

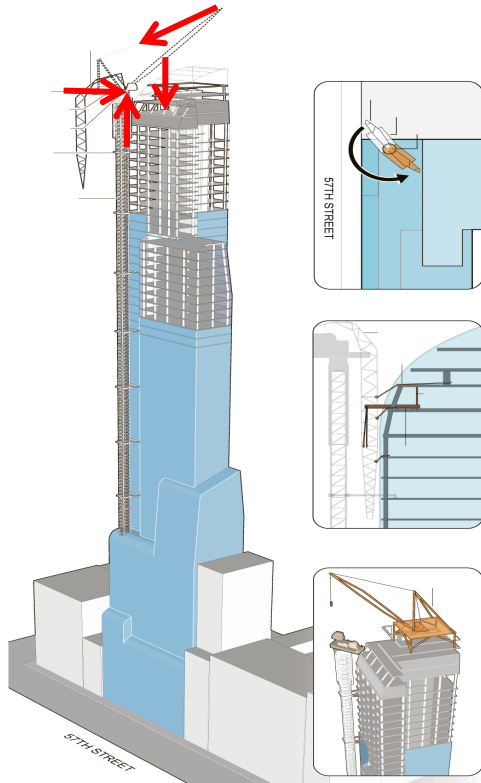
STATIC & ROTATIONAL EQUILIBRIUM Units 15 & 3

Dr. John P. Cise, Professor of Physics, Austin Community College, 1212 Rio Grande St. Austin Tx 78701

jpcise@austincc.edu & NYTimes November 7, 2012 by Charles V Bagli

As Crane Hung in the Sky, a Drama Unfolded to Prevent a Catastrophe Below

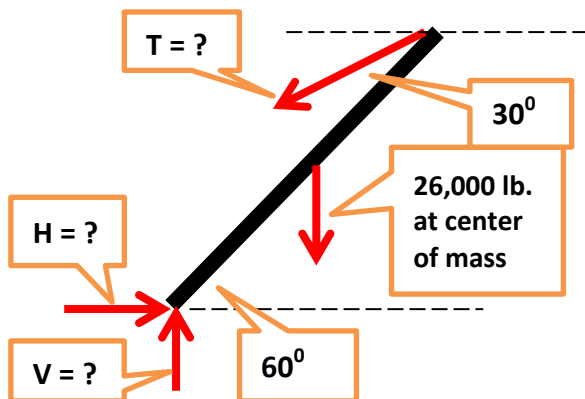
Michael Alacha, a New York City buildings engineer, was racing up the stairwell of a 74-story luxury skyscraper being built in the heart of Midtown Manhattan. [Hurricane Sandy](#) was battering the region, and Mr. Alacha was trying to avert a disaster.



The boom of the construction crane atop 157 West 57th Street was damaged by Hurricane Sandy's winds on Oct. 29. It took six days to secure before neighboring buildings could be reoccupied.

High above him, a **150-foot crane boom** next to the building, one of the tallest construction projects in North America, was dangling. It had **twisted and crumpled** in the 80-mile-an-hour winds and was now threatening to plunge 1,000 feet to the street, onto a natural gas main, and possibly cause a major explosion.

Mr. Alacha, in an interview this week, said that in the hours after the accident, he estimated that there was an 80 percent chance that the **26,000-pound boom** would plummet to the street.



INTRODUCTION: This is the crane boom set up (as seen in Graphic in the upper left) prior to being blown down. It was in static and rotational equilibrium.

QUESTIONS: Find tension (T) in cable, $V = ?$, $H = ?$

HINT: Use conditions for static ($\Sigma F_x = 0, \Sigma F_y = 0$) & rotational Equilibrium ($\Sigma \tau = 0$).

ANSWERS: $T = \sim 13,000 \text{ lb.}$, $V = 32,500 \text{ lb.}$, $H = 11,259 \text{ lb.}$