COMPLEX VENTILATION AND MICRO-ENVIRONMENTAL CONTROL IN LIVE-STOCK HOUSING

It is a project which will last from Oct 1st 2013 to Sept 30th 2016 under the supervision of Senior scientist Guoqiang Zhang.

The aim of this project is to improve animal welfare and reduce environmental impact. A new concept for monitoring the thermal and airflow conditions in animal zones will be introduced. Furthermore, we will set up a dynamic predictive model to create a precision environment control strategy at individual animal or defined zone level.

Micro-complex ventilation involves integrating precision local ventilations in animal zones and near manure fouled floors or manure surfaces within the building ventilation. In order to gain knowledge about air motion and distribution in animal occupied zones, and about system effects on emission reduction, the project will investigate an integrated micro ventilation concept in livestock housing. Data will be gathered by using both Computational Fluid Dynamics (CFD) simulations and full scale experiments. After the establishment of the system, optimisations are also needed. Then, to validate the optimal system, varied techniques including local cross ventilation, heat exchange and passive earth-air heat/cooling will be investigated. The proposed system combines the advantages of natural, mechanical and displacement ventilation, making it a technology with great efficiency and potential.

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