Published on *CD-adapco* (http://www.cd-adapco.com)

A Computational Fluid Dynamics Study of Air Mixing in a Naturally Ventilated Livestock Building with Different Porous Eave Opening Conditions

Biosystems Engineering
Pages:
125-137
Volume:
106
Issue:
2
Date:
Tuesday, June 1, 2010
DOI:
10.1016/j.biosystemseng.2010.02.006

Computational fluid dynamics models of wind-dominated and wind and buoyancy-influenced ventilation in a naturally ventilated livestock building were developed to investigate the mixing characteristics of the building and to determine its ventilation efficiency when different cladding materials are used at the eave openings. Firstly, CFD was used to provide insight into the air mixing characteristics of the building during wind-driven and wind and buoyancy-influenced ventilation. Secondly the relationship between an eave opening?s resistance to airflow and indoor air mixing during wind-dominated ventilation was quantified, and finally the effect of eave opening conditions (i.e. eave cladding type, porosity, height) on building ventilation rate was analysed for a range of wind speeds. Overall, this study found the porosity of the eave opening cladding system heavily influenced the mixing of indoor air during wind-driven ventilation, with the low porosity cladding significantly enhancing the building?s ventilation efficiency.

Rights:
2010 IAgrE
Author Name:
T. Norton
J. Grant
R. Fallon
D.W. Sun
Industries:
Building Services[1]
Products:
STAR-CCM+®[2]

CD-adapco is the world's largest independent CFD focused provider of engineering simulation software, support and services. We have over 30 years of experience in delivering industrial strength engineering simulation.

Source URL: http://www.cd-adapco.com/journal/computational-fluid-dynamics-study-air-mixing-naturally-ventilated-livestock-building?page=32

Links:
[1] http://www.cd-adapco.com/industries/building-services
[2] http://www.cd-adapco.com/products/star-ccm%C2%AE