Benefits and challenges of full-scale testing in a large wind facility

IAWE Public Forum, "Necessity and Efficiency of Large-Scale Facilities for Wind-Related Disaster Risk Reduction" Tohoku University, Sendai, Japan



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Who is IBHS?

Insurer-funded non-profit
Promotes Resilient Construction
through
Research & Communications



Benefits of Full-Scale Testing

Failure Modes
Failure Sequence
System Performance
Evaluate Simplified Test Standards



Benefits of Full-Scale Testing

Full-Scale Components
Real-World Connections
Fluid Component Interaction
Demonstrate Benefits of Mitigation



Failure Modes Attached Aluminum Structure

- Damage or poor connections of posts supporting eave of carport
- Buckling of roof deck pans at mid-span
- Failure of connection to home
- Buckling of beam supporting eave
- Failure of connection between roof deck and supporting beams and channels
- Cracking of roof pans caused by vibrations



- Weak or Damaged Posts -



- Damaged, Corroded or Poor Connections to Slab/Foundation -



System Performance – Benefits of Mitigation

Conventional Construction Versus Wind Resistant Construction



Mitigation Measures

- Strapping of Connections
- Ring-shank Nails
- Wind Resistant Roof Cover
- Wind Resistant Vinyl Siding



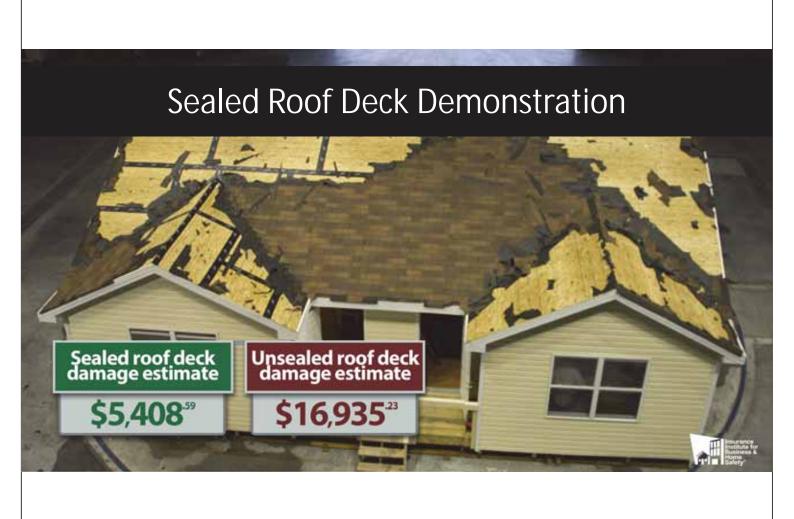
System Performance – Benefits of Mitigation

Water Intrusion Mitigation

Measures







Wildfire Ember Attacks

Ember entry through vents Ember accumulation Local ignition initiation





Challenges

Design tests based on facility limits

Test for basic phenomenon – not variability of products, materials or installation



Challenges

Improve/develop simplified tests that reflect real-world performance

Use facility to evaluate engineering design approach/assumptions





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