

On-Farm Humane Killing of Neonate Pigs, Goats and Sheep

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Occasionally young piglets, goat kids or lambs have to be killed on-farm due to ill health, poor performance or for management purposes. This technical note describes the use of mechanical, non-penetrating captive-bolt devices for the humane killing of neonate (new-born/infant) pigs¹, goats² and sheep³ up to a maximum weight of five kilograms (eleven pounds).

IN THE EU AND UK, THE FOLLOWING METHODS CAN ONLY BE USED FOR THE EMERGENCY KILLING OF NEONATE PIGS, GOATS AND SHEEP. ANY OTHER APPLICATION WILL REQUIRE THE STUN TO BE IMMEDIATELY FOLLOWED BY A KILLING METHOD, SUCH AS BLEEDING. THE OPERATOR MAY ALSO HAVE TO BE LICENSED ACCORDING TO NATIONAL OR LOCAL LEGISLATION.

Introduction

The usual methodology for the on-farm emergency killing, or culling, of neonate pigs, goats and sheep is by blunt-force trauma (BFT). This is carried out by administering a heavy blow to the head in one of two ways:

- Hold the animal by the back legs and deliver a firm blow to the back of the head with a blunt instrument, e.g. an iron bar or hammer.
- Hold the animal by the back legs and swing it through an arc to hit the back of its head with considerable force against a solid object, e.g. a brick wall or metal stanchion.

Whilst this technique, properly carried out by a trained and competent operator, is an effective, humane method of killing neonates, it is dependent on a number of variables being met: the strength and skill of the operator; and the timing and accuracy of the blow. Consequently, BFT should only be used in emergencies, when movement of the animals, any delay in killing, or a combination of the two, may cause avoidable suffering.

This method of killing is aesthetically unpleasant for the operator, any bystanders and/or onlookers, and is open to much misinterpretation.

Mechanical blunt-force trauma is an alternative method that delivers a more controlled percussive blow to the head and does not require the procedure to be followed by a killing method. There are a number of tools on the market that can humanely stun-kill neonate piglets and kids. It has been shown that lambs are more resistant to mechanical blunt-force trauma, therefore a device that delivers a heavier blow is required for lambs.

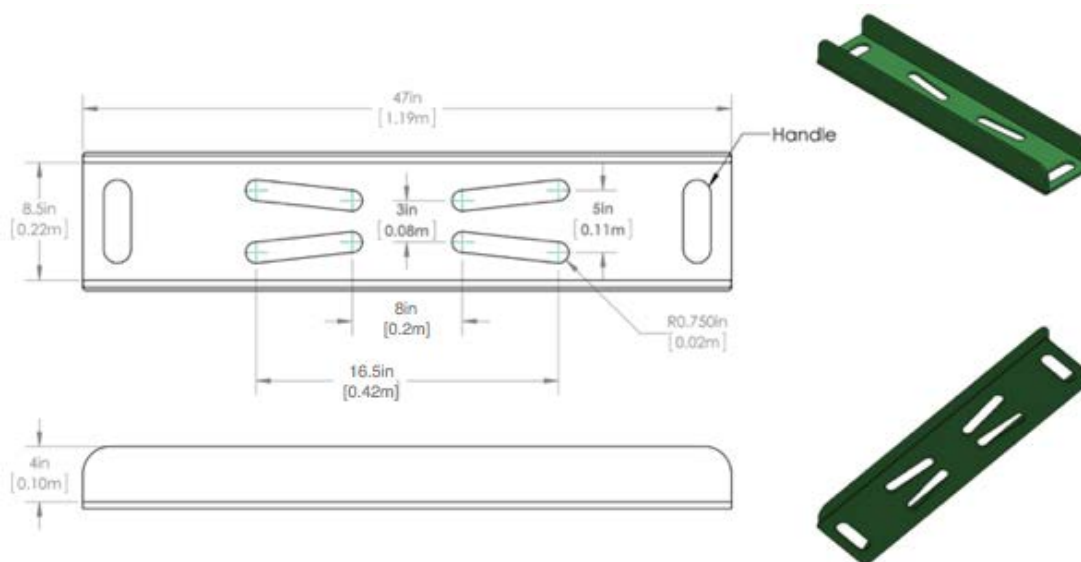
Legislation

Killing. Council Regulation (EC) No. 1099/2009 on the protection of animals at the time of killing defines 'killing' as "*any intentionally induced process, which causes the death of an animal*". Annex I of this regulation describes the permitted methods, including non-penetrating captive-bolt devices.

Restraint

It is essential to restrain the animal prior to the application of a non-penetrating captive-bolt device, particularly if undertaking this procedure alone. The restraining device shown in Figure 1 was designed by Bock Industries*, in collaboration with the University of Bristol, to enable a single operative to carry out this procedure humanely. A similar restraining device can be fabricated on-farm using a section of plastic guttering, or drainage pipe halved lengthwise, with slots cut out to accommodate the legs. Installing the restrainer crossways on a pen corner will have the head close to the horizontal steel support of the pen. Ideally the restraint should firmly support the subject so that bolt energy is not flexing the pen support. A rigid restraint system will ensure maximum impact energy is transferred to the subject.

Figure 1: Neonate restraining device.



Piglets

When using this method to kill piglets, research has demonstrated that it is important to support the head of the piglet on a hard surface for maximum energy transfer to the skull to ensure an effective kill. The energy requirement, for an effective stun-kill with piglets, is greater or equal to 27.7 J. The energy developed by individual devices can be determined from the manufacturer's website.

Shooting position: The shooting position for piglets is on the midline between the eyes and the ears on the frontal/parietal bone, as shown in Figure 2.

* Bock Industries <http://www.bock-industries.com/zephyr-exl-swine-restraint-new.html>

Figure 2: Shooting position for piglets.



Post-shot movement is an expected result of an effective stun-kill. The important organ when assessing the death of an animal is the brain. Following an effective percussive blow, the brain is no longer functioning. However, death is a process that starts with the higher centres of the brain followed by other parts of the central nervous system, for example the spinal cord, which will die more slowly. Once the brain is dead, spinal reflexes are released from the control exerted by the upper-brain and post-shot movements will result. These will gradually subside.

Some piglets will bleed from the nose due to the force of the blow – this is not a welfare concern, as the brain of the animal is no longer functioning.

[Watch – On-Farm Killing of New-Born Piglets](#)

Assessment of the effectiveness of the shot: Following the shot the piglet should be assessed as follows:

- the piglet should not be breathing rhythmically
- there should be no corneal reflex (a blink in response to touching the eye), and
- there should be no response to a painful stimulus (a nose prick with needle).

The absence of these responses indicates an effective stun-kill.

Gasping respiration, or agonal breathing, may be present in a small number of piglets. In the dying animal this is the last respiratory pattern prior to loss of movement and is not a welfare concern.

Goat Kids

The application of a percussive blow with energy of greater or equal to 27 J will produce an effective stun-kill with kids. The energy developed by individual devices can be determined from the manufacturer's website.

Shooting position: Shot position is critical with kids. The gun must be applied behind the poll, between the ears, with the neck bent and the chin touching chest, as shown in Figure 3.

Figure 3: Correct shooting position for kids.



Some kids may bleed from the nose due to the force of the blow and/or the skin on the head may split: this is not a welfare concern, as the brain of the animal is no longer functioning. Post-shot movement is an expected result of an effective stun-kill, as was reported with piglets above.

Watch – On-Farm Killing of New-Born Goat Kids

Assessment of the effectiveness of the shot: Following the shot the kid should be assessed as follows:

- the kid should not be breathing rhythmically
- there should be no corneal reflex (a blink in response to touching the eye), and
- there should be no response to a painful stimulus (a nose prick with needle).

The absence of these responses indicates an effective stun-kill.

Gasping respiration, or agonal breathing, may be present in a small number of kids. In the dying animal this is the last respiratory pattern prior to loss of movement, and is not a welfare concern.

Lambs

Lambs are more difficult to stun-kill, than piglets and kids, when using a non-penetrating captive-bolt device. The energy required to produce an effective stun-kill with lambs was found to be greater or equal to 107 J. This increased energy requirement can be produced by the Accles & Shelvoke, Small Animal Tool which has been reproofed to enable a pink, 1.25 grain cartridge to be used which produces sufficient energy for the effective stun/killing of lambs.

Shooting position: Shot position is also critical with lambs. It must be applied behind the poll, between the ears, with the neck bent and the chin touching chest, as shown with kids in Figure 3.

Some lambs may bleed from the nose due to the force of the blow and/or the skin on the head may split – this is not a welfare concern, as the brain of the animal is no longer functioning. Post-shot movement is an expected result of an effective stun-kill, as was reported with piglets above.

Watch – On-Farm Killing of New-Born Lambs

Assessment of the effectiveness of the shot: Following the shot the lamb should be assessed as follows:

- the lamb should not be breathing rhythmically
- there should be no corneal reflex (a blink in response to touching the eye), and
- there should be no response to a painful stimulus (a nose prick with needle).

The absence of these responses indicates an effective stun-kill.

Gasping respiration, or agonal breathing, may be present in a small number of lambs. In the dying animal this is the last respiratory pattern prior to loss of movement, and is not a welfare concern.

CAPTIVE-BOLT EQUIPMENT MUST BE CLEANED, FOLLOWING THE MANUFACTURER'S INSTRUCTIONS, AFTER EVERY DAY'S USE REGARDLESS OF THE NUMBER OF DISCHARGES. IT MUST ALSO BE STORED SAFELY AND SECURELY WHEN NOT IN USE.

DISCLAIMER OF LIABILITY

In no circumstances can the HSA accept liability for the way in which the equipment in this leaflet is used: or for any loss, damage, death or injury caused thereby, since this depends on circumstance wholly outside the HSA's control

References

¹Andrew Grist, Jeff A Lines, Toby G Knowles, Charles W Mason and Stephen B Wotton 2018. The Use of a Non-Penetrating Captive-bolt for the Euthanasia of Neonate Piglets. *Animals*. 8, 48; doi:10.3390/ani8040048

²Andrew Grist, Jeff A Lines, Toby G Knowles, Charles W Mason and Stephen B Wotton 2018. Use of a Non-Penetrating Captive-bolt for Euthanasia of Neonate Goats. *Animals*. 8, 58; doi:10.3390/ani8040058

³Andrew Grist, Jeff A Lines, Toby G Knowles, Charles W Mason and Stephen B Wotton 2018. The Use of a Mechanical Non-Penetrating Captive-bolt Device for the Euthanasia of Neonate Lambs. *Animals* **2018**, 8, 49; doi:10.3390/ani8040049

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