



Practical Slaughter of Poultry

A guide for the smallholder and small-scale producer

This is the downloadable PDF 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 from www.hsa.org.uk.

Introduction

This online guide is intended to provide a comprehensive introduction to the humane slaughter of poultry for the smallholder and small-scale producer. Everyone involved in poultry keeping will have to deal with the slaughter of their birds at some time. This may be the emergency killing of sick or injured birds or the slaughter of birds for consumption.

Whether you are an experienced stockman, or someone keeping a few poultry for eggs or for the table, you must have the necessary skills and knowledge to complete the task quickly, confidently and without causing the bird any avoidable pain, distress or suffering.



Slaughter may never be pleasant but it can, and must, be humane. It is your responsibility to ensure that you are fully prepared in order to protect the welfare of each individual bird.

The Humane Slaughter Association (HSA) is the only registered charity that works, in the UK and internationally, through educational, scientific and technical advances, exclusively towards the highest worldwide standards of welfare for food animals during transport, marketing, slaughter, and killing for disease control and welfare reasons.

Important Points About This Guide And Its Use

This guide is intended to instruct smallholders in the most humane methods of slaughtering poultry. In order to safeguard the welfare of the birds to be killed, it is necessary for the guide to be both thorough and illustrated. As such, some people may find some of the descriptions and graphics upsetting. Please do not read further if you feel you may be negatively affected by the content.

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In addition, some of the equipment and techniques used in the killing of animals is potentially harmful or lethal. In no circumstances can the HSA accept any liability for the way in which information contained in this site is used or for any loss, damage, death or injury caused thereby, since this depends on circumstances wholly outside the HSA's control.

If you are unsure of your ability to carry out the humane slaughter of any poultry, it may be necessary for you to consider other options (see below) for the slaughter of your birds.

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 or using the contact details provided at the HSA website.

Why Is Bird Welfare Important?

Why is the welfare of poultry during catching, handling and slaughter important? Does it really matter?

Most people believe that humans have a moral responsibility to protect animal welfare and that to deliberately cause an animal to suffer is unethical. Animal welfare is a priority for the OIE (the World Organisation for Animal Health). The OIE defines animal welfare as “how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear, and distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling and humane slaughter or killing.”



Many countries have protected animal welfare in law, so people also have a legal responsibility to ensure that the welfare of birds in their care is protected.

There is also an economic motive to ensure good animal welfare. Careless catching and handling will result in bruising and meat of poor quality. Poor stunning and bleeding will contribute to carcase quality problems such as burst blood vessels and broken bones. These problems will result in a lower value end product.

Moral duty, the law and economics – these are three reasons why it is important to treat birds well and avoid causing them fear or pain.

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Overview

Slaughter must be humane. The whole process from catching to the point of death must be performed in a controlled manner so that the birds are protected from any avoidable pain, distress or suffering. Approaching the task in a confident, patient, calm and quiet manner will produce the best outcome for both the bird and yourself.

The slaughter process has been divided into several stages in this guide:

- Preparation
- Catching and Handling
- Restraint
- Stunning and Slaughter

This guide includes images and video clips of poultry being slaughtered. Please read the 'Important points about this guide and its use' section before viewing these.



In this guide the terms 'slaughter' and 'killing' are often used interchangeably. However, they can be defined as 'killing for consumption' and 'killing for a purpose other than consumption' respectively.

Certain aspects of the law do not apply when killing birds in an emergency; this is defined as a situation in which the animal has an injury or disease associated with severe pain or suffering and where there is no other practical possibility to alleviate this pain or suffering. The priority in such a situation is to avoid prolonging the bird's suffering.

Preparation

It is important not to cause any avoidable pain, distress or suffering to any bird. It is a good idea to practise slaughter techniques on a dead bird or an inanimate object to help you gain confidence and proficiency. A lack of skill can lead to incidents of extreme, if unintentional, cruelty.

It is also important to plan ahead to ensure that you always abide by the law. Take time to ascertain your legal obligations before slaughtering any birds. Legislation in place in many countries to protect the welfare of the birds and you should also be aware of legislation regarding meat hygiene and public health.



You must be sure you have the knowledge and skills necessary to stun and slaughter each bird humanely. If you have any doubts about your ability, you must not attempt to slaughter even a single bird. It may be necessary for you to consider other options (see below) for the slaughter of your birds.

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A short training course (as are available in some parts of the world) or time spent working under the supervision of an experienced slaughterman, or veterinary surgeon, may be appropriate to help prevent mistakes and give you the confidence to cope if things do not go according to plan. The HSA runs such courses in the UK.



Remember: Do not start a task that you cannot complete. Make sure you are prepared.

Legislation

It is important to plan ahead to ensure that you always abide by the law. Legislation is in place to protect the welfare of the birds and also covering food hygiene and public health.

This online guide has been written with consideration of the relevant welfare legislation in the European Union. The guide does not deal with the food hygiene and public health aspects of the legislation. The following links provide access to the relevant guidance and legislation according to which country you are resident in.

United Nations Countries:

› [OIE Terrestrial Animal Health Code, Slaughter Of Animals](#)

European Union Member States:

› [Council Regulation On The Protection Of Animals At The Time Of Killing](#)

United Kingdom:

› [DEFRA Guidance On The Welfare Of Animals At Slaughter](#)

Other Options

For poultry to be slaughtered humanely, it is important that the task is done by someone competent and confident in the necessary procedure. If you feel unable to do it yourself then you should seek the assistance of a vet or someone else qualified or experienced and able to do the task. Veterinary surgeons can euthanase birds by lethal injection if you prefer; however, please note that birds killed in this way will not be fit for consumption.



Birds may need to be slaughtered without delay (e.g. due to injury or disease) to avoid further suffering. It is important to plan for this in advance.

Catching and Handling

The slaughter process begins when birds are caught and handled prior to killing. Correct handling ensures safety for the bird and the handler. During catching, noisy, rough or aggressive techniques

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will result in the birds panicking which may result in injury. In a confined space, panicked birds may flock together which can cause injury or suffocation to the birds.

To minimise disturbance it is important to approach birds quietly and calmly. If possible, catching under dim lighting conditions will help avoid panic. For birds in open spaces, small pens may be erected in which to confine birds before catching.

Poultry may also be caught individually with fishing nets. Care must be taken not to injure birds with the rim of the net. Remove the bird from the net gently, taking hold of the legs with one hand and securing the body and wings (or the neck for geese) with the other hand. Proceed to handle the birds as detailed in the species-specific sections of this guide.



Catching a chicken using a 50cm diameter trout fishing net.



Catching a goose with a larger, stronger, salmon fishing net.



When removing poultry from fishing nets, first secure both legs.



Once both legs are held, secure the neck (for geese) or body and wings and gently remove the bird from the net.

If birds are in cages or crates they should be removed singly and must be held securely with two hands over the wings. Care must be taken to avoid injury to the birds and to avoid squeezing the body, which can stop the bird breathing. When placing birds into cages or crates, put the birds in head-first to take advantage of the bird's movement away from you.



Birds should be removed singly from cages and crates, with two hands held securely over the wings. A helper should control the lid of the crate to avoid other birds escaping.



Birds should be placed into cages and crates head-first.

Birds must be caught and handled with care and consideration. Bone breaks, dislocations and bruising are common injuries which can occur when catching poultry, resulting in pain and poor carcase quality.



This is an example of an injury caused by poor handling prior to slaughter, resulting in suffering and poor carcass quality.

The method of handling will depend on the species of bird. The following sections describe the methods for chickens, ducks, geese, guinea fowl and quail, and turkeys.

Remember: Always handle birds with care and consideration.

Chickens

Chickens should be picked up by placing both hands securely over the wings to prevent flapping. Once you have hold of the bird, slide one hand under the body and firmly clench the legs between your outstretched fingers (positioning one or two fingers between the legs) and support the bird's breast on the palm of the same hand. The wings can then be controlled by your opposite hand or by holding the bird against your body, under your arm.



Secure the bird's legs between your outstretched fingers, positioning one or two fingers between the legs. Clench the legs firmly (which makes the bird feel secure,

minimising flapping) and support the bird's breast on your palm.



Hold the bird against your body to control wing flapping, which should be minimal if the legs are held firmly. The head of the chicken is accessible.



The bird may also be held under your arm to control wing flapping. The head of the chicken is accessible for stunning.

All chickens should be supported and carried individually and should not be inverted. Catching or carrying hens by the legs can result in hip dislocation.

Remember: Always handle birds with care and consideration.

Ducks

Poor catching and handling can easily lead to ducks becoming lame, therefore they should only be carried individually and never be caught by the leg as there is a high risk of hip dislocation.

When catching ducks, place one hand either side of the body, over the wings, and lift the bird. Alternatively, ducks may be caught and gently lifted by the base of the neck for a minimal time before transferring the bird to your hand and arm. Holding briefly by the neck minimises flapping and therefore reduces injury. Take care not to apply excessive pressure when lifting ducks by the base of the neck.



Ducks should never be caught by the legs only. They may be caught and gently lifted by the base of the neck for a minimal time before transferring the bird to your hand and arm. Take care not to apply excessive pressure.

Once you have hold of the bird, slide one hand under the body and firmly clench the legs between your outstretched fingers (positioning one or two fingers between the legs) and support the bird's breast on the palm of the same hand. The wings can then be controlled by your opposite hand or by holding the bird against your body, under your arm. Ducks tend to wriggle more than hens, so it is important to have control of the legs. It is recommended to wear gloves when handling Muscovy ducks as these birds are strong and have sharp claws.

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Support the weight of the duck, holding the legs firmly. Once held securely against your body, the bird's head is accessible for stunning.

Remember: Always handle birds with care and consideration.

Geese

To handle geese safely, it is important to have control of the head to avoid being bitten. Geese may be caught from behind by the neck, taking care not to apply excessive pressure. Most geese will sit down once caught in this way, preventing the wings from hitting the handler's legs.

Once you have hold of the neck, slide your other hand under the body and firmly clench the legs between your outstretched fingers (positioning one or two fingers between the legs) and support the bird's breast on the forearm of the same hand. The head and neck can then be tucked under your armpit of the supporting arm and the bird lifted against your body. The wings can then be controlled by your free hand.



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Once gently caught by the neck, most geese will sit down.



Once held in this position, the bird's head is accessible for stunning.

Guinea Fowl and Quail

Particular care must be taken to avoid injuring these birds. With two hands placed securely over the wings, lift the birds bodily with the legs hanging free. These birds must never be caught by one leg as there is a high risk of hip dislocation or bone breakage.

Once you have hold of the bird, slide one hand under the body and firmly clench the legs between your fingers (positioning one finger between the legs) and support the bird's breast on the palm of the same hand. The wings can then be controlled by your opposite hand or by holding the bird against your body, under your arm.



Holding guinea fowl safely and securely. The head is accessible for stunning.

Remember: Always handle birds with care and consideration.

Turkeys

Turkeys are very strong birds with powerful legs. To handle a turkey, reach from behind with one hand and take secure hold around both legs, gently lower the bird onto its breast, then slide your free arm over the wings and under the body. Lift the bird to your body. You can then transfer both legs into your other hand and use your free hand to control the wings. Due to the strength of turkeys, take secure hold around both legs with one hand rather than securing the legs between your outstretched fingers as for other species.



With secure hold around both legs with one hand and the weight of the bird in the other, lift the turkey to your body.



Once lifted to your body, the legs can be transferred into your other hand and your free hand used to control the wings.

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Alternatively, for larger turkeys, take secure hold of both legs in one hand, as before, and then grasp the shoulder of the wing furthest away from yourself with your other hand. Lift and hold the bird close to your body.



Turkeys may be lifted by the legs and the shoulder of the wing furthest away from you.



Lift the bird to your body.

Small or young turkeys may be lifted using the same method as for chickens.



Small or young turkey poults may be held using the same method as for chickens.

To avoid having to lift heavy turkeys for stunning, they may be manually restrained on the ground by taking hold of the legs in one hand and gently lowering the bird onto its breast.



Turkeys may be restrained on the ground by taking hold of the legs and gently lowering the bird onto its breast.

Restraint



Various methods of restraint are used to calm birds and reduce the risk of accidental injury during slaughter. Small birds may be restrained manually (refer back to Catching and Handling section). Using restraint devices, such as the cone, allows you to have both hands free and removes the need to support the weight of the bird. This is particularly important when killing heavy geese or turkeys.

Following electrical or concussion stunning, there will be some involuntary wing flapping and movement. Wing flapping is controlled when a bird is restrained, which avoids damage to the bird.

However, the use of restraint devices can cause discomfort or pain to the birds. Therefore they should be used only briefly. You should always be ready to slaughter a bird immediately after restraining it.

Use of Restraint Devices

Small birds may be restrained manually (refer back to Catching and Handling section). However, on-farm, the most commonly used restraint device is the cone. Birds are inverted into the device with the head lowered through a hole. Slaughter can then be carried out immediately.





A cone used to restrain a turkey. Maintain hand contact with the bird for the first few seconds it is in the cone, this will help calm the bird.

The time for which birds are restrained in a cone should be as short as possible prior to stunning and no longer than a maximum of two minutes for turkeys, geese and ducks and a maximum of one minute for other poultry. It is a good idea to maintain hand contact with the bird for the first few seconds it is in the cone as this will help calm the bird.

Remember: You must not cause any avoidable pain or suffering to any bird.

Stunning and Slaughter

The following section will help you decide on a humane and practical method of slaughter for the size, species and number of birds to be killed.

Slaughter methods usually involve a two-stage process of (i) inducing loss of consciousness and (ii) causing the death of the animal. Loss of consciousness must last until death is caused by bleeding or neck dislocation. The process of inducing loss of consciousness is referred to in this guide as 'stunning'.



There are some situations when the law does not require that birds are first made unconscious. For example, in slaughter by Jewish or Muslim methods when religious authorities prohibit stunning (in the EU this is permitted only within a slaughterhouse).

In this guide, the methods for stunning and slaughter of poultry have been divided into:

- Electrical Stunning (followed by Neck Cutting or Neck Dislocation)
- Concussion Stunning (followed by Neck Cutting or Neck Dislocation)
- Neck Dislocation
- Gas Killing
- Other Methods



Electrical Stunning

Electrical stunning equipment is available for use on-farm and, if operated correctly, is a humane method of pre-slaughter stunning. Electrical stunning must make the bird immediately unconscious and insensible to pain until death occurs. Death is usually achieved by cutting the major blood vessels in the neck.

The following pages provide detailed advice on the use of electrical stunning for poultry.

Physiological Effects of Electrical Stunning

The general principle of electrical stunning is to pass sufficient current through the brain to disrupt the normal electrical activity and cause an epileptic-like fit. During epileptiform brain activity, the neurones fire in a hyper-synchronised way, which leads to neuronal fatigue. Epileptiform brain activity results in immediate unconsciousness and insensibility to pain. The duration of insensibility depends on the size of the current that passes through the brain and the length of time for which the current is applied.

The initial effect on poultry is immediate insensibility, accompanied by arching of the neck, no rhythmic breathing, rigidly extended legs, constant rapid body tremors and the wings held close to the body. If poultry are electrically-stunned in the correct position with sufficient current and length of application, the stun is usually irreversible. However, the bird may recover to some degree if insufficient current is delivered, or the positioning is incorrect. If there is any uncertainty as to whether a bird has been effectively stunned, it should be re-stunned immediately.

An effective stun can be defined as one which causes immediate insensibility. This condition should persist until death.

Electrical Stunning Equipment

Electrical stunners for use on-farm are generally hand-held, with paired electrodes for placing across the bird's head. The equipment operates from mains electricity via a step-down transformer. The handset is manually operated, with adjustable electrodes to accommodate the heads of different sized birds. Always select electrodes that offer a large contact area with the bird's head. The

electrodes must be placed correctly, on each side of the bird's head, across the brain. When switched on, the flow of electricity between the electrodes causes immediate unconsciousness.



An example of a hand-held electrical stunner.

The level of current must be sufficient to cause an effective stun. Recommended levels are:

Small birds (e.g. chickens): 300-400mA

Large birds (e.g. turkeys): 400mA

Current flow is reduced by poor contact between the electrodes and the head, which can be made worse by dirt on the electrodes or the bird. Poor current flow can result in an ineffective stun and considerable suffering to the bird. Contact resistance must therefore be kept to a minimum. Pre-wetting the bird's head (using a wet sponge) can improve the electrical contact. Current flow can be particularly poor for ducks, geese and turkeys and so the use of concussion stunning equipment is preferable for these species.

For a bird to be effectively stunned you must:

- Regularly maintain equipment.
- Regularly clean and replace electrodes.
- Apply the equipment correctly.
- Maintenance of Electrical Stunning Equipment

Before slaughter, particularly if killing on an irregular or seasonal basis, electrical stunning equipment must be tested. Output voltage should be a minimum of 110V under load (use a dead bird for testing). The equipment must also be tested for earth leaks.

It is important that electrodes are always kept clean and free of dirt and debris. This will reduce contact resistance. Before and after use each day, and at regular intervals during stunning (every 25-50 birds), the equipment should be switched off and the electrodes cleaned with a wire brush. If electrodes become corroded they must be replaced immediately. Always store the equipment under dry, clean conditions.

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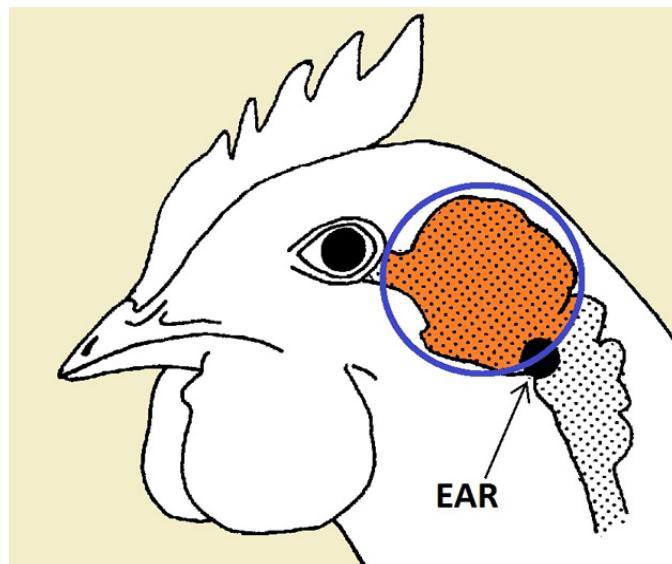


The contact electrodes of a hand-held electrical stunner.

Remember: To protect bird welfare and operator safety, electrical stunning equipment must not be tampered with or adapted and should only be used according to the manufacturer's instructions.

Use of Electrical Stunning Equipment

Check the electrodes are the correct size to fit across the head of each bird. Wearing a rubber glove, use one hand to hold the back or bottom of the bird's head and then apply the electrodes firmly to either side of the head between the eye and ear. You must position the electrodes correctly so that the current flows through the brain and causes immediate unconsciousness.



This diagram shows the position of the brain (coloured orange) in a chicken. The electrodes must be positioned to span the brain.



Correct positioning for electrical stunning.

Electrodes must never be placed across the neck as this may cause paralysis whilst the bird remains fully conscious and able to feel pain.

When you are certain you have good electrode contact in the correct position, press the switch to deliver the current without delay. Electrode application times vary according to the size and species of bird but, as a guide, electrodes should be applied for a minimum of seven seconds and at least until wing flapping stops.

Check for signs of an effective stun. You may not see wing movement if the wings are restrained in a cone so you should look for the legs becoming rigid and extended.

Signs of an Effective Electrical Stun:

- Neck arched with eyes fully open;
- No rhythmic breathing immediately after the stun;
- Rigidly extended legs;
- Constant rapid body tremors;
- Wings held close to the body (following initial uncontrolled bursts of flapping).

Checking Unconsciousness:

It is important to check unconsciousness by the absence of a blink reflex when the cornea (the surface of the eyeball) is touched. Presence of a blink reflex must be acted upon immediately: it may not indicate full consciousness but the return of this reflex after stunning is a sign of some brain function returning and it indicates the possibility that consciousness may also be returning. Do not hesitate to repeat the stun or use an alternative method.

Electrical stunning disrupts the normal co-ordination between brain activity and spinal reflexes, which results in uncontrolled wing flapping and body movement. Do not be alarmed by this involuntary movement, it is a sign of an effective stun and will continue in the unconscious bird until the spinal cord stops functioning.

If the equipment fails to produce an effective stun, check the electrodes are being applied in the correct position for the correct time. Do not continue to use the stunner until it has been tested and you are sure it is functioning correctly. For your own safety, remove all jewellery before using electrical stunning equipment, wear rubber gloves and boots, avoid all contact with the live electrodes and observe the manufacturer's operating instructions.

Immediately after electrical stunning, within 15 seconds, the bird must be killed by either neck-cutting or neck dislocation.

Electrical Stunning Summary

Safety first: follow the relevant safety procedures and inspect and test equipment before use.

To stun effectively, make sure to select the correct current and apply the electrodes in the correct position.

Always check for signs of an effective stun.

If you are in any doubt, always stun the bird again. Have an alternative method available as a back-up.

Cut or dislocate the neck immediately after stunning.

Clean and maintain the stunner after use.

Concussion Stunning

Concussion stunning involves the application of a severe blow to the skull to cause immediate unconsciousness, or, if sufficient force is applied, death. This must be followed by neck-cutting or neck dislocation to ensure the death of the bird.



The following pages describe the use of specially designed concussion stunning equipment. It is not easy to ensure an effective blow to the skull with manual concussion stunning (e.g. using a heavy rod) and it requires complete commitment in order to destroy the brain in one fast blow. If not applied accurately and with sufficient force, it will cause extreme distress and suffering.

In the EU, if specialised mechanical concussion equipment is not available nor any other better method, manual concussion may be used but this should only be in an emergency to prevent suffering and can only be used for birds less than 5kg liveweight and for no more than 70 birds per person per day.

Physiological Effects of Concussion Stunning



When a fast, heavy blow is correctly applied to the skull it produces a rapid acceleration of the head, causing the brain to collide against the inside of the skull. This causes disruption of normal electrical activity resulting from a sudden, massive

increase in intra-cranial pressure followed by an equally sudden drop in pressure. The resultant damage to the nerves and blood vessels causes brain dysfunction and/or destruction, and impaired blood circulation. The duration of insensibility depends on the severity of damage to the nervous tissue and the degree to which the blood supply is reduced.

The initial effect on poultry is immediate insensibility, accompanied by what is termed 'tonic' activity: the bird becomes rigid, reflexes are lost and rhythmic breathing stops. This is quickly followed by the 'clonic' phase during which the bird will display pronounced, uncontrolled movement, especially of the wings. If poultry are concussion-stunned in the correct position with sufficient force, the stun is usually irreversible. However, if insufficient force is delivered, or the positioning is incorrect, the bird may recover to some degree. If there is any uncertainty as to whether a bird has been effectively stunned, it should be re-stunned immediately.

An effective stun can be defined as one that causes immediate insensibility. This condition should persist until death.

Concussion Stunning Equipment

Mechanically operated concussion equipment has been specifically developed to kill poultry. Such equipment applies a controlled blow to the bird's head, causing immediate unconsciousness. When operated to the manufacturer's instructions, this equipment will produce an effective stun and cause the death of the bird. Although it can effectively kill chickens and turkeys, mechanical concussion stunning must still be followed by neck-cutting or dislocation to ensure the death of the bird.

Two types of concussion stunning equipment are available: cartridge powered captive-bolt stunners and compressed air powered captive-bolt stunners. These both come with a choice of flat or convex heads. Flat heads are best for chickens and small birds, whilst the convex heads are more suitable for larger birds such as ducks, geese and turkeys.

Mechanical concussion stunning is preferable to electrical methods for ducks, geese and turkeys because of the difficulty of ensuring sufficient current flow when electrically stunning these species.



An example of air-powered concussion stunning equipment.



An example of cartridge powered concussion stunning equipment.

Maintenance of Concussion Stunning Equipment

The ability of captive-bolt equipment to deliver an effective stun is mainly dependant on the velocity of the bolt. Lack of regular maintenance can significantly reduce bolt velocity and the efficacy of stunning.

Increased friction caused by a build-up of carbon deposits (in cartridge powered stunners) and/or defects in the firing chamber are the main conditions which lead to reduced bolt velocity. A build-up of carbon deposits in the breech of a stunner can reduce the velocity of its bolt by 50 percent. If the bolt cannot retract fully into the breech the explosive pressure exerted on the piston will be reduced due to the increased size of the expansion chamber. This can also occur if any of the recuperator sleeves are worn. Similarly, if there is excessive wear on the piston, cylinder or flange, gases will escape around the piston and the propulsive force will be reduced. Corrosion, or build-up of carbon, can also cause increased friction around the cylinder, bolt and undercut.

The biggest cause of power loss is the failure of the bolt piston to return fully into the breech after the shot, whether this is done automatically or manually. Where recuperator sleeves are fitted, care must be taken to ensure that when the muzzle is screwed into position it causes the sleeves to be compressed. If this does not occur, either insufficient washers or sleeves have been fitted, or some sleeves are worn and must be replaced.

Captive-bolt stunners should be dismantled, cleaned and lubricated after use, even if they are used only a few times in the day, or even less frequently. Back-up equipment must also be regularly serviced, even if it has not been used. The continual use of a cartridge powered captive-bolt, in a slaughterhouse for example, causes comparatively less build-up of carbon deposits than sporadic use for a similar number of shots.

Daily Maintenance Must Include:

- Dismantling of the stunner.
- Visual examination for evidence of damage and signs of excessive wear.
- Removal of blood and water.
- Removal of carbon deposits from the undercut of cartridge powered stunners.
- Checks on the condition of the recuperator sleeves.
- Reordering of the recuperator sleeves on the bolt assembly.
- General lubrication.

Daily removal and cleaning of the bolt assembly reduces the chance of excessive wear on any one part of it.

Step-By-Step Maintenance Of Cartridge Powered Concussion Stunning Equipment

These broad principles apply equally to most cartridge-fired captive-bolt equipment, regardless of manufacturer or model. The manufacturer's instructions should be followed at all times.

Daily Maintenance:

Each time a captive-bolt stunner is used it should be cleaned to prevent corrosion and hardening of carbon deposits. It is essential that the following simple operations are carried out in order to ensure maximum bolt velocity and effective stunning:

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1. Unscrew the muzzle from the barrel and remove the bolt assembly (i.e. bolt, washers and recuperator sleeves). Older models may have rubber collars or 'Plasticine' instead of recuperator sleeves.
2. Wipe out the inside of the barrel with a soft, dry cloth and scrub with a wire brush to remove the soft powder and sludge. This is best done while the barrel is still warm and before the powder solidifies.
3. Remove the washers and recuperator sleeves (or their equivalent) from the bolt and remove any carbon using a wire wheel or brush. Once cleaned, wipe the bolt over with a lightly oiled rag.
4. Clean any powder and sludge from the recuperator sleeves and washers, and examine them for wear. Replace any excessively worn sleeves, and reassemble them on the bolt in a different order to that in which they were removed (i.e. move former middle sleeves to the ends and former end sleeves to the middle). End sleeves wear the fastest, so rearranging the order minimises wear. A full set of sleeves should last for approximately 4,000 shots.
5. Using the tool provided with the stunner, remove any carbon deposits from the breech and tap out onto a hard surface such as a wooden table top.
6. Reassemble the stunner and wipe all metal parts with an oily rag. Wrap the stunner in an oily rag before locking it away in a secure cabinet.

Weekly Maintenance:

The enlarged diameter inside the barrel at the breech block end (the undercut), must be kept from filling with powder, otherwise bolt return and stunning power will be adversely affected. Therefore, in addition to daily cleaning, the following procedure should be carried out weekly with the undercut cleaning tool which is provided with the stunner:

Grip the undercut cleaner vertically in a vice.

Slide the barrel down the cleaner until the breech face makes contact.

Apply sideways pressure to the barrel. Maintaining this pressure, rotate the barrel backwards and forwards two or three times. Turn the barrel through 90° and then repeat the forwards and backwards movement. Repeat this process until the undercut has been thoroughly cleaned.

Use of Concussion Stunning Equipment

When operated to the manufacturer's instructions, poultry concussion stunning equipment will produce an effective stun and cause the death of the bird. However, it is still important to cut or dislocate the neck immediately after mechanical concussion stunning.

Birds must be restrained appropriately to enable accurate positioning of the captive-bolt. The muzzle of the device should be placed on the highest point of the head, on the midline, with the captive-bolt aimed straight down. The bird's head may be held in position by lightly holding the comb or resting the end of the beak between the tips of your fingers, in a way which allows the beak to slip out of your hold without causing injury to yourself when the stunner is fired.

Make sure to use the correct cartridge size or air pressure for the species and age of bird being killed. This information is specific to the make and model of the equipment being used and can be found in the manufacturer's instructions.

Concussion stunning disrupts the normal co-ordination between brain activity and spinal reflexes, which results in uncontrolled body movement and wing flapping. Do not be alarmed by this involuntary movement, it is a sign of an effective stun and will continue in the unconscious bird until the spinal cord stops functioning.

Signs Of An Effective Concussion Stun:

- No rhythmic breathing (check for abdominal movements in the vent area);
- Uncontrolled wing flapping;
- Leg flexion and extension;
- No neck tension;
- No vocalisation.

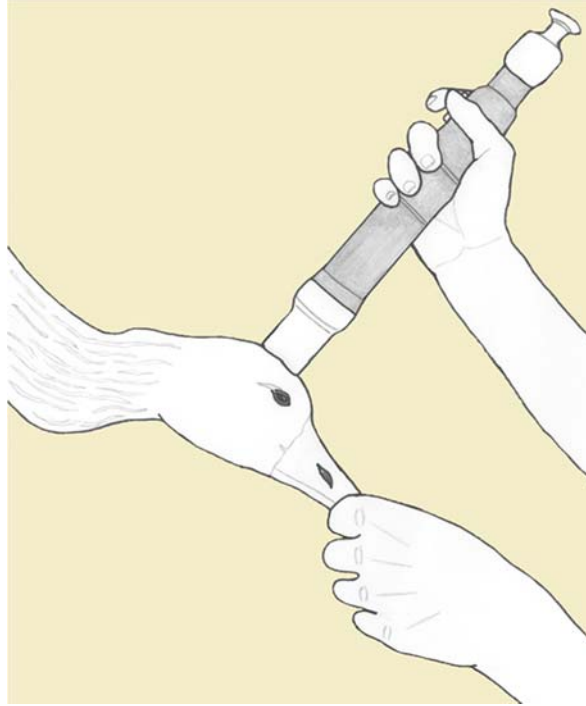
Checking Unconsciousness:

It is important to check unconsciousness by the absence of a blink reflex when the cornea (the surface of the eyeball) is touched. Presence of a blink reflex must be acted upon immediately: it may not indicate full consciousness but the return of this reflex after stunning is a sign of some brain function returning and it indicates the possibility that consciousness may also be returning. Do not hesitate to repeat the stun or use an alternative method.

The correct stunning positions for each species are shown in the following images:



Correct positioning for concussion stunning of chickens.



Correct positioning for concussion stunning of ducks and geese.



Correct positioning for concussion stunning of turkeys.

Safe Use Of Concussion Stunning Equipment

Captive-bolt stunning equipment is potentially lethal to the operator.

However, the equipment includes a number of inbuilt safety features:

- The bolt is 'captive' within the barrel of the stunner, rather than a free bullet which could ricochet within an enclosed area.
- Recuperator sleeves automatically return the bolt to its pre-firing position.
- Two positive actions are required by the operator before it is possible to fire.

Safety Procedures:

It is essential that the safety procedures recommended by the manufacturer are closely followed, and that all operators of mechanical stunning equipment are properly trained in its safe operation and maintenance. Equipment must be regularly checked by a qualified engineer and the following procedures should be followed:

- When handling captive-bolt equipment, during and after loading, the muzzle of the stunner must at all times be pointed away from yourself and anyone else.
- Refer to the manufacturer's instruction sheet for the correct loading procedure and the correct cartridge size or air pressure to use. Avoid repeated use of too heavy a cartridge, or air shots, which can result in the bolt shearing and flying free of the stunner.
- Captive-bolt stunners should always be handled as if they are loaded.
- Once the stunner has been loaded or connected to the airline, ensure that the mechanism is in the 'safe' position until an animal is ready to be stunned.
- Never leave a loaded or connected stunner unattended.
- In the event of a misfire, do not open the breech of a cartridge powered stunner for 30 seconds. Sometimes, slow primer ignition will cause a 'hang fire' and the cartridge will explode after a short pause.
- At the end of the day's kill, ensure the daily cleaning procedures are carried out.
- Make certain that the stunner is unloaded or disconnected before cleaning.
- Immediately note any faults in the operation of the stunner and do not use the equipment until the fault has been rectified.
- Ensure that captive-bolt equipment is stored securely when not in use.
- Remember: The captive bolt is a dangerous firearm. Never point the muzzle at yourself or anyone else.

Trouble-Shooting For Captive-Bolt Equipment

Problem	Causes	Solution
Cartridge Does Not Detonate (A Misfire)	Firing pin failing to make contact with cartridge.	Inspect cartridge for firing pin indent. If no indent is visible, strip down firing assembly and check condition and operation of parts. If indent is visible, check position of indent and rectify if necessary.
	Water or oil-damaged cartridges.	Use a new box of cartridges.
Bolt Does Not Return Fully To The Breech	Incomplete set of buffers and washers.	Check and make good, as necessary.
	Worn washers and buffers.	Check and replace as necessary.
	Build-up of carbon deposits on piston, breech and in chamber.	Check and remove if present.
	Bolt is bent.	Replace immediately.
	Corrosion inside barrel.	Check and remove if present.
Stunner Fires, But There Is Insufficient Power To Stun The Animal	Incorrect strength of cartridge being used.	Check type of cartridge against model of stunner and animals being stunned.
	Incorrect air pressure used.	Choose air pressure according to manufacturer's recommendations.
	Incorrect positioning of stunner on animal.	Check correct stunning position for type of animal.
	Bolt not returning fully to the breech after each shot.	Check for carbon deposits on bolt, breech or in chamber and remove if present. Check buffers, washers and collars for wear, replace as necessary. Check number of washers, buffers and collars, make good as necessary.
Cartridge Difficult To Extract	Damaged breech	Check for scored or split cartridge and if found, return stunner to manufacturer for repair
Unusually Loud Detonation	Split cartridge	Check for damaged breech, return to manufacturer for repair. Check that the correct cartridge is being used.

Concussion Stunning Summary

Safety first: follow the relevant safety procedures and inspect and test equipment before use.

To stun effectively, make sure to select the correct cartridge or air pressure and the correct stunning position.

Always check for signs of an effective stun.

If you are in any doubt, always stun the animal again. Have an alternative method available as a back-up.

Cut or dislocate the neck immediately after stunning.

Clean and maintain the stunner after use.

Neck Cutting Following Stunning

Birds should be bled as soon as possible, within 15 seconds of stunning. Neck cutting must sever both of the carotid arteries or the vessels from which they arise. This method is recommended to ensure death occurs before consciousness can be regained. A sharp, clean knife should be used to cut across the front of the neck just below the head.



Positioning of the knife for bleeding chickens following stunning. Both carotid arteries must be severed.

Some people have advocated cutting the major blood vessels via the mouth to avoid cutting through the external tissue of the neck for aesthetic reasons. However, this is not recommended. It is likely that not all of the vessels will be severed so blood flow may continue to the brain. This can delay the onset of death and the bird may begin to recover from stunning during bleeding. This will result in avoidable pain and suffering.

When slaughtering birds for consumption, for food safety reasons, birds should be kept suspended for a while after neck-cutting to allow time for the blood to drain from the carcass. Turkeys and geese must be allowed to bleed for a minimum of two minutes, and other birds for one and a half minutes, before plucking and evisceration can begin.

Checking Unconsciousness:

It is important to check unconsciousness by the absence of a blink reflex when the cornea (the surface of the eyeball) is touched. Presence of a blink reflex must be acted upon immediately: it may not indicate full consciousness but the return of this reflex after stunning is a sign of some brain function returning and it indicates the possibility that consciousness may also be returning. Do not hesitate to repeat the stun or use a backup method.



Neck Dislocation

Neck dislocation may be preferable to neck cutting following the stunning of diseased casualty birds, to avoid the risk of disease spread from spillage of blood and bodily fluids. Neck dislocation kills the bird by a combination of rupturing the spinal cord, which stops breathing, and by disrupting the blood flow to the brain by rupturing the blood vessels in the neck.

Neck dislocation without prior stunning has been widely used as a method of killing poultry. However, research findings have suggested that neck dislocation does not consistently concuss the brain and it is unlikely to cause immediate insensibility.

Neck dislocation without prior stunning is therefore not recommended for the routine slaughter of poultry and should only be used in an emergency or for the slaughter of very small numbers of birds where better methods are not available. Certain laws apply when slaughtering birds by neck dislocation in some countries. In the EU, neck dislocation must not be used as a routine method but only when no better method is available and may not be performed on more than 70 birds in a day by one person. Weight restrictions also apply.

Electrical or concussion stunning followed by neck-cutting or neck dislocation are more appropriate, humane methods of killing poultry.

Neck Dislocation Techniques

In practice, a variety of techniques and equipment are used for neck dislocation. Neck dislocation should involve sudden stretching of the neck to instantly damage the brain stem, the lower part of the brain from which the spinal cord arises, and cause extensive damage to the major blood vessels. Do not worry if you accidentally decapitate the bird in the process of neck dislocation, the effect will be the same.

Effective neck dislocation disrupts the normal co-ordination between brain activity and spinal reflexes, which can result in uncontrolled wing flapping and body movement. Do not be alarmed by this involuntary movement, it will continue in the unconscious bird until the spinal cord stops functioning.

You must never attempt to kill a bird by crushing its neck (e.g. with pliers or other tools). This does not have the same effect as neck stretching and is neither quick nor humane. Equipment that simply crushes the neck is therefore not recommended.



Examples of unsuitable neck crushing equipment.

If neck dislocation has to be carried out, careful consideration should be given to the size and species of bird on which it is used: the larger the bird the harder it is to kill humanely using this method.

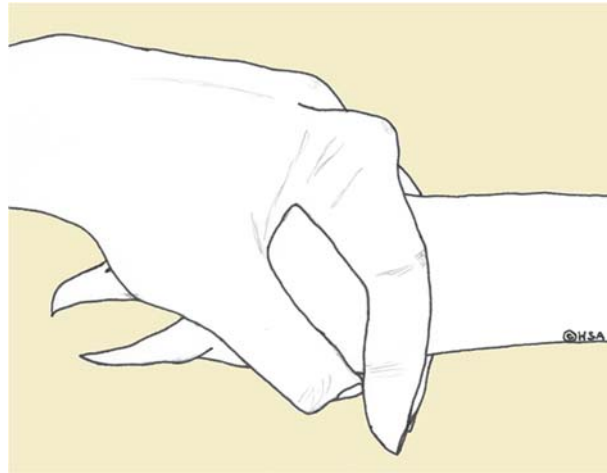
Neck dislocation is not recommended without prior stunning because its use cannot guarantee a consistent and immediately effective stun.

Manual Neck Dislocation

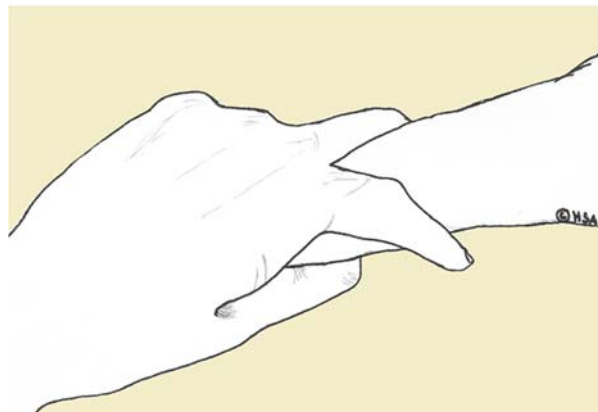
A small bird can be slaughtered by manual neck dislocation. However, this method is not ideal and requires skill, experience and physical strength. In the EU, manual neck dislocation may only be used to slaughter birds less than 3kg liveweight.

The best technique depends on the size of the bird. For adult chickens, hold the bird's legs (and the wing tips if possible) in one hand, close to your hip with the underside of the bird's body against your thigh. Using the first two fingers of your other hand, grip the head immediately behind the skull with

your thumb under the beak. Stretch the neck downwards, at the same time pressing your knuckles into the neck vertebrae and pulling the bird's head back. Neck dislocation should be achieved in one, swift pull. Be firm, confident and positive.



Holding a bird's head for manual neck dislocation. Grip the head immediately behind the skull with your first two fingers and place your thumb under the beak.



Another view of how to hold a bird's head for manual neck dislocation. Grip the head immediately behind the skull with your first two fingers and place your thumb under the beak.



Holding a chicken for manual neck dislocation.

Check For Signs That The Bird Is Dead:

- Feel the neck for a gap in the vertebrae;
- Ensure the bird is not breathing;
- Ensure there is no blink reaction if the eye is touched and that the pupil is dilated.

If you are unsure that the bird is dead, repeat neck dislocation immediately.

Killing Cone

The killing cone consists of a restraining cone with a clamp device below to dislocate the neck. Although not ideal, this method can be used for the slaughter of small numbers of birds. In the EU, this method must not be used to slaughter birds more than 5kg liveweight. The bird is placed in the cone with the head hanging below. Grip the neck in the clamp and firmly pull the handle down to dislocate the neck.



A killing cone, being used to slaughter a turkey.

Check For Signs That The Bird Is Dead:

- Feel the neck for a gap in the vertebrae;
- Ensure the bird is not breathing;
- Ensure there is no blink reaction if the eye is touched and that the pupil is dilated.

If you are unsure that the bird is dead, repeat neck dislocation immediately.

Heavy Stick

Two people are needed for this method which, although not ideal, may be used to slaughter large birds such as turkeys and geese. In the EU, this method must not be used to slaughter birds more than 5kg liveweight.

Hold the bird by the legs (and wing tips if possible), with the head and neck on the ground. An assistant should place a heavy stick (or metal bar) across the neck, behind the head. The person holding the legs should then apply firm pressure to the bar either side of the head and immediately pull the bird's body upwards using sufficient force to dislocate the neck (this may cause some bleeding).



The heavy stick method being used to dislocate the neck of a goose.

Check For Signs That The Bird Is Dead:

- Feel the neck for a gap in the vertebrae;
- Ensure the bird is not breathing;
- Ensure there is no blink reaction if the eye is touched and that the pupil is dilated.

If you are unsure that the bird is dead, repeat neck dislocation immediately.

Gas Killing

Gas killing can be a humane method of slaughtering poultry. However, at present, gas killing is used almost exclusively in large plants with specialised equipment. Anoxic gas mixtures (air which contains very low levels of oxygen) are used, which must render the birds unconscious and insensible without discomfort. Birds must be held in the gas for sufficient time so that they are dead on removal from the gas.

Until specialised, small-scale gas killing equipment is available, this method is not recommended for the on-farm or small-scale slaughter of poultry as welfare and safety hazards are likely to occur without the necessary facilities for precise monitoring of the gas.

Other Methods

The use of a firearm to slaughter poultry is not safe or practical and is not recommended.

Instruments that slice through a bird's brain from inside the mouth should not be used as they are not effective, immediate or humane. Neck-crushing pliers, as discussed in the section on 'Neck Dislocation Techniques', must never be used without effective prior stunning.

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Decapitation involves severing the head from the neck using an axe or sharp blade. It is not recommended on welfare grounds as brain activity may continue for up to 30 seconds and it is doubtful the bird is rendered immediately unconscious. Decapitation is not an acceptable method of slaughter without prior stunning. In the EU, slaughter or killing birds by decapitation without prior stunning is not permitted.

Please note that decapitation using an axe or sharp blade is different to accidentally decapitating the bird in the process of neck dislocation - in the latter case, the stretching damage to the base of the brain and spinal cord is more likely to cause rapid loss of consciousness.

Food Hygiene

In addition to maintaining high welfare standards at all times, if you are slaughtering poultry for consumption it is important to maintain high standards of food hygiene. It is recommended that you obtain further information or advice on food hygiene, such as from your local authority department responsible for environmental health, a local poultry club or the government authority responsible for food standards.



A period of food withdrawal prior to slaughtering poultry is often recommended, to reduce faecal contamination when gutting the carcass. The time poultry are kept without food should be kept to a minimum and should be no longer than 12 hours. Water should be available at all times.



Further Sources of Advice

Further advice and practical training may be available at a local agricultural college or from your veterinary surgeon or an experienced slaughterman. Practical training may be appropriate to help prevent mistakes and give you the confidence to cope if things do not go according to plan. The HSA runs such courses in the UK.

Advice on slaughter of livestock not covered by this guide is available from the HSA website. The killing of day-old chicks is not covered by this guide; for detailed advice you should refer to the HSA Code of Practice for the Disposal of Chicks in Hatcheries.

Acknowledgements

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