Key issues for the successful transportation of day old chicks

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Hatchery managers are responsible for transport of day old chicks to customers. The duration of transport is often only several hours, so chick transport is often seen as less important but inevitable, getting less attention and investment than the hatchery. However, it does not make sense to put maximum effort and investment in a state-of-the-art hatchery, when the so precious chick quality is damaged during transport.

It is true that transport cannot improve the quality of the day old chick, but it can certainly harm it. A first conclusion can be that transport should be minimised, since it costs money and does not add quality. If transport is required however, it should be done properly, to avoid unnecessary losses.

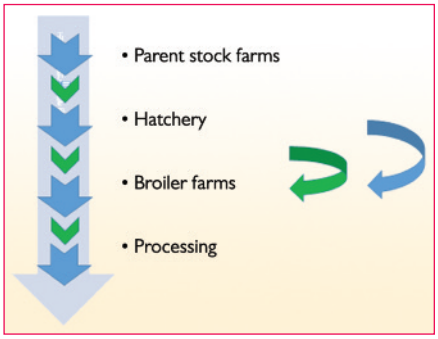
Key parameters

This article looks at key issues related to transport performance such as actual transport systems, climate parameters, the technical design of day old chick trucks, effects of transport on quality and farm performance and hygiene considerations.

Capacity guidelines and a financial comparison are given in order to choose a suitable solution for your actual situation.

Traditional poultry transportation takes place in chick boxes or crates. In warm climates, open trucks are used, in relative small quantities (<1000 chicks) and over short distances or time (100km, two hours).

Fig. 1. Influence on farm performance.



In the colder or more humid season, the chicks are often protected by a cover. This simple and relatively cheap solution is accepted widely, even though some mortality on arrival may occur.

Quality standards for transport get stricter with increasing farm size and higher quantities, distances, hygiene levels, food security standards and reliability. The bird physiology tends to change as well, giving need for more ventilation and cooling, and stricter climate control.

Awareness of the present damage caused by day old chick transport is a first important step to improve transport performance and come to a profitable day old chick truck fleet. In our view, day old chick trucks and their drivers should be as professional as hatchery equipment and staff. The positive side of investing in more developed chick transport is that, if chosen accurately, this will pay off. Improved chick quality and farm performance may result in higher return on investment in transport compared to the average investment.

A poultry integration needs transport between different phases in the production chain, such as hatching eggs from parent stock farms to the hatchery (often transported in chick carriers), day old chicks from the hatchery to farms of customers and live birds to markets or processing.

Chick quality

The most important aspect is quality of the day old chick – in other words – what will be the performance on the farm? Different phases in the production chain influence the quality (parent stock management, egg transport and storage, incubation and day old chick transport) where it is difficult to assess the contribution of these separate aspects.

Stressful factors during transport can be loading and unloading, duration of the trip, air speed, humidity, shocks and vibrations and noise.

Most important however is the temperature, since bird response to non-optimal temperatures can cause serious harm. Body temperature of the chick during transport should be maintained between

Traditional poultry transportation.

39.5-40.0°C. This parameter is not easy to measure, but can be used to assess your transport system.

Climate factors

The combination of humidity, air speed and temperature decides whether the transport will be a success. Body temperature, measured as navel or cloaca temperature is most reliable, where navel temperature is normally 0.5°C lower than internal cloaca temperature, and it is more deviated by ambient temperature. However, air temperature in the chick box can be a guideline as well, where 30-33°C is regarded optimal, as in start-up during brooding.

Most practical to measure is the air temperature in the truck, but the right air temperature depends on the air speed. The higher the air speed, the smaller the difference will be with the air in the chick box, so the higher the temperature set point should be.

As an example, in a closed truck with little ventilation, air temperature set points can be as low as 24°C, while in better ventilated trucks this set point reaches 30°C in order to keep the temperature in the chick box within range. A low air speed is always connected to a large temperature variation in the truck, the hottest chick boxes will still

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be around 33°C, if not higher. In an open truck, the variation will be larger, where no real air flow or temperature control is present. For this reason, this type of transport only fits moderate ambient temperatures and short transportation times. This implies that chicks will suffer quality loss in an open truck, if the distance would be longer, this would result in mortality.

Humidity is measured as relative humidity, and expressed as a percentage. There is a strong relation with temperature. When the temperature increases, the relative humidity will drop. That is why in moderate climates, when we heat cold air in the winter, we read the lowest humidity levels, around 20%. Since this causes no harm during transport, acceptable levels can be defined between 20 and 80%. However, this is only valid at comfort temperature, so 30-33°C as mentioned before.

At lower or higher temperatures, high humidity is dangerous and should be limited to around 60%. The reason is that at low temperatures humid air takes more heat from the chickens than dry air, so the cold stress will be increased.

At high temperature and humidity, the evaporative cooling that chickens achieve by breathing quickly (panting) is reduced, leading to heat stress where mortality rates and quality losses increase.

Humidity control by humidification in chick trucks is not advisable in our view, since an increase in humidity is not necessary in winter (where levels are low) and dangerous in high temperatures.

A commonly heard argument is that chicks dehydrate during transport, and humidifiers should counteract that. The reality is that chicks dehydrate because of their panting behaviour at high temperatures, which implies a water loss. Temperature control is the way to solve this problem, not humidifying.

Humidity reduction in hot and humid climates is a good idea, but not easy to implement. It requires high cooling capacity, where water vapour from the air is condensated, or it requires air dryers. Both options are expensive and energy consumption is high.

For the time being, high ventilation rates will at least reduce humidity build up in the truck. The moisture production of chickens, especially at high temperatures, should not be underestimated.

Example of Asian climate

The challenge in climate control in a day old chick truck is two-fold: first, the ambient climate conditions have to be transformed to the proper temperature and humidity, where in the loading space the air should be distributed equally in order to provide an optimal climate to each chick box. The aim is to achieve 30-33°C in the chick boxes,

Inside view of a Heering chick truck.

and a body temperature between 39.5-40°C. In a tropical climate, temperature and humidity have to be altered, to achieve an optimal internal climate.

Reliability

In modern chick trucks, many day old chicks are brought together in a relatively small volume. Climate conditions are maintained within small margins, and rely on forced ventilation and climate control. When these systems fail, damage will be done in a short time.

We need very reliable systems to ensure safe and comfortable transport during the complete lifetime of the truck. This makes reliability a key factor. Optimum material and technology choice, correct design, maintenance and repair, and if suitable back-up systems contribute to this reliability.

Capacity

Careful planning of the logistic process around the hatchery will help you improve your transport performance. The choice between one's own transport or third party transport, in part or in whole, by third parties if available, is the first question. To strike a balance between efficiency and total capacity, having different trucks of different sizes may be the best option.

The chick box is the smallest logistical unit to transport, they can be combined on trolleys for quick and easy handling. In chick boxes, two options exist: the cardboard, lightweight single use solution for instance is hygienic, and also ideal for air freight.

The standard size is 50 x 50cm, varying from 40-70cm. Weak points are costs of purchase and assembly hours, and limited strength. Extra height compared to plastic chick boxes implies a lower stacking level and capacity.

The other option, plastic boxes, are the most commonly used, with standard size 40 x 60cm, height 11-14cm. Sizes vary from 30-80cm. Single use plastic recyclable boxes are available on the market as well.

The resulting capacity per metre truck length will be 5,000-9,000 chicks for cardboard boxes and 9,000-17,000 chicks per metre for plastic boxes. If hatching eggs are transported in the same truck, a truck with a higher payload should be arranged.

Pulp trays are used for good shock absorption, and packed in carton boxes they have a good weight ratio between packing and cargo, so these are ideal for air freight.

Hygiene rules may force one to use them only once. Their strength reduces sharply when wet. They are difficult to (dry)clean, and limited aeration makes ventilation, initial cooling down and temperature control difficult. Stacking in metal trolleys makes handling easy. Plastic trays are easier to clean and wash, but give less shock absorption. They can be stacked in the same trolleys as mentioned above.

Transporting eggs in setter trays reduces work in transferring eggs in the hatchery. Transport should be done in farm trolleys, setter trolleys are not stable enough and roads and trucks should be good enough to control egg shell damage.

Transport capacities of hatching eggs in trucks vary with packing material: setter trays in trolleys can place from 15-18,000 hatching eggs per metre truck length, (about 1250kg per metre) where trays on pallets go as high as 25,000 hatching eggs per metre, or about 1800kg per metre. Eggs in cardboard trays and boxes will give a similar capacity

Truck requirements

Most truck chassis, from vans to semi-trailers can be used as a base for a day old chick truck. An important feature is air suspension to reduce damage, mainly to hatching eggs.

A weight calculation is necessary to specify the required axle weight capacities. For smaller trucks on 12 or 24 Volt ventilation, sufficient alternator and battery capacity are important.

Trends

Hygiene tends to get stricter, with more regular cleaning and disinfection, and stronger disinfectants, that can be applied in on-board disinfection systems.

With increasing farm size, the quantity of day old chicks per truck increases, as well as the transport distance. With the increasing growth potential of broilers, heat production increases over the years, at a reducing yolk sac content at hatch. The trucks change from open trucks to closed ones, with ventilation, heating and cooling.

Specially developed truck bodies are necessary to ensure equal airflow. Track and trace systems follow the truck and its climate online, making it an inclusive part of the hatchery.

More attention to chick transport will improve transport performance; chick quality, hygiene, capacity and reliability. ■