Welfare of Poultry at Slaughter

Regional approach of the implementation and enforcement of Regulation 1099/2009

Workshop organised by Regional Animal Welfare Centre (RAWC) for Balkan region

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Welfare during loading & unloading

Annex III

- 1.3. Containers in which animals are transported shall be kept in good order, handled with care, in particular if they have a perforated or flexible bottom, and:

- (a) shall not be thrown, dropped, or knocked over;

- (b) where possible, shall be loaded and unloaded horizontally and mechanically;

Whenever possible animals shall be unloaded individually.

Stunning Methods

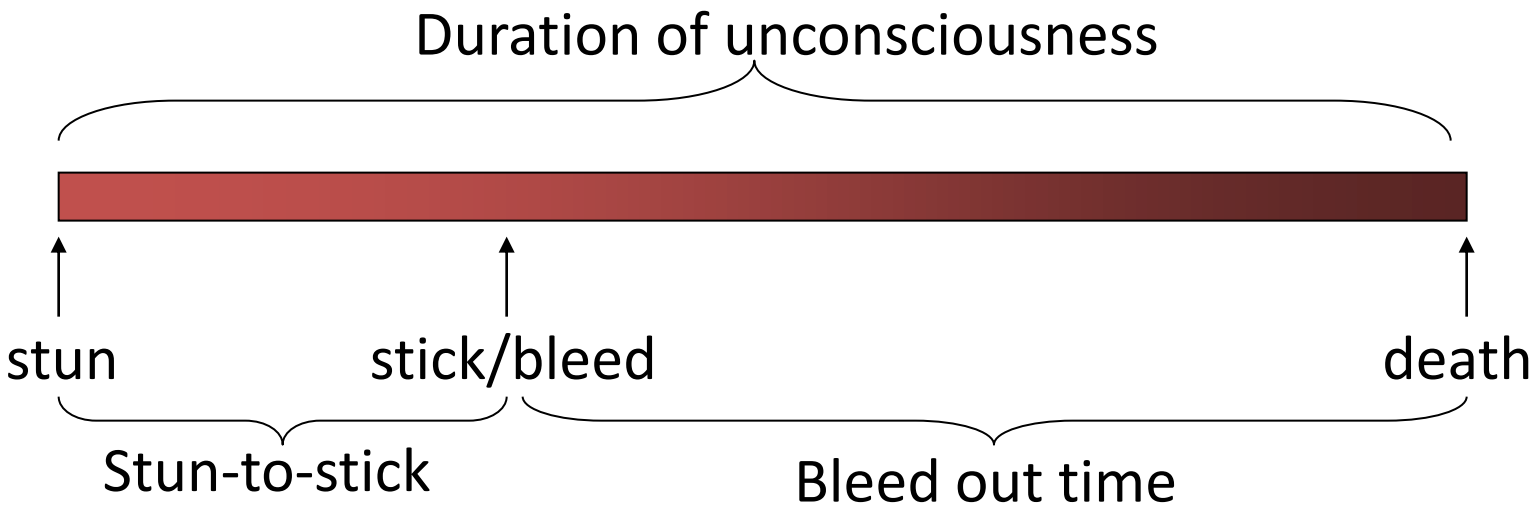
- Simple stunning (reversible):

The duration of unconsciousness induced by stunning should be longer than the time interval between the end of stun and onset of death through blood loss at slaughter

- Stunning (irreversible):

Stun-to-bleeding interval is not critical

Duration of unconsciousness



The onus of preventing recovery of consciousness after simple stunning relies on the efficacy of neck cutting and bleeding

Slaughter (Bleeding)

Annex III, 3.2.

In case of simple stunning or slaughter in accordance with Article 4(4), the two carotid arteries or the vessels from which they arise shall be systematically severed.

Electrical stimulation shall only be performed once the unconsciousness of the animal has been verified.

Further dressing or scalding shall only be performed once the absence of signs of life of the animal has been verified.

Automatic neck cutting

Annex III, 3.3.

Birds shall not be slaughtered by means of automatic neck cutters unless it can be ascertained whether or not the neck cutters have effectively severed both blood vessels.

When neck cutters have not been effective the bird shall be slaughtered immediately.

Electrical stunning methods

- Head-only
- Electrical waterbath

Electrical stunning (criteria)

Should induce **epileptiform** activity in the electroencephalogram (EEG)

requirement under the EU Slaughter Regulation 1099/2009

Epileptiform activity in the brain

Induction of a generalised epileptiform activity in the brain (i.e. involving whole brain) is essential for unconsciousness

Partial epilepsy involving one group or region of brain is not sufficient for unconsciousness

The amount of current necessary to induce seizures is less than necessary to induce generalised epileptiform activity

Head-only

Description	Conditions of use	Key parameters
Exposure of the brain to a current generating a **generalised epileptic form on the electro-encephalogram (EEG)** Simple stunning	Slaughter, depopulation and other situations	•Minimum **current** (A or mA) •Minimum **voltage** (V) •Maximum **frequency** (Hz) •Minimum **time of exposure** •Maximum stun-to-stick / kill intervals •Frequency of calibration of the equipment •Optimisation of the current flow •Prevention of electrical shocks before stunning •Position and contact surface area of electrodes

Head-only: minimum currents

Chicken	Turkeys
240 mA	400 mA

Head-only

Specific requirement

- When using head-only electrical stunning, electrodes should span the brain of the animal and be adapted to its size
- A minimum current should be delivered for at least 4 seconds

Head-only electrical stunning

Physical signs (monitoring points) of effective head only electrical stunning

Successful head only electrical stunning should induce immediate onset of wing flapping (clonic convulsions)

- no respiration (apnoea)
- fixed eyes without any reflex (palpebral or corneal)
- no response to painful stimulus (e.g. comb pinch or prick with a needle)

Electrical waterbath

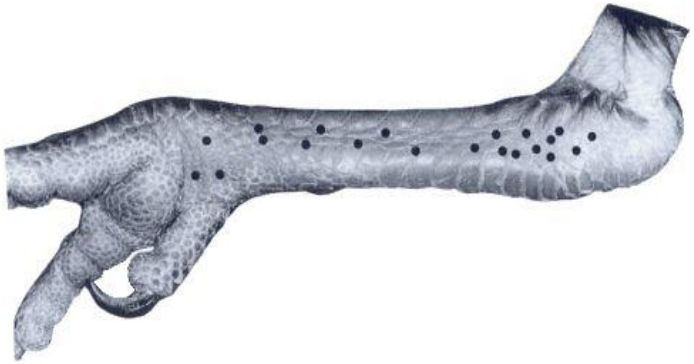
Specific Requirement:

- Birds that are too small for the waterbath stunner or if shackling is likely to induce or increase the pain suffered (such as visibly injured animals) should not be shackled. In these cases, they should be killed by an alternative method.
- Shackles should be wet before live birds are shackled and exposed to the current. Birds should be hung by both legs.
- Birds should be exposed to the current for a minimum duration of at least 4 seconds.

Electrical waterbath

Welfare issues:

- Shackling of conscious poultry prior to stunning
- Involves stunning of several birds at a time in the water bath

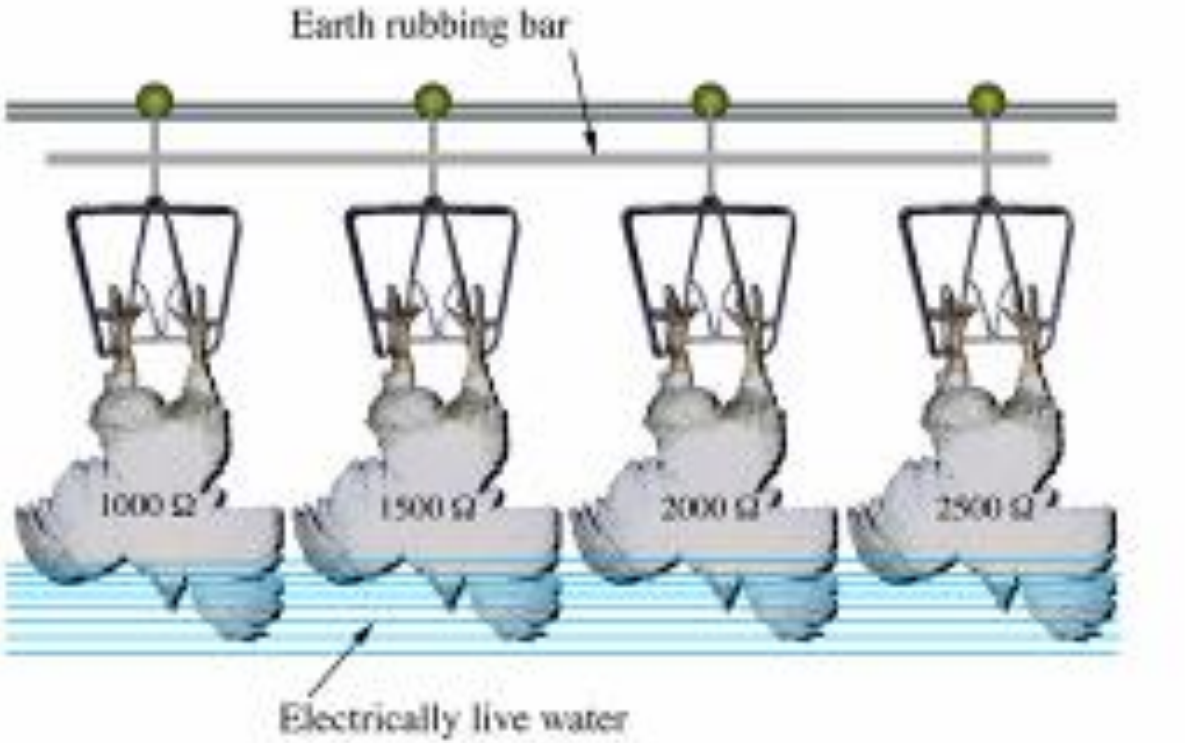


Nociceptors
Source: Mike Gentle et al.

Pre-stun electric shocks

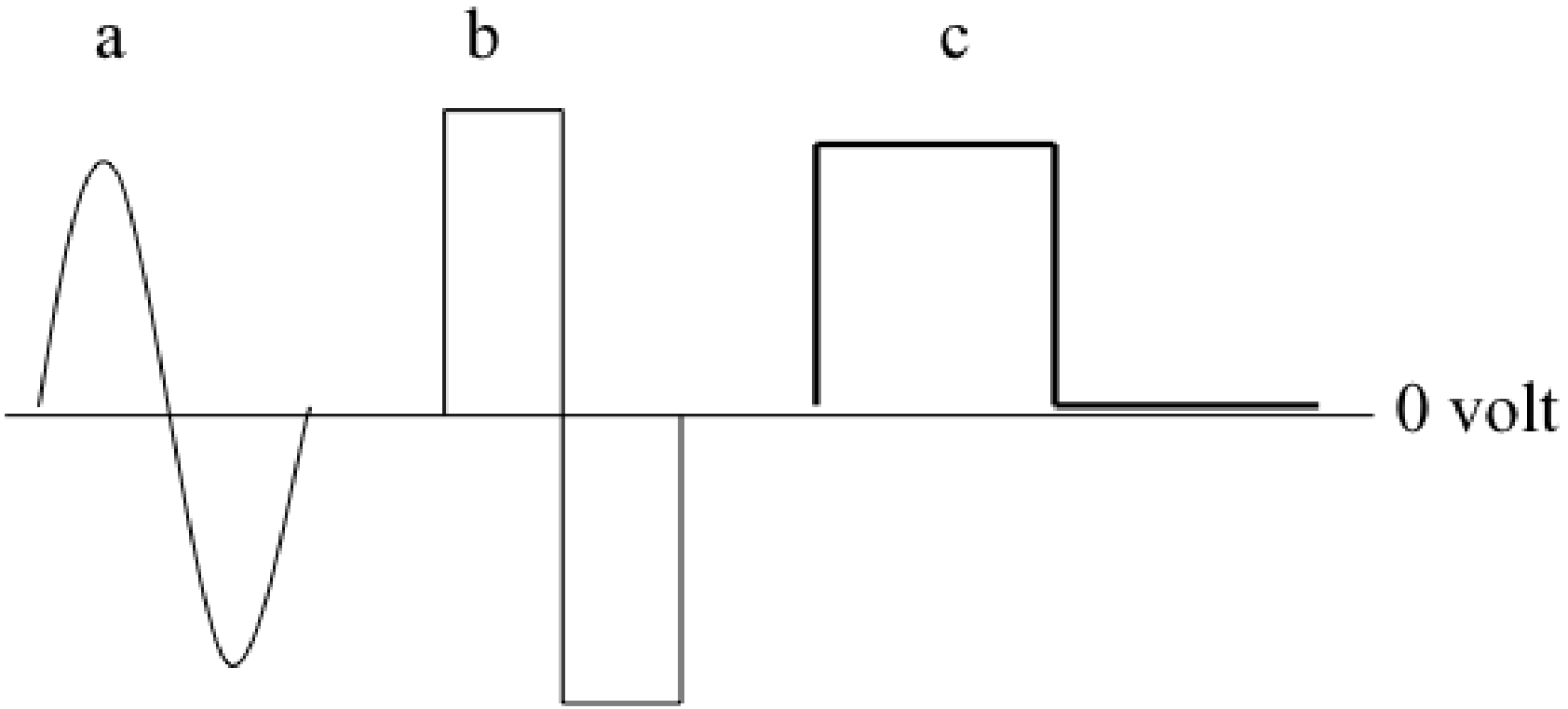
- Occur due to wing making contact with electrified bath before head
- Wings hanging lower than heads in large poultry species, especially in turkeys and geese
- Overflow of electrified water at the entrance

Variation between birds



Water bath stunner – showing possible variation in individual bird resistance
Source: Defra

Electric current waveforms (eg)



a = sine wave AC, b = square wave AC, c = pulsed DC

Waterbath stunning equipment (1)

Annex II, 5. – deals with shackle line design and construction

Art 29.1. requirement from 8 December 2019

- 5.1. Clear of any obstruction and that disturbance to the animals is reduced to a minimum.

- 5.2. Chickens shall not remain hung conscious longer than one minute.
- Ducks, geese and turkeys shall not remain hung conscious longer than two minutes.

- 5.3. The whole length of the shackle line shall be easily accessible.

- 5.4. The size and shape of the metal shackles shall be appropriate ….secured without causing pain.

Waterbath stunning equipment (2)

- 5.5. Equipped with an electrically insulated entry ramp
- 5.6. Level of immersion of the birds can be easily adapted.
- 5.7. Electrodes in waterbath shall extend the full length of the waterbath.

  Shackles shall remain in continuous contact with the earthed rubbing bar.
- 5.8. Bird calming measure from the point of shackling until the birds enter the waterbath stunner.
- 5.9. Access to the waterbath stunning equipment shall be available.
- 5.10. Shall be fitted with a device which displays and records the details of the electrical key parameters used.

  These records shall be kept for at least one year.

WBS

Description	Conditions of use	Key parameters
Exposure of the entire body to a current generating a **generalised epileptic form on the EEG and possibly the fibrillation or the stopping of the heart** through a water bath Simple stunning except where frequency is equal to less than 50 Hz	Poultry Slaughter, depopulation and other situations	•Minimum **current** (A or mA) •Minimum **voltage** (V) •Maximum **frequency** (Hz) •Frequency of calibration of the equipment •Prevention of electrical shocks before stunning •Minimising pain at shackling •Optimisation of the current flow •Maximum shackle duration before the waterbath •Minimum **time of exposure** for each animal •Immersion of the birds up to the base of the wings •Maximum stun-to-stick / kill intervals for frequency over 50Hz(s)

WBS minimum currents (average)

Frequency (Hz)	Chickens	Turkeys	Ducks & geese	quail
< 200 Hz	100 mA	250 mA	130 mA	45 mA
200 – 400 Hz	150 mA	400 mA	Not permitted	
400 – 1500 Hz	200 mA	400 mA	Not permitted	

Physical signs (monitoring points) of effective water bath stunning (WBS)

Successful WBS should induce a generalised epileptiform activity in the brain

The epileptic state can be recognised by the immediate onset of tonic spasm from the moment of birds entering the WBS and lasting several seconds after the exit from the stunner

Induction of cardiac ventricular fibrillation during WBS will result in relaxed carcasses at the exit of the stunner and birds will not show any signs of life

Physical signs (monitoring points) of effective water bath stunning (WBS)

During tonic seizure, all the muscles are in a state of tetanus (stiffness) and, as a consequence, birds will show

fully extended stiff legs

wings held tightly around breast

no respiration (apnoea)

fixed eyes without any reflex (palpebral or corneal)

no response to painful stimulus (e.g. pinching or pricking comb with a needle)

WBS signs

Gas stunning

- Exposure to gas mixtures leads to inhibition of the brain
  - Lowering of pH, e.g. carbon dioxide
  - Hypoxia, e.g. inert gases
- Gradual loss of brain activity is evidenced from the EEG records

Gas stunning poultry
Intention and purpose

Eliminate uncrating, hence avoid pre-slaughter handling induced fear, anxiety, distress, suffering or pain in conscious birds

Eliminate problems inherent to multiple bird water bath electrical stunning

Gas Stunning Systems - Types

Passage of transport crates through a chamber

Passage of drawers from modules through a chamber

Passage of birds on conveyor through a chamber

Gas Mixtures for poultry

- Carbon dioxide at high concentrations
- Carbon dioxide in two phases
- Carbon dioxide associated with inert gases
- Inert gases

Gas Stunning Systems/Key Parameters

- Concentration(s) of gas(es)
- Quality of the gas(es)
- Temperature of the gas(es)
- Duration of exposure
- Maximum stun-to-stick/kill interval(s) in case of reversible (simple) stunning

Specific requirement

- **Carbon dioxide, use of inert gases or a combination of those gas mixtures**
  - Under no circumstances shall gases enter into the chamber or the location where animals are to be stunned and killed in a way that it could create burns or excitement by freezing or lack of humidity

Monitoring welfare during gas stunning

- Exposure to gas mixtures should result in:
- no muscle tone
- no respiration, including gagging (oral breathing)
- fixed eyes without any reflex (palpebral or corneal)
- no response to painful stimulus (e.g. comb or toe pinching)

Mechanical stunning

- Penetrative captive bolt device
- Non-penetrative captive bolt device
- Firearm with free projectile
- Maceration
- Cervical dislocation
- Percussive blow to the head

Key parameters (1)

- Penetrative captive bolt device
  - Position and direction of the shot
  - Appropriate velocity, exit length and diameter of bolt according to animal size and species
  - Maximum stun to stick/kill interval(s)

Key parameters (2)

- Non-penetrative captive bolt device
  - Position and direction of the shot
  - Appropriate velocity, diameter and shape of bolt according to animal size and species
  - Strength of the cartridge used
  - Maximum stun to stick/kill interval(s)

Key parameters (3)

- Firearm with free projectile
  - Position of the shot
  - Power and calibre of the cartridge
  - Type of projectile

Key parameters (4)

- Maceration
  - Maximum size of the batch to be introduced.
  - Distance between the blades and speed of rotation.
  - Measure to prevent overloading

Key parameters (5)

- Percussive blow to the head
  - Force and location of the blow

Specific requirements (1)

- **Non-penetrative captive bolt device**
  - When using this method business operators shall pay attention to avoid the fracture of the skull

Specific requirements (2)

- **Maceration**
  - shall provide instantaneous maceration and immediate death
  - apparatus shall contain rapidly rotating mechanically operated killing blades or expanded polystyrene projections
  - The capacity of the apparatus shall be sufficient to ensure that all animals are killed instantaneously, even if they are handled in a large number

Specific requirements (3)

- **Cervical dislocation and percussive blow to the head**
  - shall not be used as routine methods but only where there are no other methods
  - shall not be used in slaughterhouses except as a back-up method
  - No person shall kill by manual cervical dislocation or percussive blow to the head more than seventy animals per day.
  - Manual cervical dislocation shall not be used on animals of more than three kg live weight

EFSA Toolbox

- Monitoring welfare at slaughter of poultry
  - http://www.efsa.europa.eu/en/efsajournal/pub/3521.htm
- Sample size
  - http://www.efsa.europa.eu/en/efsajournal/doc/541e.pdf

Thank you