Developing Objective Tests and Repair Guidelines for Hog Facility Trusses

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Developing Objective Tests and Repair Guidelines for Hog Facility Trusses

Client: Smithfield Foods, Northwest, Iowa

Problem Statement
• Predicting naturally ventilated hog barns life expectancy
• Increase useful life of facilities and provide options to growers
• Barn collapses and safety of personnel, livestock, facilities, and other assets
• Provide cost breakdown of complete replacement vs. truss repair options

Objectives
• Develop a timeline for the estimated structural useful life of facilities
• Identify structural failure points by type and precedence and alternatives for repairing trusses
• Provide preventative maintenance/inspection document with time and cost comparisons

Constraints
• Tests must be repeatable and objective
• Estimation of useful life of facilities
• Provide alternative recommendations for truss repair
• Cost and time comparison between repair vs. replacement

Scope
• Objective inspection test of trusses
• Identify truss failure points by type
• Cost and value-added timeline of reinforcement recommendations

Approach
• Common facility failure points influence reinforcement methods
• Facility visits used to improve evaluation tests and capture pictures for final document
• Pictures of common failure points at specific levels of deterioration used to estimate remaining facility life

Major Deliverables
• Evaluation template for measuring Structural integrity of trusses in a hog production facility
• Useful life remaining for a facility based on structural rating and age
• Reinforcement practices and options for extending the useful life of a facility
• Deflection test for use in structural integrity evaluation

Recommendations
• Use preventative maintenance document to test and evaluate facilities objectively
• Continue to explore alternative truss plate reinforcement options
• Share solution throughout industry

References
• Murphy-Brown LLC, 2013: Truss Reinforcement Package - Warsaw, NC
• EPS Buildings: Randy Wesley - Graettinger, Iowa
• Naval Facilities Engineering Command, 1985: Inspection of Wood Beams & Trusses: Alexandria, VA