

## Flow Modeling Helps Prove Hurricane Damage Caused by Wind, Not Water

A steel storage building located on a canal between downtown New Orleans and Lake Pontchartrain was damaged during Hurricane Katrina. The insurance company asserted that the damage, in which the walls were pushed outward in two areas, was water-related. Since insurance covered only wind damage, the claim was denied. TRC, representing the owners of the storage building, undertook a modeling study to investigate whether the strong winds could explain the damage.

TRC is a publicly traded (TRR) environmental and engineering consulting firm that provides integrated services to the environmental, energy, infrastructure and real estate markets. The Company is also a leading provider of technical, financial, risk management and construction services to commercial and government customers across the country.

### TECHNOLOGY USED

FLUENT®, GAMBIT®

### CHALLENGES

A traditional approach would have been the simple application of equations relating force and wind speed; however, these would not have included information about the building shape nor accounted for the air flowing through open doors inside the building. TRC determined that a more accurate simulation of the pressure forces on the building would provide more persuasive evidence that the damage was wind-related, resulting in payment of the claim.

### SOLUTIONS

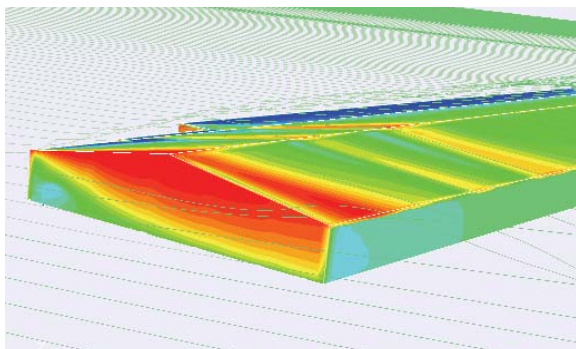
Using FLUENT and GAMBIT software, scientists at TRC:

- Built a model of the storage building along with two upwind structures that might have affected wind and turbulence fields
- Used wind speeds and directions predicted by mesoscale meteorological model MM5 simulations of Katrina, and corroborated by observations from National Hurricane Center reconnaissance devices, to set the inlet boundary conditions
- Simulated the wind-induced net total pressures on all outside walls of the storage building
- Using calculations from structural engineers, calculated the forces needed to cause the damage to the steel walls of the storage building

### RESULTS

- The predicted pressures on the building walls indicated two locations with outward forces strong enough to cause the observed damage
- These two locations closely agreed with the actual damage
- The case against the insurance company was successfully settled

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FLUENT software predicted pressures on the warehouse roof and walls during 60 meter per second winds blowing from left to right. The streamlines of flow are also shown.

### COMPANY INFORMATION

Country: U.S.A.

Industry: Environmental and Engineering Consulting



www.trcsolutions.com

“Without using FLUENT software from ANSYS to simulate the pressure forces, we would not have been able to provide the evidence needed to show the insurance company that the damage to our client’s building was caused by wind from Hurricane Katrina, and not water. The simulation was instrumental in helping our client successfully settle their case.”

Lloyd L. Schulman, Ph.D.  
TRC Companies, Inc.