was immediately raised to relieve clamping pressure on the animal's head. On some cattle very little pressure was required to make the animal stand still. Even though they were held so loosely that they could move, they did not appear to feel the throat cut by the shochet. Most cattle stood quiet and did not appear to be aware of what had happened. Bleedout is facilitated if the cut is made near the jaw bone (Figure 2) — the animal's chest should not be pushed up hard against the front of the box.

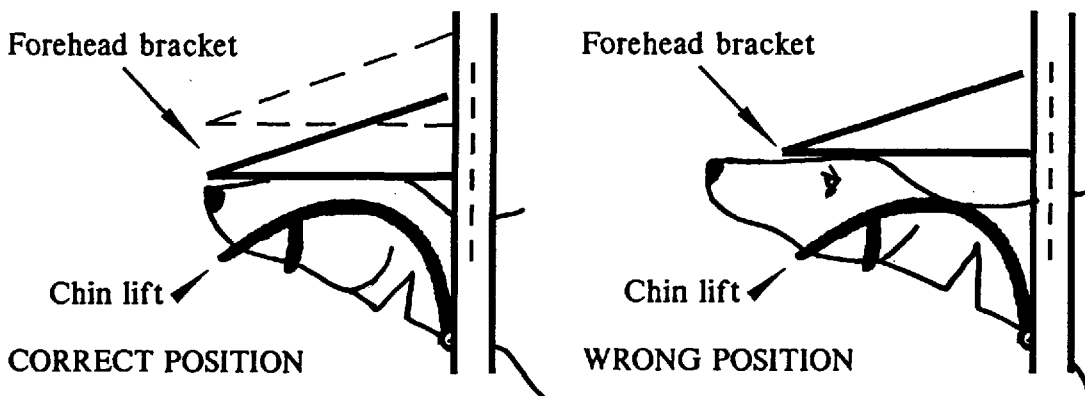


Figure 2 Position of the head for ritual slaughter

The correct position, left hand diagram, allows the cut to be made near to the jaw bone. After the throat is cut the forehead bracket should be immediately raised to the position shown by the dotted line. The chin lift should remain up during the 20 seconds bleedout period. The right hand diagram shows the animal pushed too far forward in the pen and head holder due to excessive pressure from the rear pusher gate.

Immediate release of the rear pusher gate and lifting of the forehead bracket appeared to improve bleedout and cause unconsciousness to occur more rapidly. Removing pressure from the animal's head and body allowed it to relax. Gentle operation of the restraining box also greatly reduced the incidence of small haemorrhages in the meat. Excessive pressure applied to the body seemed to increase bloodsplash and reduce bleedout.

General

The operator needs to be trained to carefully regulate the air or hydraulic fluid through the control valves. The cattle remained calmer when pressure via the belly lift and the rear pusher gate was applied at first slowly and then speeded up. All ASPCA pens should be equipped with separate high quality manual control valves and pressure limiting devices for the head holder, rear pusher gate and the tail gate to reduce the chance of a careless operator injuring an animal or applying excessive pressure. The flow of fluid (or air) to the cylinders which operate the moving parts should be proportional to the degree of deflection of the control valve handle. The pen should also have built-in flow moderator controls which automatically limit the maximum speed of movement of the pusher gate, belly lift and head holder. On pneumatic pens spring return-to-centre valves must be used to provide the operators with limit controls of midstroke positions for the various moving parts of the pen. Hydraulic equipment is recommended for all new installations. Stunning boxes and restraint devices must have adequate illumination to prevent cattle from balking. Lighting affects cattle movement (Grandin 1980). At one slaughterhouse cattle refused to enter a well designed restrainer system after a light over the entrance burned out. All equipment should be engineered to reduce noise! Poor lighting, excessive noise or smell blowing towards incoming cattle will cause balking. Even a well designed piece of equipment will perform badly under these circumstances. It is essential that the restraint device operator is supervised closely. The best equipment can be operated in an abusive manner by a careless employee. It is the responsibility of management to enforce a high standard of humane treatment of animals.

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