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Humane Slaughter Association

Technical Note No 9

Instantaneous Mechanical Destruction (IMD) for the killing of chicks in hatcheries

Introduction

Surplus day-old chicks are generated from both layer and broiler hatcheries. Primarily it is male chicks which are killed in layer hatcheries, and in both layer and broiler hatcheries chicks require disposal if they are sickly or deformed. UK legislation permits surplus chicks to be killed by mechanical apparatus which causes immediate death, by exposure to specified gas mixtures or by cervical (neck) dislocation.

This leaflet is based on the legal and welfare requirements of using Instantaneous Mechanical Destruction (IMD) to kill day-old chicks. It focuses on the two designs of IMD commonly used for this purpose in the UK, however this guidance does not exclude the use of other designs of IMD.

As unpleasant as it may sound, when used correctly, IMD is a very humane and effective method of killing day-old chicks. It is imperative that all staff using IMD machines are trained in accordance with the Humane Slaughter Association (HSA) *Code of Practice for the Killingl of Chicks in Hatcheries – 4th Edition (2023)* and the recommendations set out by the manufacturers' specifications.

Although aesthetically unpleasant, Instantaneous Mechanical Destruction (IMD) is a humane and effective killing method for day-old chicks when the equipment is used, managed, and maintained correctly

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Legislation

It is permitted under current EU legislation for chicks to be killed by a mechanical apparatus that produces immediate death. The legislation (Council Regulation (EC) No 1099/2009) specifies that:

"This method shall provide instantaneous maceration and immediate death of the animals. The 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."

For a mechanical apparatus to be considered humane and to comply with legislation it must cause immediate death to each individual chick.

All excess embryos in a hatchery must also be disposed of, however this leaflet is concerned only with live chicks that have hatched and broken away or are free from their shells.

IMPORTANT

Under NO circumstances must live chicks, no matter how unviable, enter an IMD machine along with in-shell embryos and hatching debris.

Options available

There are two main designs of IMD commonly used in the UK, the roller type and the knife type. The roller type will either have one roller that rotates against a solid side, or two interlocking rollers (see Figure 1a). The roller(s) have solid projections that run along their length and rotate rapidly. This type of IMD causes all chicks to be killed immediately by the rapidly rotating and interlocking projections in the narrow gap between the rollers.

The knife-type design has rapidly rotating blades that effectively kill the chicks (see Figure 2). The blades in this design, although not necessarily sharp, must successfully fragment the chicks resulting in immediate death.

General IMD specifications

- IMD equipment must be properly set up according to the manufacturers' specifications
- The rotating parts of the IMD machine must always operate at the manufacturers' specified speed which must result in immediate death of every chick. These parts tend to rotate at a speed pre-determined by the motor capacity of the IMD
- The capacity of the IMD machine used must be compatible with the throughput of the hatchery
- To prevent blockages, chicks should enter the machine at a rate compatible with its capacity

- Chicks should be handled by a trained operator, who manually places them into the IMD machine, or onto a conveyor in a single layer
- The entrance to the IMD machine should always direct chicks into the working parts of the equipment, without causing deflection or bouncing of chicks
- The drop distance into the working parts of the IMD machine should be kept to a minimum
- There should be no possibility of chicks being deflected out of the IMD machine by revolving blades
- The working parts, whether blades or projections, must be correctly positioned to kill all chicks instantly, causing no deflection
- If the IMD machine stops, then any mechanical conveyor must also stop simultaneously
- Daily inspection of the material exiting the IMD machine must be made to ensure that the equipment is operating effectively. This inspection should happen as soon as possible after killing has begun. If a problem is identified, the equipment must be stopped, and corrective action taken. The equipment should not be used again until the problem has been rectified

Common roller-type design: specifications

- Roller-type IMD (Figure 1a) machines have solid projections which radiate from the roller(s) or from a solid side. Rollers without projections will not ensure instantaneous death but merely result in chicks being 'flattened'
- The gap between the roller(s) or side projections, ie the area through which chicks are crushed, must not be more than 10mm (Figure 1b). Rollers or projections must not be forced apart as the chicks pass through
- Chicks must be killed immediately in the narrow, restricted gap between the roller(s) or side projections
- If projections are damaged, they must be repaired or replaced; damaged projections could reduce the effectiveness of the machine

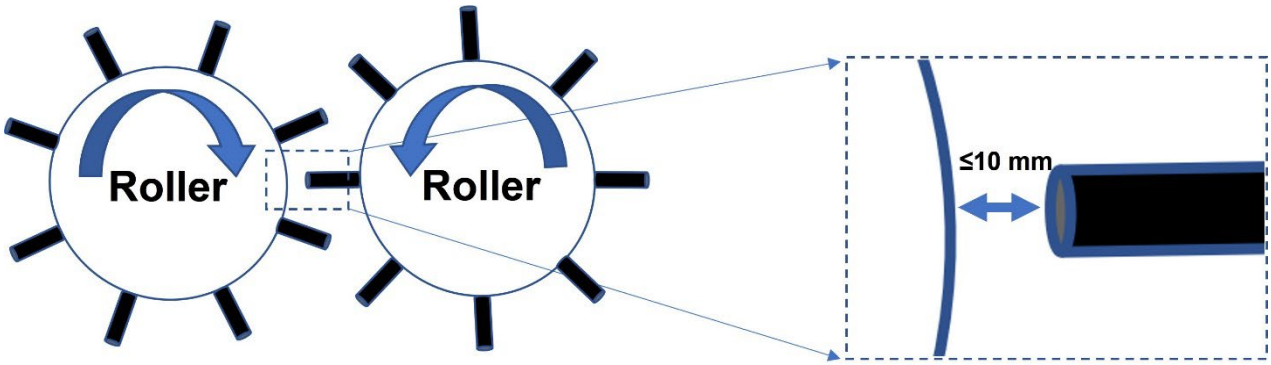

Figure 1a Schematic diagram of the roller-type design

Figure 1b Magnified section of Figure 1a

Common knife-type design: specifications

- All equipment should be set up according to the manufacturers' specifications
- Knife-type IMD (Figure 2a) machines should have solid blades, which radiate from a central axle. This c entral axle and individual blades interlock with a grid. Neither blades nor grid need necessarily have sharp edges as they cut effectively due to the speed at which the blades rotate
- The blades should be strategically located around a central axle to ensure that all chicks are killed immediately. For example, in Figure 2b three blades are located at 120° from each other (equivalent to 12, 4, and 8 on an analogue clock-face) and rotate in a clockwise direction
- The blades should rotate at a speed which ensures the instant death of all chicks
- If blades are damaged, they must be repaired or replaced, as damaged blades will reduce the effectiveness of the machine

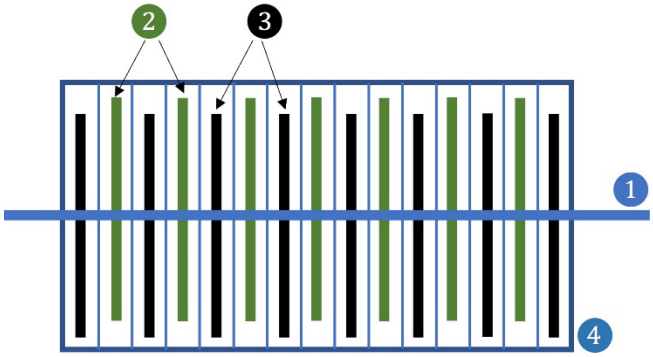

Figure 2a Aerial view of knife-type IMD, with (1) central rotating axle, (2) and (3) blades welded to axle, and (4) metal grid interlocking with blades

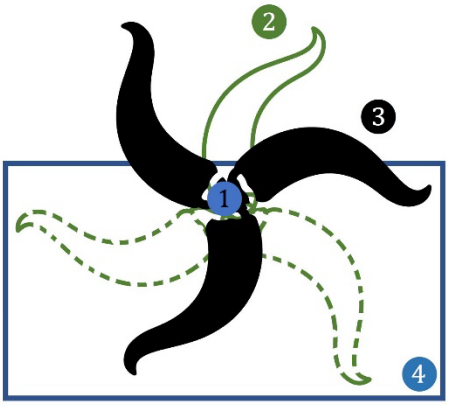

Figure 2b Side view of knife-type IMD, numbering as in Figure 2a

Staff training

To ensure that IMD machines are used correctly, hatchery staff must be trained in accordance with the recommendations set out by the manufacturers' specifications and the HSA's *Code of Practice for the Killing of Chicks in Hatcheries - 4th Edition*.

Staff training should include how the machine works and the welfare problems arising if the machine is not used correctly. Relevant staff should also be trained in the cleaning and maintenance of the IMD machine. A contingency plan must be made which:

i. details alternative chick killing methods in case of machine malfunction or power cut;
ii. identifies trained competent staff who can carry out emergency procedures;
iii. lists contact details for manufacturers and engineers.

All staff should be familiar with this contingency plan, and it should be reviewed regularly. Although some operators might find the use of IMD machines unpleasant, they must be made aware that any hesitation on their part could lead to unintentional suffering. If staff have any doubts about their ability to use an IMD machine effectively, they must notify their supervisor immediately.

Cleaning and maintenance

The ability of an IMD machine to cause immediate death to chicks is greatly dependent on the working parts (ie blades or projections) operating correctly. To ensure effective functioning of an IMD machine, hatchery staff must employ a strict and rigorous cleaning and maintenance regime:

- A **daily inspection** should be made by a trained and competent member of staff to ensure the IMD machine is working correctly. If a problem is identified during this inspection, the IMD machine must be stopped immediately
- All working parts of the IMD machine must be **thoroughly cleaned every time the machine has been used**
- Relevant **staff should be trained** to ensure they are competent at dismantling and cleaning the IMD machine
- A lack of **regular maintenance** can significantly reduce the effectiveness of any IMD machine
- A **weekly maintenance-check of all aspects of the IMD machines** should be made by a competent member of staff. If problems are identified, the IMD must not be used for killing chicks until the problem has been rectified. Spare parts for the IMD machine should be kept on-site, to ensure a prompt repair
- **Cleaning and maintenance records** should be completed and filed safely, and made available during safety inspections

IMPORTANT
Cleaning and maintenance of an IMD machine is essential to ensure that all chicks are killed instantly Although aesthetically unpleasant, instantaneous mechanical destruction (IMD) is a humane and effective killing method for day-old chicks when the equipment is used, managed, and maintained correctly

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 circumstances outside the HSA's control

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Further Reading

Code of Practice for the Killing of Chicks in Hatcheries (4th Edition) Humane Slaughter Association 2023

Council Regulation (EC) No 1099/2009 of 24 September 2009 on the protection of animals at the time of killing. Official Journal of the European Union, 18.11.2009; L303/1-30.

The Welfare of Animals at the Time of Killing (WATOK) – Defra Regulations:

- Link for regulation in England (2015): https://www.legislation.gov.uk/uksi/2015/1782/contents/made
- Link for regulation in Wales (2014): https://www.legislation.gov.uk/wsi/2014/951/regulation/3/made
- Link for regulation in Scotland (2012): https://www.legislation.gov.uk/ssi/2012/321/contents/made
- Link for regulation in Northern Ireland (2014): https://www.legislation.gov.uk/nisr/2014/107/contents/made