

Short introduction to pig houses with source separation of liquid and solid manure

February 2008

Background:

During the last 30 - 40 years pig house constructions have moved from solid floor with separate handling of urine and faeces to slatted floor with a mix of urine, faeces and bedding material handled as animal slurry.

This development has reduced the labor work involved in pig production. It has however also introduced environmental problems such as increased ammonia release.

Perstrup Beton Industri is, in cooperation with other companies, research and extension, involved in development and test of a pig house system, which combines the reduced labor requirement with the advantages of separate handling of liquid and solid manure. Agri Contact acts as coordinator.

Concept:

The concept of the source separation of liquid and solid manure is shown in fig. 1:

Principal sketch of environmentally and animal friendly pig facility with indoor slurry separation

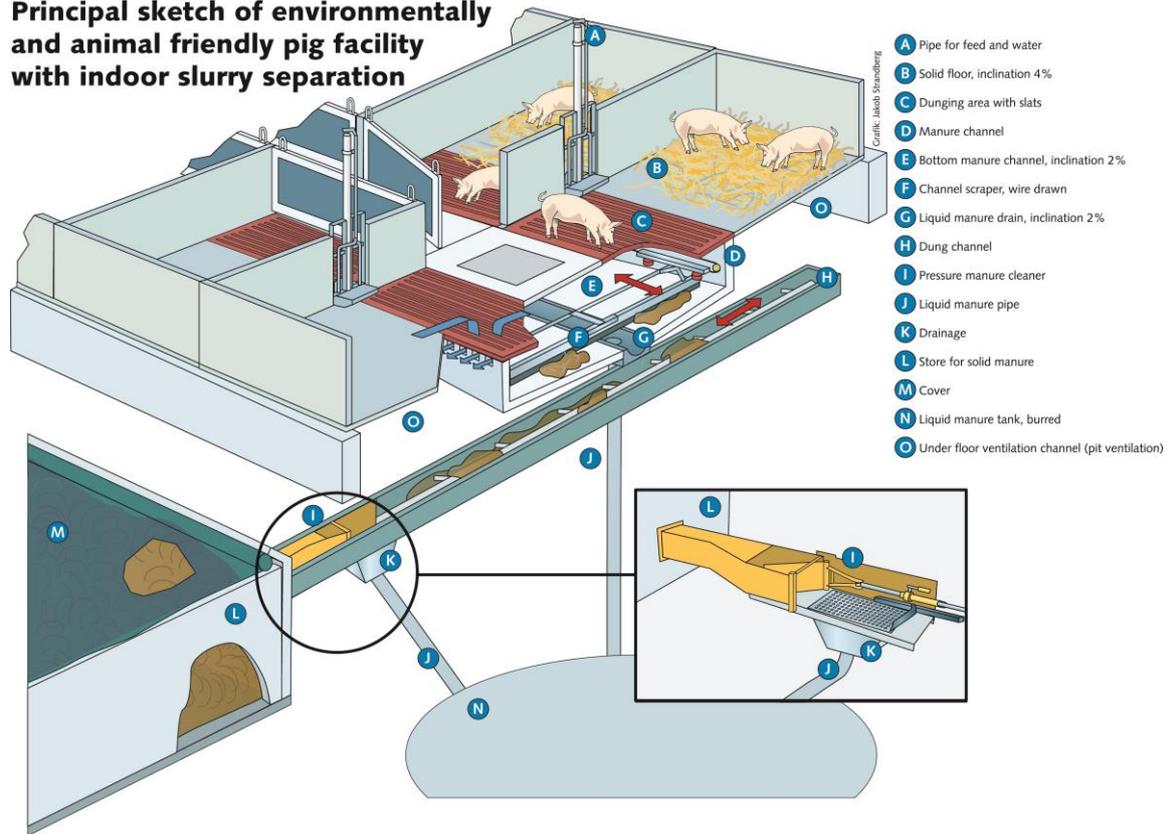


Fig 1

The urine is directly drained of to the closed container (N) and faeces is together with the bedding material periodical scraped to the transfer duct (H) and further to the storage (L).

As a result the solid part (faeces and bedding) content about 90 % of the total phosphorus, and the liquid fraction contains most of the ammonia.

Purpose of the project:

The purposes of the project are:

- 1) Separation of liquid and solid manure
- 2) Reduced ammonia emission
- 3) Reduced odour emission
- 4) Better handling of bedding material
- 5) High production results

The construction:

The next few pictures show key elements of the construction, having 2 sections each with 24 pens holding 16 pigs.



Fig. 2 Bottom for two sections



Fig. 3: Below the slatted floor

Status as of February 2008

The construction now have been in operation for about 1 year and results from 2 charges of pigs from 30 kg to slaughtering have been followed and compared to traditional slurry system as the one sector, is forced to operate as a slurry system.

Compared to the project goals the following results have been obtained:

Re 1) Separation of liquid and solid manure.

The urine with a dry matter content of only 2 % ends up in the closed container.

The dry part consisting of feces and bedding material ends up as shown in fig. 4 (uncovered).



Fig 4 Solid manure: Faces and bedding material

This with use of 200 gram bedding material pr day /pig.

More than 95% of the phosphorus is in the dry part.

2) Reduced ammonia emission

The ammonia level in the pig house is very low (1-2 ppm). However the expected reduction in ammonia emission has not been reached.

3) Reduced odour emission

The expected reduction in odour emission has not been reached.

4) Better handling of bedding material

It has been demonstrated, that the system without problems can handle all the bedding material that can pass the slatted floor.

This fit with expected new animal welfare requirements in Denmark.

5) High production results

The tests have demonstrated a high production level with daily weight gain of 984 gram / day and a loss of dead or disapproved of only 2 %.

Conclusion and further activities:

The results until now have demonstrated several important features of the new construction, and we have good reasons to believe, that we have identified the reason for the missing results in objectives 2 and 3.

The construction is being modified accordingly, and the tests will be repeated.

The follow up project should be terminated June 2009.