

# Some engineering applications of fluid mechanics

**CE319F**

**Elementary Mechanics of Fluids**

**Spring 2013 (Kinnas)**

**The University of Texas at Austin**

**Civil, Architectural, and Environmental  
Engineering**

# *Rivers*



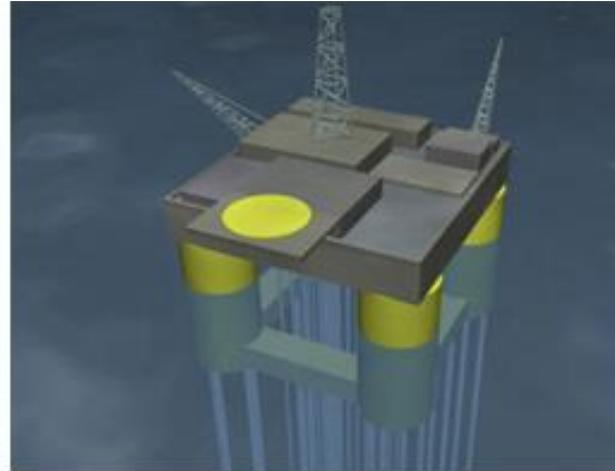
# *Dams*



# *Ships*



# *Offshore Structures*



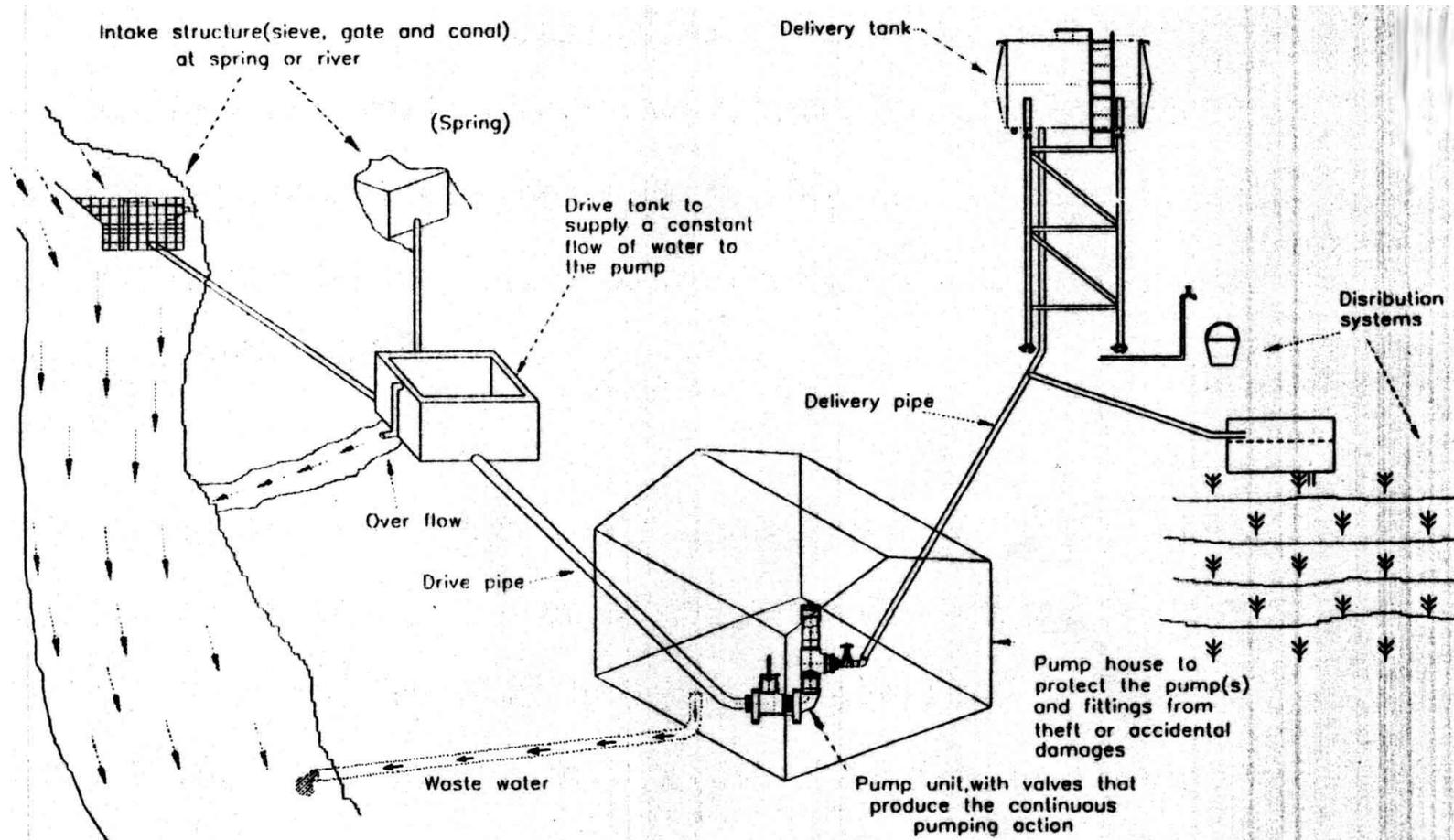
# *Pipelines*



January 20, 2015

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# Hydraulic systems



# *Wind turbines*



# *Ocean Current Turbines*

*(taken out of the water for maintenance)*

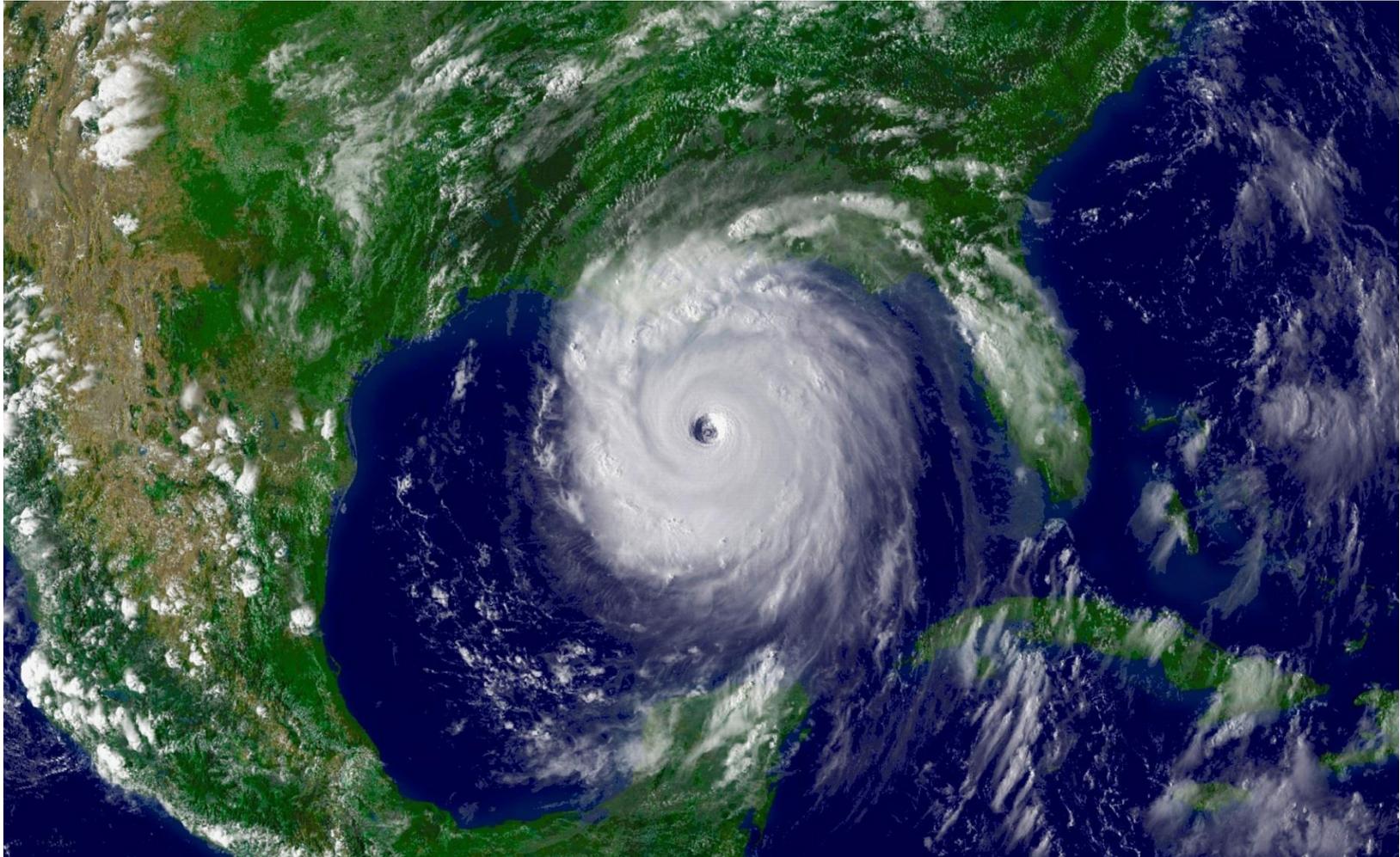


# Waves



# *Satellite image of Hurricane Katrina*

*(Aug. 28, 2005, cat. 5, wind speeds at 175 mph)*





January 20, 2015

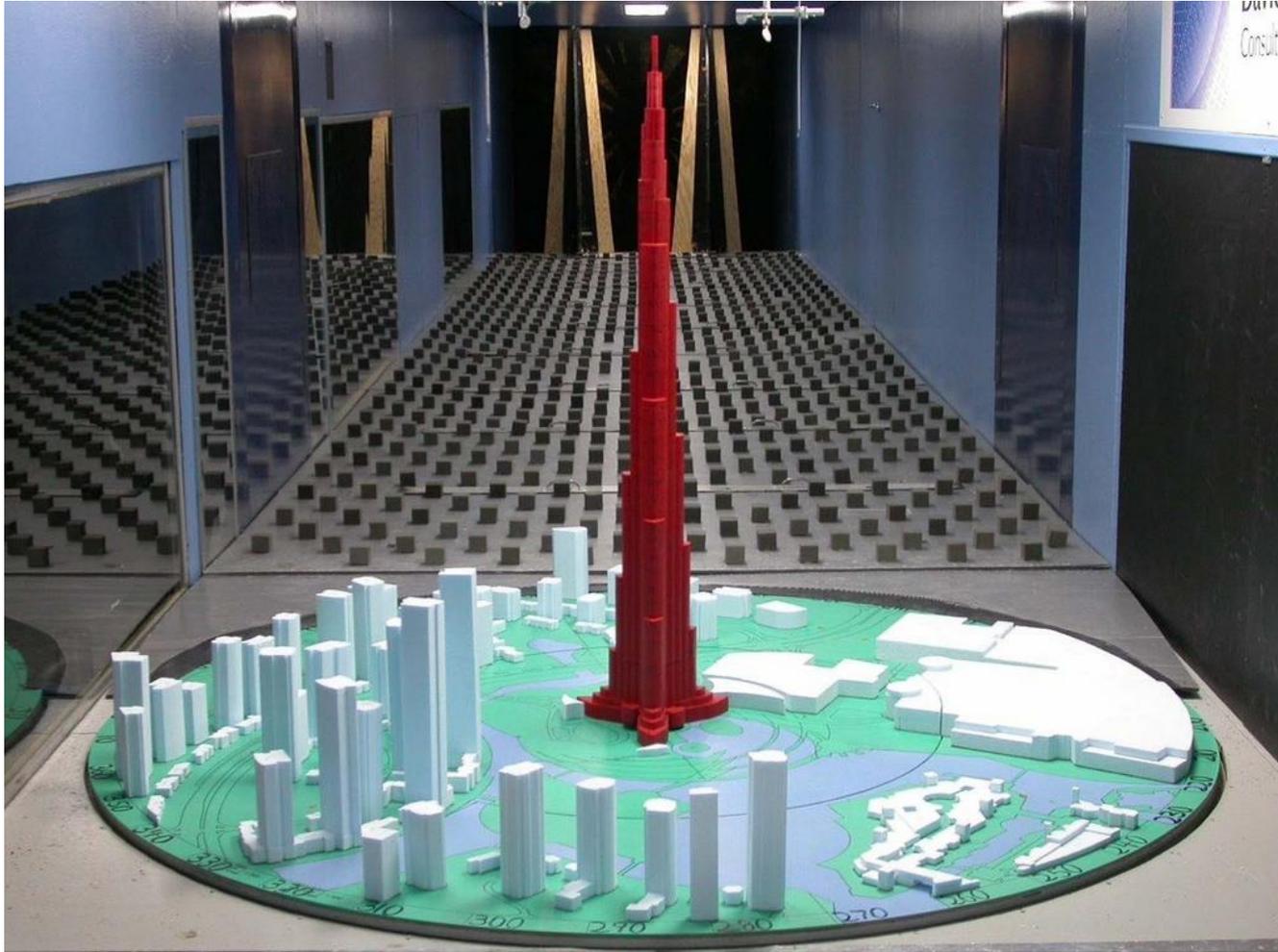
*Boston's John Hancock Tower (241 m, 60 floors) was originally vibrating excessively at wind speeds  $> 45\text{mph}$  and causing windows to fall (...became the "Plywood" palace!)*



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# *Testing of models of buildings inside wind-tunnel*



**Burj Dubai**  
skyscraper in  
Dubai, U.A.E.  
World's tallest  
building (828 m,  
163 floors)

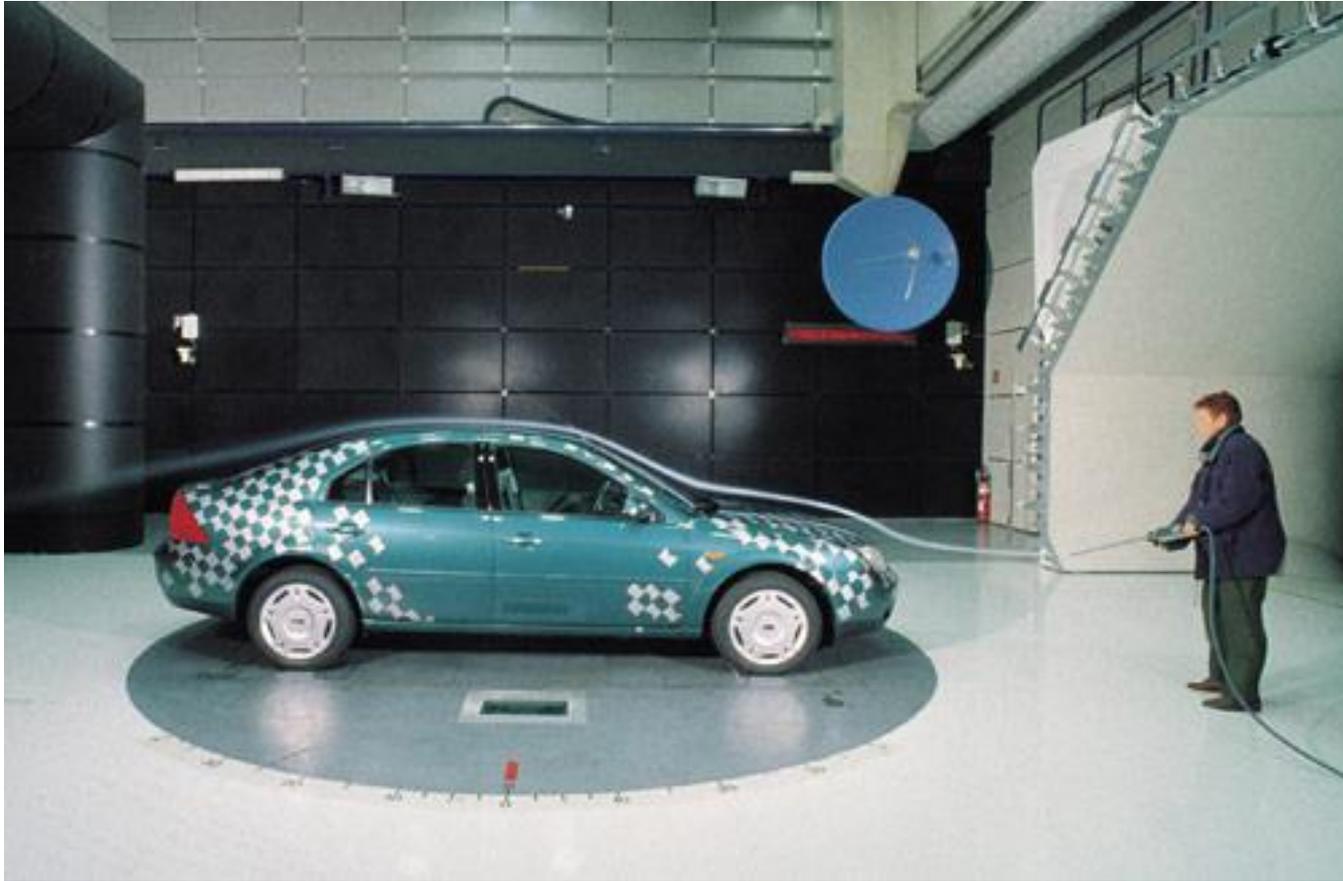
***See what can happen to a bridge if you do not account for the wind forces!***

<http://www.youtube.com/watch?v=3mclp9QmCGs>

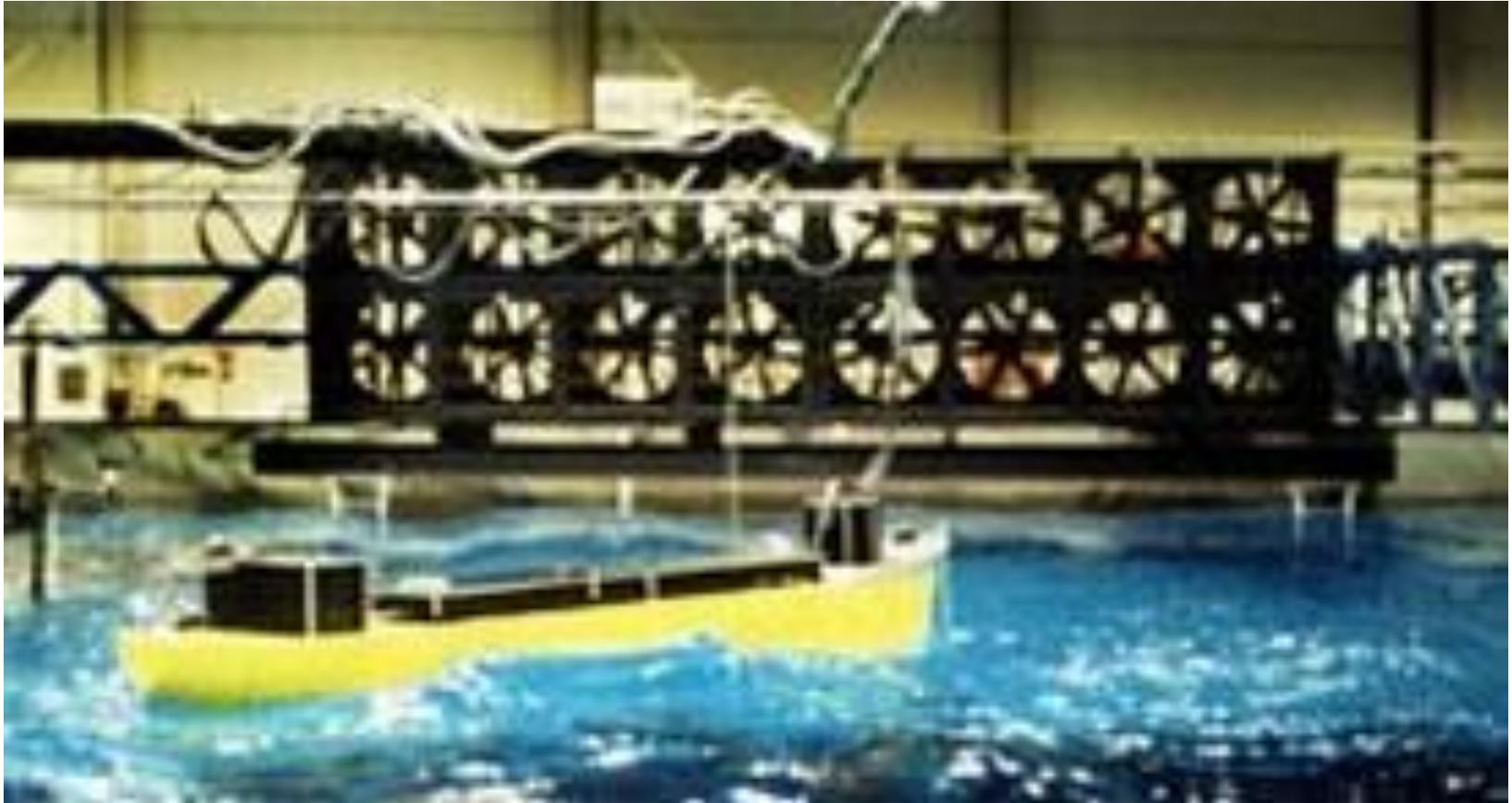
# *Testing of bridges inside wind-tunnel (NEW twin bridges at Tacoma Narrows)*



# *Testing of cars inside windtunnel to reduce air resistance*



# Testing of models of tankers, offshore structures at the Wave Basin of Offshore Technology Research Center (OTRC) (joint center by UT Austin and TAMU)



***Civil and Architectural Engineers  
need to know how fluids flow, and  
how they affect objects in contact  
with them, so that they design these  
objects properly, for un-interrupted  
and safe function!***