

**Title:** Developing Virtual Engineering Tools for Hoop Swine Housing - **NPB #03-161**

**Investigators:** Dr. Kenneth "Mark" Bryden, Professor, Dr. Thomas L. Richard, Associate Professor

**Institution:** Iowa State University

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**Abstract:** Over the past century livestock housing facilities have evolved from traditional wooden barns to engineered structures made of plastic and steel. Although building materials have changed dramatically to match the needs of modern agriculture, the facility design process continues to lag considerably with farmers and consultants developing and adapting designs based on rules of thumb and past experience. The aerospace industry has developed computer models that accurately predict the airflow and temperature around an aircraft operating under specified conditions. This same type of computer model has been applied to swine production facilities to predict its airflow and temperature, but there is a steep learning curve associated with using these tools.

Virtual Engineering tools interface computational models with hog building geometry in a virtual reality environment making it possible for a livestock production specialist (farmer) to use the models and interactively alter the shape, size, operating conditions, or other characteristics of the components within the proposed system and see the impact of these changes on his/her production operation. A case study of Virtual Engineering was performed on a Hoop-Structure swine enclosure and a mechanically ventilated building. The mechanically ventilated hog building airflow model was exhibited using Virtual Engineering tools at the Iowa Pork Congress in January 2004.

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**For more information contact:**

**National Pork Board, P.O. Box 9114, Des Moines, Iowa USA**  
800-456-7675, **Fax:** 515-223-2646, **E-Mail:** [porkboard@porkboard.org](mailto:porkboard@porkboard.org), **Web:** <http://www.porkboard.org/>