



## Improving animal welfare in poultry slaughterhouses

How to reduce stress, suffering and ease handling





## Electricity or gas?

To date, 2016, the electrical water-bath is still the most-used stunning system for poultry in Europe. Due to advantages in animal-welfare and meat quality, gas stunning systems are becoming more and more popular. In the Netherlands almost all broiler slaughterhouses have switched to gas stunning systems that use low concentrations of CO<sub>2</sub> to render birds unconscious. Ducks and most laying hens though are still stunned by an electric water bath even though for these birds gas stunning is also a more humane option.

In the past few years Eyes on Animals visited several European poultry slaughterhouses to observe bird behavior and welfare during transport, handling and stunning. We observed gas stunning systems (low CO<sub>2</sub> concentrations) as well as electrical waterbath stunners.

A concern with CO<sub>2</sub> stunning is that CO<sub>2</sub> induces breathlessness, fear and respiratory irritation before birds are rendered unconscious. These things can be reduced by using low CO<sub>2</sub> concentrations and (in some systems) adding O<sub>2</sub> to the gas mixture. However, some suffering still occurs and cannot be prevented. During our visits we observed that birds show medium stress signals like head shaking, restlessness and deep inhalation for approximately 30-50 seconds.

This suffering caused during CO<sub>2</sub>-gas stunning, though, cannot be compared to the extreme fear and pain birds experience during the manual unloading and shackling when using the electrical water bath stunners. During our visits of poultry slaughterhouses using the electric waterbath we observed that birds heavily flap their wings, scream and breath fast during unloading and shackling. These are all signs of pain and extreme stress. It is also known that shackling causes fractures, dislocations and bruises.<sup>1</sup> Using an electric waterbath also causes very painful 'pre-electrical stuns' and a considerably high percentage of birds are not stunned adequately.<sup>2 3</sup>

Gas stunning systems have four important advantages that help reduce suffering:

1. in some gas systems birds are stunned inside their crates or containers, so the birds remain in the transport containers and do not have to be unloaded. These systems have an advantage over other CO<sub>2</sub> systems which tilt the transport containers so that the live birds fall out onto conveyor belts leading them to a CO<sub>2</sub> tunnel. This tilting causes stress and possibly also bruising.
2. live-shackling and inversion is prevented causing extreme fear and pain to their legs
3. pre-electrical stuns will no longer occur
4. percentage of properly stunned animals is much higher



Water bath stunner ©Eyes on Animals



Gas stunner ©Meyn

Gas-stunning systems that use low concentrations of CO<sub>2</sub> and stun birds inside the containers cause the least amount of animal suffering, because live painful handling procedures like shackling and unloading are eliminated. The one drawback with CO<sub>2</sub> gas stunning is that CO<sub>2</sub> remains an aversive gas to breathe in. We would therefore like to encourage industry and scientists to keep looking for systems that use anoxic gases instead of CO<sub>2</sub>, so pre-slaughter stress is reduced further.

## Electrical waterbath stunners- improvements

We strongly discourage the use of electrical waterbath stunning as this method causes serious animal-welfare problems, like fractures, dislocations, injuries and fear during shackling, very painful 'pre-electrical stuns' and a considerably high percentage of birds not being stunned properly.<sup>456789</sup> If slaughterhouses however decide to keep using waterbaths we would strongly recommend the following options to at least slightly reduce the stress and pain it causes.

### Improve shackling



Shackling of birds ©Eyes on Animals



### Install a system to support weight of the breast

A breast-supporter will diminish the stress and pain caused by shackling as the birds feel supported and it likely also disperses the weight of their bodies. The suffering though will not be totally prevented. A breast supporter should be in contact with the breast of the birds and made of a solid piece of non-conductive material. The strip should be solid and smooth, without any obstacles in it like bolts that could cause injury. The strip should start where the birds are first shackled until the moment they enter the waterbath. The strip should block the view for the birds, to prevent them being scared of activity around them. This photo shows how such a breast-system should look like.



Breast supporter that prevents birds being disturbed by activity around them. ©Meyn

Please see this document from Humane Slaughter Association (HSA) for more information:

<http://www.hsa.org.uk/downloads/hsagn7electricalwaterbathpoultry1.pdf>

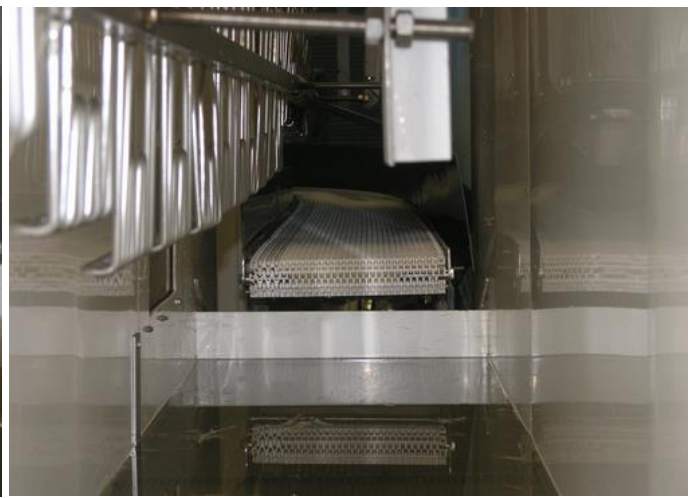
### Touching birds during shackling

If the birds flap their wings heavily during shackling, gently place your hand against the birds' breast, hold their body or legs for a while, or gently push them against the breast supporter strip while you walk with him.

### Conveyer belt to support breast

Even better than a breast supporter as indicated above, is a conveyer belt underneath the shackle line. A conveyer belt will give support to the birds breasts even more than a strip in contact with the breast does. A conveyer belt will also keep the birds in a more upright position which will decrease their fear and pain. Of course one must pay attention that the birds cannot fall or become loose and walk off. The conveyer belt should be always rigid, as birds will struggle if the conveyer belt is bendable. If the birds have been shackled, the worker should fold the wings into a closed position to prevent pre-electrical stuns.





Conveyer belt system to reduce suffering caused by shackling

©Jeff Lines - <http://www.silsoeresearch.org.uk/>, HSA and BSI Schwarzenbek

Please also see the HSA **Guidance Notes No.7 on Electrical Waterbath Stunning of Poultry:**

<http://www.hsa.org.uk/shop/publications-1/product/electrical-waterbath-stunning>

### Compliant shackles

Use compliant shackles to reduce pain and stress caused by high pressure on legs. Compliant shackles adapt to the size of the birds' legs, as they are flexible. The leg size of birds can differ enormously due to housing conditions, breed and body development.



Left: compliant shackle, right: normal shackle ©HSA

### Prevent delay

Always prevent the shackle- line from stopping, as any delay will prolong animal suffering caused by live-shackling.

### Sufficient space in between the birds

If the birds can touch each other during wing flapping, they have been shackled too close together. Increase the space in between the birds. If birds touch each other, they can hurt each other and stress, blood spots, and fractures occur. Placing the birds further apart will also reduce the chance of electric shocks passing from one bird in the water bath to the next one in line.

### Prevent pre-electrical stuns

It is extremely important that pre-electrical stuns be prevented. A pre-electrical stun means that the wing, or other body part, is in contact with the electric-water bath before the head is. This means the bird gets an electric shock while s/he is still conscious and fully sentient. Electric shocks are known to be *extremely* painful. The head should therefore always touch the water first and immediately, so the bird is rendered unconscious straight away. Turkeys in particular are at high risk for getting pre-electric stuns because their large wings often hang below their head .

The HSA has published an interesting paper on preventing pre-electric stuns:

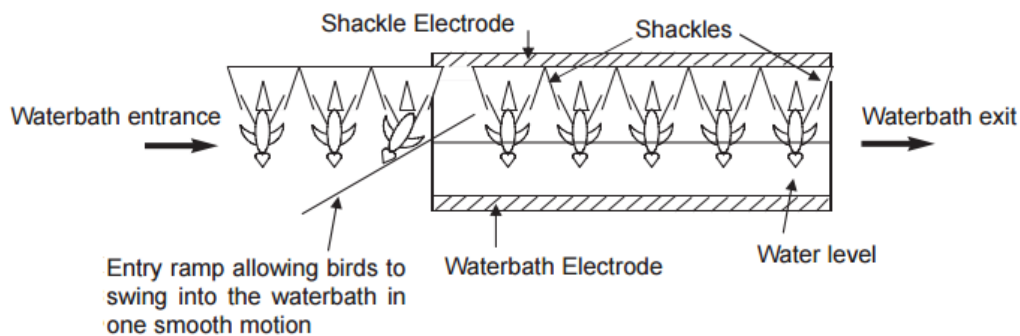
<http://www.hsa.org.uk/downloads/technical-notes/TN16-prevent-pre-stun-shocks-waterbaths.pdf>

**If pre-electric stuns occur make sure recommendations below are put into practice:**

Bolt a steeply inclined ramp onto the entrance of the waterbath. It should extend over the water, so the birds get drawn up the ramp and then swing down directly into the water, in one movement. In this way the birds head and wings will enter the water together, so - if they receive sufficient current from the waterbath - the birds will be stunned immediately. Please see the drawing below from HSA.



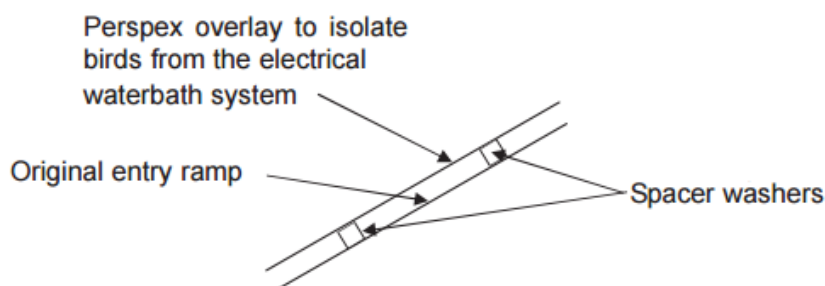
Inclined ramp attached to the waterbath



Drawing HSA. HSA Guidance Notes No.7 on Electrical Waterbath Stunning of Poultry:

<http://www.hsa.org.uk/shop/publications-1/product/electrical-waterbath-stunning>

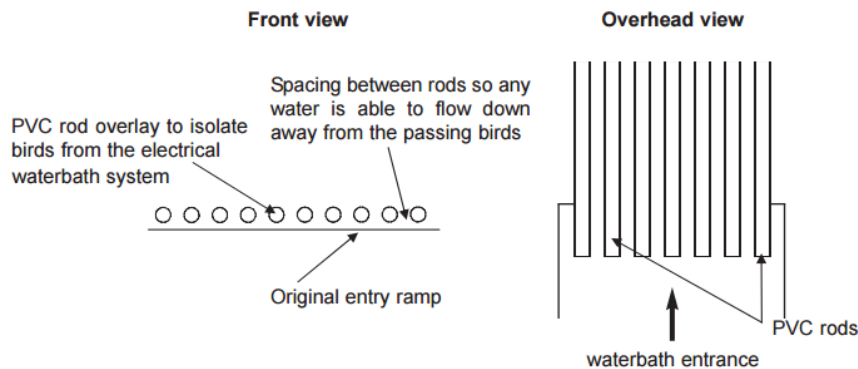
- ✓ It is important birds do not receive pre-electric stuns by the entry ramp itself. This happens if the ramp is not isolated from the rest of the stunner, or if water is flowing from the bath onto the ramp. Therefore always isolate the ramp. For example by using a Perspex layer on top of the original ramp. Use spacer washers in between to prevent water flowing out onto the birds, but flows between the two layers underneath. Please see drawing below from HSA.



Drawing from HSA. HSA Guidance Notes No.7 on Electrical Waterbath Stunning of Poultry:

<http://www.hsa.org.uk/shop/publications-1/product/electrical-waterbath-stunning>

- ✓ Another option is using PVC rods on top of the original ramp. Any water that splashes onto the entry ramp will flow down either side of the rods and does not come into contact with the birds moving up the ramp. Please see drawing below from HSA.



**Figure 4 Side and overhead diagram of how the entry ramp can be isolated from the electrical waterbath system by PVC rods**

*Drawing from HSA. HSA Guidance Notes No.7 on Electrical Waterbath Stunning of Poultry:*

<http://www.hsa.org.uk/shop/publications-1/product/electrical-waterbath-stunning>

## Water level inside bath

Make sure the water bath does not flow over, as electrified water might touch the birds before they are unconscious.

## Improve stunning

If the birds' head touches the water, s/he should be stunned successfully and immediately. If the bird does not show an instant tonic muscle contraction - for example the bird flaps the wings or lifts the head up - the current is likely too low. In this case it is possible birds are not unconscious after stunning, but paralyzed. To check consciousness after stunning - lift up the head: an effective stunned bird has no muscle tension in the neck. The head should be limp and floppy. There should be also no rhythmic breathing and no eye reflexes in response to touch.

If there are signs of birds being improperly stunned it is of great importance that the settings are checked right away. Maybe the current is too low or (some) shackles do not have good contact with the earthed rubber bar (overhead electrode). Contact an official consultant immediately if (some) birds show signs of consciousness.

Official consultant waterbath stunner:

<http://pbtech.co.uk/>

<http://www.silsoereseearch.org.uk/animal-welfare/jeff-lines.html>

[www.wur.nl](http://www.wur.nl)

## Prevent noise and vibrations

Chickens are sensitive to sound and vibrations. They hear up to 10.000 Hertz, which means they can hear people talk and scream. They also have extra senses in their feet and skin to detect vibrations from the air or floor. Birds are therefore easily stressed by sudden and loud noises and vibrations. Therefore:

- ☑ All processes in the slaughterhouse should make as little sound as possible and vibrations should be prevented.
- ☑ Workers should do their work as quietly as possible, without shouting or yelling.
- ☑ High ceilings should be prevented to reduce echoes and noises.
- ☑ Sound-absorbing materials are recommended in the ceiling.





- ☑ The noise of machines (pneumatic) can be redirected to different rooms using piping.
- ☑ Activities that create a lot of noise, such as the truck wash area, should be located as far away from the animal area as possible.

## Good lighting

Chickens not only have the three basic color cones like humans (red, yellow and blue) but also an ultra-violet light cone (UV). Therefore they can see far more colors and shades than humans can. With the UV cones chickens can easily find shiny bugs, berries and fruits, because they reflect UV-light.

Therefore birds are very sensitive to colors, especially colors that are bright (high wavelengths). Birds sense light through their eyes and through photosensitive cells in the brain. Long wavelengths of light (towards red end of the spectrum) penetrate the skin and skull more efficiently than short wavelengths. From these observations it has been reported that blue light has a calming effect on birds. <sup>10</sup>



Blue light has a calming effect on birds ©Eyes on Animals

Birds see more detail in movement than do humans because they see more observations per second. This is necessary in order to detect small insects. This also makes birds very sensitive to movements. Chickens have a motion-detecting cone in their eyes. This enables them to sense slight movements more easily such as bugs creeping through the grass or a predator lurking.

Slaughterhouses should therefore pay special attention to light in the premises where live birds are handled.

- ☑ Bright lights and bright vivid colors stress birds and should therefore be avoided.
- ☑ Blue light calms the birds and is recommended in the parts of the building where live birds are handled or waiting.
- ☑ The movement of birds (for example while in their transport containers on the conveyor belts or on the fork-lift or when unloaded and placed on the shackle lines) should be carried out smoothly, steadily and calmly and without any obstructions.

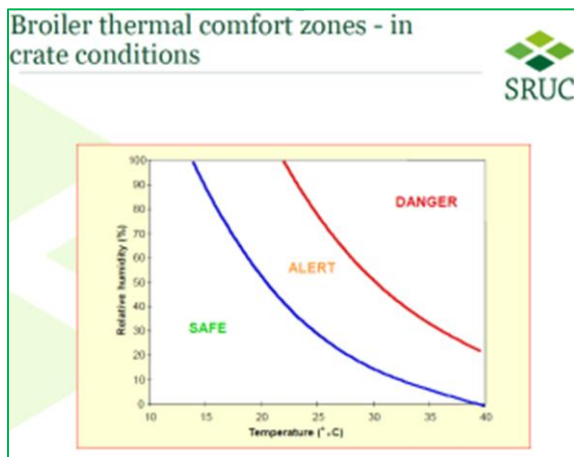
## Heat stress

Heat stress can easily occur if poultry-trucks are stationary, or containers are stacked on top of each other and air circulation is poor. It is known that mortality rates during transport increases during warm weather. Long lairage time increases death rates.<sup>11 12</sup> Broilers are more sensitive to heat stress, while laying hens are more sensitive for cold stress.

Birds in the middle and front part of the truck are at the highest risk for heat-stress. In these parts of the truck the air circulation is most poor and temperatures and humidity can quickly rise to dangerous levels. Birds loaded in the crates in this part of the truck should therefore be less crowded to improve air circulation. To improve ventilation some containers/crates in the middle row(s) of the truck should be left empty. During cold seasons, birds in the back part of the truck are at the highest risk for cold-stress.



Temperature and humidity are highest in the middle and front part of the truck. Drawing: Dr. Rabitsch



High humidity increases risk of heat stress

To improve air circulation inside the trucks and crates/containers, fans should be installed. To further improve ventilation slaughterhouses can insist that transport companies bringing birds to their plant used trucks with roofs that can be lifted and have air grills to help dissipate the built-up heat.



Truck with roof that can be lifted and air grills in the roof ©Eyes on Animals





In Turkey Eyes on Animals have seen a truck with a passageway in between the containers, so ventilation is improved. This design can further improve ventilation and prevent heat stress. This design is sometimes also used for rabbits.



Trucks with passageway in the middle. On the left: poultry truck, on the right: rabbit truck ©Eyes on Animals

If trucks have to wait outside, shade should be available and mobile fans should improve air circulation inside the truck.



Fans to improve ventilation inside a stationary truck and trees to provide shade. © Storteboom

- ☑ Prevent long waiting lines at the slaughterhouse as much as possible.
- ☑ Install big fans inside the lairage to improve air circulation inside the stacked crates.
- ☑ Provide shade if trucks have to wait outside.
- ☑ Purchase big mobile fans to improve ventilation for trucks that have to wait outside.
- ☑ Make sure supplying transport companies use trucks that have roofs that have air grills and can be raised to help dissipate warm air that collects at the top..
- ☑ Make sure supplying transport companies also leave some crates in the middle row of the truck empty and decrease loading density in those areas of the truck known to become hot.





## Access

Access to the animals is a legal requirement. Unfortunately in practice, whether it be crates or containers, access to poultry is often impossible. In case of emergency or breakdown in the slaughter line that causes long waiting lines, access to the birds can be extremely important for their welfare. With access doors sick, weak or injured animals can be given care, water or euthanized humanely.



Birds on their back need to get emergency care, otherwise they will die. Access can be vital. ©Eyes on Animals

Eyes on Animals therefore tries to stimulate industry to use crates with access doors. The Dutch Plastic company Coevorden already made crates with two doors, one for access (on the side) and one to load the birds (on top). Sometimes the birds are also loaded via the access-door on the side. If the access doors are big enough this can be beneficial for bird welfare as loading via the access doors prevents the need to stack crates.



Crates from Coevorden ©Eyes on Animals

Also Meyn, a big company that produces equipment for slaughterhouses, produced containers with access-doors. Via these access doors birds can be given care or inspected when needed. Also in Turkey we have seen a poultry truck with access doors.





Meyn container with access door



Poultry truck from Turkey with access to the birds

- ☑ Use crates or containers with access doors so sick, weak or injured animals can be given care, water or be euthanized humanely. If these access doors are big enough they can also be used to load birds. These access doors should be big – so birds can easily be reached and the doors can also be used to load birds.



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## Literature

<sup>1</sup> Raj, 2004; Gregory and Wilkins, 1989

<sup>2</sup> Hindle, VA., (2009). Elektrisch verdoven van pluimvee. Een evaluatie van de praktijk situatie in Nederland.

<sup>3</sup> Morgenstern, P. (2009). Integrale beoordeling verdovingstechnieken pluimveeslachterijen. Landbouw Economisch Instituut Wageningen UR, RIVM-rapport 609021080/2009

<sup>4</sup> King, A.S. (1964) NORMAL BREATHING AND THE EFFECTS OF POSTURE IN GALLUS DOMESTICUS

<sup>5</sup> Hindle, VA., (2009). Elektrisch verdoven van pluimvee. Een evaluatie van de praktijk situatie in Nederland. Onderzoek naar elektrisch alternatieven. Animal Sciences Group van Wageningen UR, rapport 200

<sup>6</sup> Raj, 2004; Gregory and Wilkins, 1989

<sup>7</sup> Raj ABM. (2004). Stunning and slaughter of poultry. In: Mead GC (ed.), Poultry Meat Processing and Quality. (Cambridge, U.K.: Woodhead Publishing Ltd.).

<sup>8</sup> Morgenstern, P. (2009). Integrale beoordeling verdovingstechnieken pluimveeslachterijen. Landbouw Economisch Instituut Wageningen UR, RIVM-rapport 609021080/2009

<sup>9</sup> Hindle, VA., (2009). Elektrisch verdoven van pluimvee. Een evaluatie van de praktijk situatie in Nederland. Onderzoek naar elektrisch alternatieven. Animal Sciences Group van Wageningen UR, rapport 200

<sup>10</sup> [http://web.uconn.edu/poultry/poultrypages/light\\_inset.html](http://web.uconn.edu/poultry/poultrypages/light_inset.html)

<sup>11</sup> F.M. Vieira (2011) Thermal stress related with mortality rates on broilers' preslaughter operations: a lairage time effect study

<sup>12</sup> Appleby, MC. (2008) Long Distance Transport and Welfare of Farm Animals