Head Restraint Equipment

SUMMARY

It is a statutory requirement to have a head restraint fitted into every cattle stun box in the UK. When this regulation came into force, the Humane Slaughter Association (HSA) reviewed the effects of head restraint systems on the accuracy of stunning and the associated effects on animal welfare. The report concluded that active head restraints markedly increased the accuracy of the shot, although the improvement did not compensate for the increased stress levels experienced by the majority of the animals subjected to this type of restraint. Passive restraints, however, produced a significant increase in the accuracy of each shot, with no increase in stress levels or the length of time animals were spending in the box prior to stunning.

For these reasons, passive systems are the recommended form of restraint for captive-bolt stunning of cattle.

Legislation

The Welfare of Animals (Slaughter or Killing) Regulations 1995 (as amended), state that all stunning boxes should be equipped with a device which:

‘...restricts the movement of the head of any animal confined in it without causing the animal any avoidable excitement so as to permit accurate stunning and allows the head of the animal to be released immediately after the animal has been stunned’

Types of restraint available

The types of restraint available range from active devices, which physically hold the head in place, to passive devices which simply encourage the animal to hold its head in the correct position. Active restraints, (the head-yoke and chin-lift, and cantilever neck-yoke system) physically restrain the animal to decrease the amount of head movement. The head-yoke and chin-lift restraint works in two stages; the yoke closes around the animal’s neck, the chin-lift then rises to push the animal’s head upwards, resulting in complete immobilisation of the head. The cantilever neck-yoke has arms which lie flat against the side of the wall; when activated, the arms move up and out to close around the neck, stopping the animals moving backwards and restricting head movement to up and down. Part-passive devices restrain the animals like the cantilever neck-yoke, but have one static arm and one moving part which causes less stress to the animal. The passive devices available (fixed shelf) do not physically restrain the head, but encourage the animal to place its head in the correct position and restricts downward movement. The passive restraint has no moving parts, although the effectiveness can be improved by the use of a rump-push device behind the cattle.
1) Active restraint - design specification
- The arms should fit closely to the wall - no distraction to the animal entering.
- The area in front of and above the head restraint should be brighter than the rest of the box - encouraging the animal to place its head in the correct position.
- The slaughterman should have enough room to stun correctly and safely once the head is held.
- The restraint should have an immediate, quiet action when activated, ensuring the animal is restrained at the first attempt without inducing undue stress.
- The power source operating the restraint must work quietly with no sudden noises.
- A hydraulic power source will be quieter than a pneumatic source.
- If operated manually, a trip mechanism should be fitted to allow immediate release of the head.
- The restraint should be regularly maintained so that the device operates effectively at all times.

Cantilever head restraints, as shown below, are not suitable for heavy or strong animals which may pull the restraint system off the wall.

![Active Restraint Cantilever Neck-Yoke](image)

Figure 1a Resting Position  Figure 1b Restraining position

2) Part-passive restraint - specific requirements
The part-passive system has the same requirements as the active restraints. To avoid distraction the stationary side should not contrast with the inside of the box.
- The power source should be fitted out of the sight of the animal.
- The fittings on the stationary side should be on the side closest to the front of the box to prevent distraction.
3) Passive restraints - specific requirements

- Use internal fittings to hang the shelf - minimising distraction to the animal.
- The shelf can be either a solid box (Figure 3), a piece of sheet metal curved to form a surface (Figure 4) or a metal shelf held by a counter balance (Figure 5).
- The fixed shelf (Figures 3 and 4) should be fitted in such a way that swing-doors are not impaired and the removal of the stunned animal is not affected.
- The movable shelf (Figure 5) can be fitted in boxes with fully rotating doors as the shelf will drop as the gate goes over it.
- Make the area above the shelf lighter than the rest of the box.
- Close any gaps which allow light in at the base or sides of the box – to avoid distraction.
- Place a bar across the top of the box (lying above the withers) – to prevent animals stepping onto the shelf.
- Avoid creating shadows or contrasting colours in the box which may distract the animal from entering.
- Install a rump-push so the box can deal with all sizes of animals.

Rump-push

When a plant kills animals of a similar size the shelf is an ideal system. However, when the size of the animals varies, the shelf becomes less effective as smaller animals can shy back away from the slaughterman. By fitting a rump-push the animals are encouraged forwards and prevented from backing away. Rump-pushes can be operated manually, hydraulically or pneumatically depending on the power source available. Overall the hydraulic system would be best as this can apply the correct pressure to individual animals and also has a quiet action. The push should be ideally be positioned around 90cm high.

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

- not impair removal of the animal after stunning
- be capable of applying suitable pressure, therefore positioning without causing pain or bruising to the animals
- be at a height suitable to control all animals
Comparisons of restraints

As mentioned above, the type of restraint depends entirely on the individual abattoir’s circumstances. The following table summarises all the options discussed so far, showing both advantages and disadvantages of each system.

<table>
<thead>
<tr>
<th>Effect of restraint on animal</th>
<th>Active</th>
<th>Part-passive</th>
<th>Passive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
<td>Head-yoke and chin-lift</td>
<td>Cantilever neckyoke</td>
<td>Hinged neckyoke</td>
</tr>
<tr>
<td></td>
<td>Held securely in a fixed position</td>
<td>Backward movement restricted</td>
<td>Backward movement restricted</td>
</tr>
<tr>
<td>Animal held stable</td>
<td>animal held stable</td>
<td>animal held stable</td>
<td>animal held stable</td>
</tr>
<tr>
<td>Allows accurate shot</td>
<td>allows accurate shot</td>
<td>allows accurate shot</td>
<td>allows accurate shot</td>
</tr>
<tr>
<td>Good for training staff</td>
<td>good for training staff</td>
<td>good for training staff</td>
<td>head held in a good position</td>
</tr>
<tr>
<td>Can hold heavy animals</td>
<td>animal can not move back</td>
<td>animal can not move back</td>
<td>animal cannot move back</td>
</tr>
<tr>
<td>Animal cannot move back</td>
<td>animal cannot move back</td>
<td>animal cannot move back</td>
<td>animal cannot move back</td>
</tr>
</tbody>
</table>

Possible disadvantages

- Extra stress experienced
- Slower throughput time
- Increased time in stun-box prior to stunning
- Disruption of carcass removal
- Rump-push may be needed to position (power would be required)

Construction materials

The device should be manufactured from materials which:

- are non-toxic
- are corrosion resistant and robust
- are familiar to the animal and non-contrasting with surroundings
- require minimum routine maintenance
- are able to withstand a high degree of abuse from both animals and operators
Design

The following considerations are a good basis for finding the right system for your abattoir.

<table>
<thead>
<tr>
<th>Conformity</th>
<th>Flexibility</th>
<th>Useability/reliability</th>
<th>Environmental factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does it conform to current welfare legislation?</td>
<td>Will it adapt to future:</td>
<td>Can it be easily:</td>
<td>Have you considered:</td>
</tr>
<tr>
<td></td>
<td>operational changes?</td>
<td>installed?</td>
<td>lighting?</td>
</tr>
<tr>
<td></td>
<td>cattle breeds/sizes?</td>
<td>operated?</td>
<td>noise? (for operator and animal)</td>
</tr>
<tr>
<td></td>
<td>plant capacities?</td>
<td>inspected?</td>
<td></td>
</tr>
</tbody>
</table>

5. Human factors
- Is it safe for humans?
- Is it easy to operate?
- Is handling made easier?
- Can all parts be reached?
- Have staff approved it?
- Does it cater for worst case operators?

6. Animal Factors
- Is it suitable for all cattle?
- Is there no risk of injury at all?
- Does it prevent goading?

7. Cost
- Is it affordable in terms of:
  - installation?
  - running?
  - maintenance?
- Will the accuracy of stunning be significantly improved?

8. Future implications
- Have all future implications been considered?

Adapted from Link: Improved Handling Systems for Pigs at Slaughter

Final design

An ideal head restraint design would consistently position the animals' heads in such a way that accurate stunning would occur all the time, without compromising animal welfare. To enable this, the design should:

- have a minimal adverse impact on animal welfare
- not increase time spent in stun box prior to stun
- be constructed so that the animal enters freely, with little hesitation
- be suitable for the existing stunning equipment and procedures
- position, rather than physically restrain, the head
- provide an instant constraint so throughput is not disrupted
- not impair the removal of animals from the stun box
- allow unhindered access for both stunning and restunning of dropped animals
- release the head immediately after stunning

IMPORTANT:
The best restraint does not have to be over-complicated in either design or operation.

Humane Slaughter Association
HSA recommendations

Based on its survey results and trials on restraint systems, the HSA recommends that:

Passive head restraint systems are currently the best type of restraint available for conventional slaughter.

- The effectiveness of the head shelf can be improved by installing a rump-push especially if your plant kills varying sizes of animals.
- A good head restraint design will not cause extra ‘excitement’ to be experienced by the animal whilst in the box, ie not increase the time spent in the box prior to stunning, not require extra handling or force to get the animal into the box, but will allow improved shooting accuracy.
- If already in place, an active restraint should only be used when absolutely necessary, ie when animals voluntarily place their heads in the device, or are too fractious to manage, and when trainees are undergoing practical instruction.
- Due to the increased stress caused by a head-yoke and chin-lift, this system can only be justified when religious slaughter is being performed.
- Staff and equipment should be regularly monitored to maintain high animal welfare standards.

IMPORTANT:

Animal welfare will be compromised if captive-bolt equipment is not carefully maintained, the wrong cartridges are used, or the shot is inaccurate, even with a good restraint system.

This technical note is intended for abattoirs in which animals are killed by conventional slaughter methods. It is important to stress that the legislation for religious slaughter states the animals should be slaughtered;

‘...in a restraining pen which has been approved by the minister...’

and will therefore have different restraining requirements to the stun boxes mentioned in this technical note.

Further reading

Head Restraint at Slaughter  HSA  1995
Captive-Bolt Stunning of Livestock (3rd Edition)  HSA  2001
Handling Cattle at Abattoirs and Markets  HSA & MLC 2001

Full details of all legislation can be found on the following website: www.tso.co.uk

WARNING: DISCLAIMER OF LIABILITY

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