



SKOV International

POULTRY EDITION

April 2008

Why Combi-Tunnel - test at a grower in Thailand

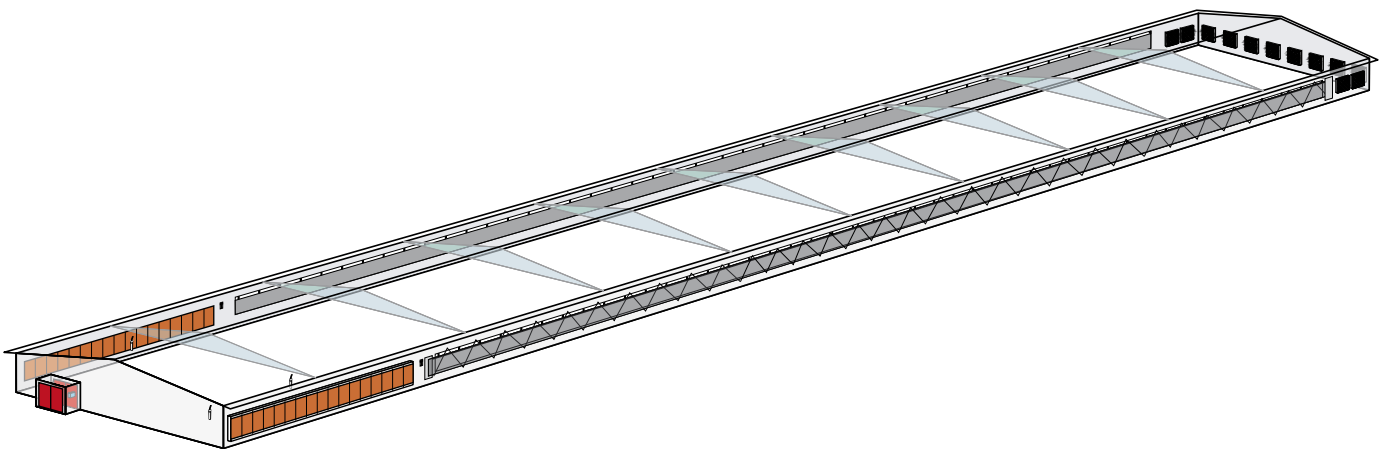
Tunnel Ventilation

In the subtropical and tropical regions of the world, the traditional choice of ventilation system often is Tunnel ventilation. A ventilation system which takes the air in through tunnel openings (often installed with cooling pads) at one end of the house and exhaustion of the air is carried out at the other end of the house through gable fans. Airflow is thus created lengthwise in the house.

Tunnel ventilation is a good system when it is a matter of cooling the birds. However, there will always be times during the production cycle when there is no need for

cooling to maintain the optimum temperature. In most areas, there will be times (day/night or summer/winter) when the outside temperature for a shorter or longer period will fall below the temperature comfortable for the birds.

In addition, there will be great difference in the temperature lengthwise in the livestock house when using Tunnel ventilation in cool/cold periods. In a traditional broiler house with day-old chickens, it may take up to 10 minutes for the air to flow from one end of the house (at air inlet) and to the other end of the house (at the gable fans).





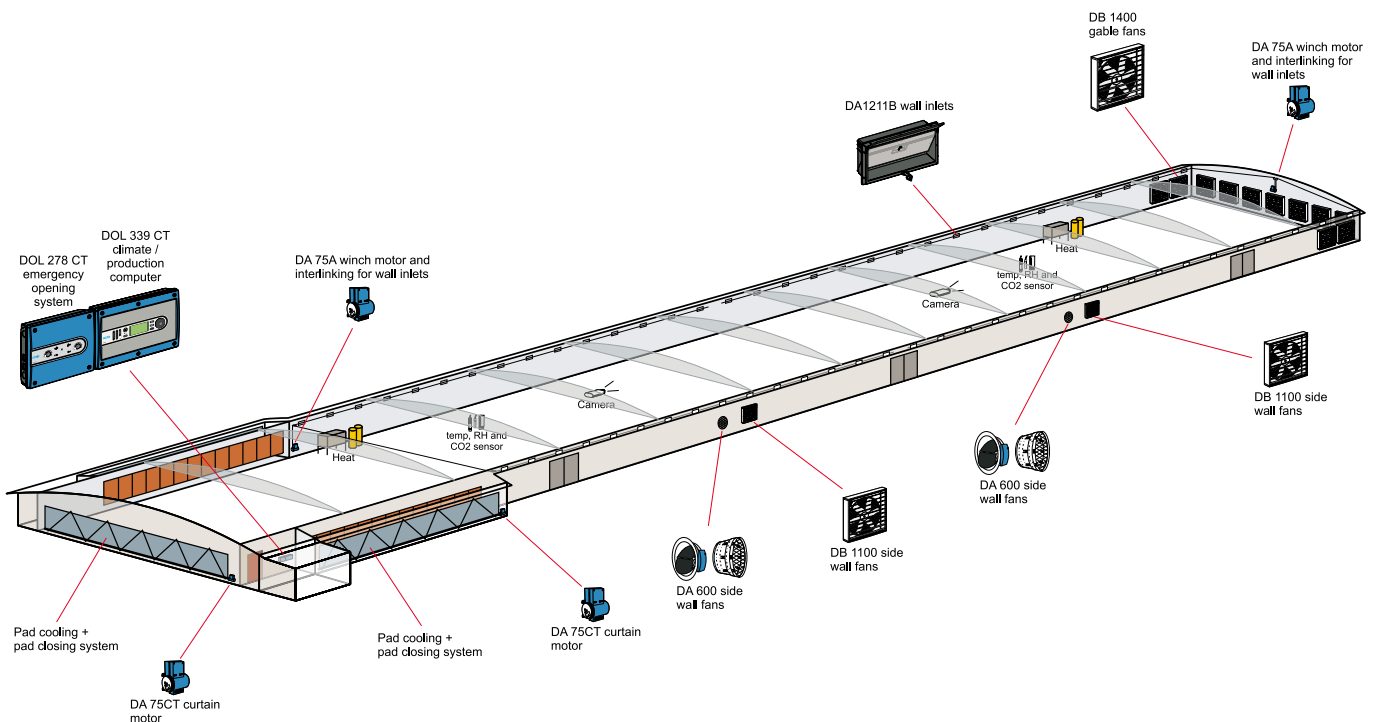
Combi-Tunnel Ventilation

The Combi-Tunnel system takes this complex of problems into account. The ventilation system consists of two systems ventilating according to two different principles.

During the hot season, Combi-Tunnel ventilates as a normal Tunnel system. During the cool/cold season, where the Tunnel principle has its weaknesses, the Combi-Tunnel system takes the fresh air in through smaller wall inlets that are placed in sidewalls of the

building. The air outlet is conducted through exhaust units in the roof or through wall fans. This principle has been known for many years from the temperate regions of the world where it has proved its worth as a stable and profitable system.

Unlike the Tunnel principle, a certain warming-up of the incoming air is ensured at minimum ventilation, as the air is directed up along the ceiling and is mixed with the house air before reaching the zone occupied by the birds.



Test at a Grower in Thailand

The price of a Combi-Tunnel system is approximately twice the price of a Tunnel system. The price of a Tunnel system is approximately 580,000 Bath (18,500 USD) and the price of a Combi-Tunnel system is approximately 1,160,000 Bath (37,000 USD). These prices are for standard houses of 12x120 metres. But the experience of SKOV is that this surplus investment will be paid back in three or four years as a result of a better FCR and a lower mortality rate. The more cold periods - time of the year or cold hours at night - the quicker the surplus investment will be earned back.

From November 2006 to April 2007, SKOV performed a test at a Thai grower. The purpose was to test whether the surplus investment for the Combi-Tunnel ventilation system can be paid back within an acceptable number of years (three to four years).

Two identical houses were selected. One of the houses was installed with a Combi-Tunnel ventilation system whereas the reference house was installed with a traditional Tunnel ventilation system. Both houses had a capacity of 20,000 broilers.

The day-old chickens populating the two livestock houses were of identical breeding material. During



the entire production sequence, the broilers in the two houses were fed with identical feed; also other production conditions were identical - e.g. the broilers' access to water. We tried, as far as possible, to eliminate all differences which could not be associated with the ventilation principle.

During the entire production sequence, we made a series of measurements. Furthermore, the production sequence was filmed by a webcam, so we could evaluate the behaviour of the broilers in the livestock house. One of the most important parameters in connection with production of broilers is an even

distribution of birds in the livestock house; something which can only be discovered during a visual inspection.

Production results from three batches were collected. A fourth batch was started but it had to be interrupted, as the grower changed to a new contractor. The test results for the third batch are stated below.

The figures are based on the following conditions:

Feed price bath/kg	9.52 (0.30 USD)
Bath per kg live weight	24.00 (0.80 USD)
Price of day-old chickens bath/pc	10.00 (0.32 USD)
Batch per year	6.50

Batch 3		House 5 (Tunnel)	House 6 (CT)	Diff	Value Bath/flock	Value USD/flock
Feed consumption	Kg	94200	91560	2640	25133	800
Bird weight 1	G	2363	2347	-16	-3840	-122
Bird weight 2	G	2290	2270	-20	-4800	-153
Dead	Pcs.	867	831	36	360	11
Total					16853	536
Pay back time	Year				5.21	5.21

Lower FCR and mortality

The two first batches were used for running-in the installation. Combi-Tunnel is a more advanced ventilation principle than Tunnel and a number of technical aspects were adjusted during the first two batches. In connection with the third batch, the running-in had reached a point where we could begin to compare the results.

As it appears from the figures, there is a lower FCR and a lower mortality rate in the house installed with Combi-Tunnel ventilation. The improvements of productivity in the third batch mean that the payback period of the surplus investment was approx. five years.

The FCR and mortality rate were continuously improved from the first to the third batch and a positive tendency thus became noticeable in relation to these factors over all three batches.

During the test in question, we did not reach our goal of a payback period of approx. 3-4 years, as we had to finish the tests. The tendency was however evident and we would have reached the goal during one or two additional batches.





Uniformity

A uniform distribution of the broilers in the livestock house is one of the most important concepts in broiler production. A uniform distribution on the floor (the litter) should be ensured so all the birds have the same growing conditions - however with a minimum consumption of energy for heating and ventilation.

Especially during the cool periods, it was difficult to maintain an even distribution of broilers in the house with Tunnel ventilation.

The below four screen images show the two houses at high and low temperature. The two upper pictures (1 and 2) are from the Tunnel house and the two lower pictures (3 and 4) are from the Combi-Tunnel house.

As it appears from the pictures 2 and 4, there is a first-class distribution of the broilers in both the Tunnel and Combi-Tunnel house when the outside temperature is high.

But at lower outside temperatures, the distribution of broilers is significantly better in the Combi-Tunnel house ventilating in side mode (picture 3) compared to the Tunnel house (picture 1) ventilating according to the Tunnel principle.

The adverse distribution in the Tunnel house, where the broilers huddle together, reflects the fact that they are too cold. If the broilers are too cold, they use the energy from the feed to maintain the body temperature at the expense of growth. The fact that the broilers in the Tunnel house had a lower FCR in the test results also reflects this.

1



2

3

4



The impact of the Feed Prices on the Test

As mentioned before, the test took place from November 2006 to April 2007. At the time, the feed costs per kg were approximately 9.5 bath (0.3 USD). If we had made the test today, with the current feed prices, the figures would have been strikingly different. Today, one kilo of feed costs on the low side of 13 bath (0.41 USD).

So under the condition "other things being equal", the payback period of the surplus investment is changed considerably. The payback period of the surplus investment would be (based on the first batch) approximately seven years, whereas it would be (based on the third batch) approximately three and a half years. So with the current feed prices, our goal of a payback period of three to four years has been achieved.

Conclusion

Tunnel ventilation does not provide the birds the optimum productivity during the cool/cold seasons. There will also be times in the tropical regions, where Tunnel ventilation is not the optimum solution. Combi-Tunnel can remedy the weaknesses of the Tunnel ventilation during these seasons.

Our test in Thailand has proven that the production in Combi-Tunnel-ventilated houses has a lower FCR and lower mortality rate: i.e., the production is more optimal in Combi-Tunnel-ventilated houses. The development

in results in our test render probable that the surplus investment can be paid back within an acceptable period of max. three to four years.

Feed is the top scorer on the expense account in a broiler production. The system that optimizes the feed conversion ratio in broilers will, other things being equal, be the most optimum system. Our calculation shows that with the current feed prices, our goal for payback of the surplus investment has been achieved.

All prognoses show that the feed prices will also increase in future, so keeping this in mind, Combi-Tunnel ventilation will become an increasingly interesting option as regards ventilation system.

