



Structural Risks of Wind Towers

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The most unique aspect of wind tower structural design is the dynamic characteristics and fatigue-related issues. Of all civil engineered structures, the wind tower stands as an inherently special structure because it is a “working machine” with moving parts, versus a bridge or high rise building.¹

Wind Tower Structural Failures²

Year	70s	80s	90-94	95-99	00	01	02	03	04	05	06	07	08	09	10*
No.			1	9	9	2	8	4	3	7	6	11	9	15	

**to 31 March 2010 only*

STRAAM’s SKG reduces your RISK against wind tower failure while continuously monitoring the tower’s performance against the following¹ dynamic loads or events:



FATIGUE EVENTS

- Frequency-rotational stiffness
- Fatigue failure of welds
- Foundation cracking from fatigue

SHORT TERM LOADS

- Seismic/earthquake loads
- Foundation softening due to poor drainage
- Peak wind dynamic pressure or gust load

OFFSHORE ENVIRONMENTS

- Hydrodynamic wave loading on the tower foundation
- Frequency response of tower-foundation with complexity of the wind and water wave action on the structure
- Fatigue and corrosion from the water-wave action
- Geotechnical performance of the sub-sea floor foundation behavior

MECHANICAL EVENTS

- Turbine over-speed
- E-stop
- Blade failure
- Turbine eccentricity loads
- Rotor imbalance

LONG TERM LOADS

- Normal operational wind loads that include dead, live, static wind pressure and standard operational overturning moments, shears and axial loads.

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¹“Economics of Taller Wind Towers,” by Diliip-Khatrri, Ph.D., URS Corp. *Renewable Energy North America*, published 2/17/10

² Caithness Windfarm Information Forum 2010, www.caithnesswindfarms.co.uk