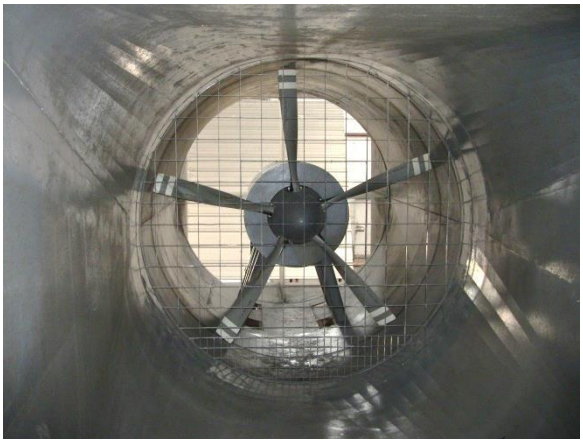
1500 Finfeather Rd
Bryan, Texas 77801
979-703-1874
Cell: 979-218-5226

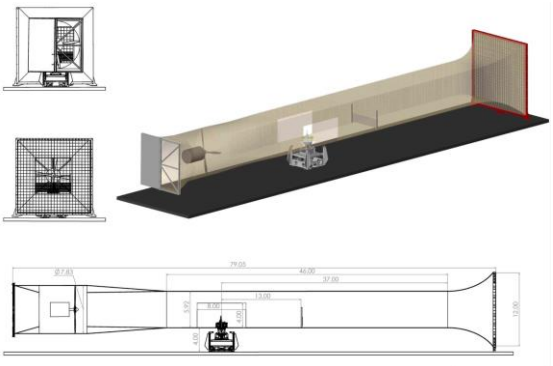
JLMLLM Low Speed Wind Tunnel

The JLMLLM Low Speed Wind Tunnel facility is housed inside a 35k sf warehouse in Bryan Texas. The facility is inside a 5K sf room (125x40 ft) with 20 ft ceilings that works as a recirculation zone during operation. The wind tunnel is an Eiffel-type facility (suction, open return) 79 ft long, with a 4 to 1 contraction Nozzle that includes flow straighteners/screen and a 6x6ft test section (10 ft long).

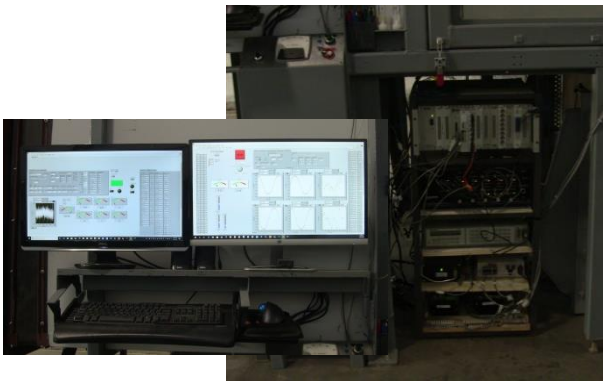


The power section includes 13 ft long diffuser, a 250 hp electric motor operated at a constant RPM (1185), a five (5) blade propeller eight (8 ft) diameter with hydraulic blade pitch actuation to control the wind tunnel wind speed. The facility design includes a long section with constant cross section (32 ft) extending from the nozzle exit to the front of the test section to help with the development of boundary layer profiles.

The facility has a 90 mph (40 m/s) maximum speed and a minimum speed of 20 mph (9 m/s). For installations including a boundary layer profile the reference speed at 32 ft (10 m) is between 50-60 mph (23-27 m/s), depending on the profile selection. Turbulence levels for a clean tunnel are 1 %.



The test section area includes viewing access to the model, adjustable base for model positioning system, instrumentation rack for data acquisition equipment, data acquisition computer and displays. The back side is a 4x8 ft door that can be open to access the test section and make major test section and/or model changes. The floor accommodates a mechanical turntable 28" diameter used for offshore semisubmersible tests and a 60 in static round table used for larger setups not requiring the floor to rotate.

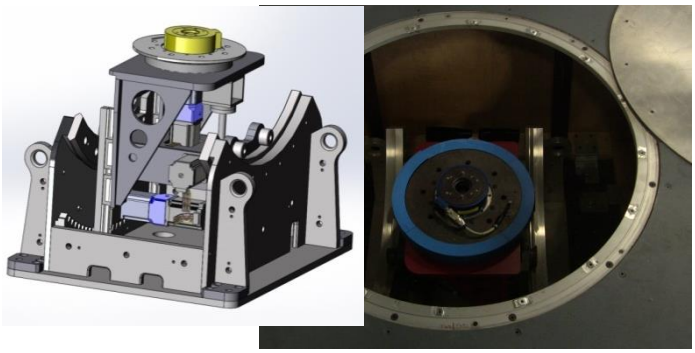


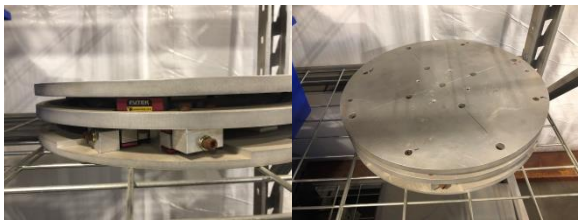
The data acquisition system includes a National Instruments (NI) SCXI interface with data acquisition modules, a NI 18 bit Multifunction data acquisition board, stepper motor motion control hardware, Dantec Streamline measuring system for Constant Temperature Anemometer (CTA/Hotwire). A wide selection of SCXI modules is available for different data and/or control requirements.

A model positioning and balance system was design and fabricated specifically to be used with offshore floating installations, but can be used for a variety of other test.

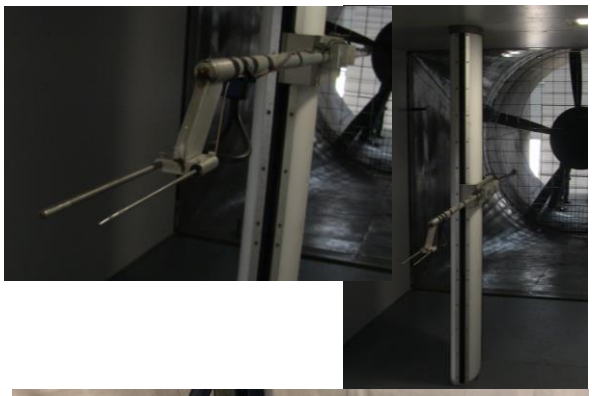
For offshore platforms, the mechanism can change the draft (height) by a range of 6 inches, rotate 0 to 360°, and heel -30 to +30°. The design of the mechanism has a fixed rotation point at floor level and the heel angle is always in the direction of the wind. Typical model scales are 1:196 for floating platforms. All movement is made using stepper motors controlled with a NI LabVIEW code. The in-house developed code includes the data acquisition of the balance loads and wind tunnel conditions, therefore providing all required information for model testing and post-processing.

A JR3 force-moment sensor is used to measure the loads and mounted in between the model and the positioner. There are two sensors available; the first has a range of 50 lbs in x and y axis, 100 lbs in the z axis and 225 in-lbs in all 3 moments (Mx, My and Mz), the second has a range of 100 lbs in x and y axis, 200 lbs in the z axis and 450 in-lbs in all 3 moments (Mx, My and Mz), both of the sensors are 4.5 in diameter and 1.5 in thick. A third balance system is an in-house developed system that uses 12 load cells. The system design with three levels measures the 3 forces and moments, 75 or 150 lbs load cells can be used to change the load ranges.



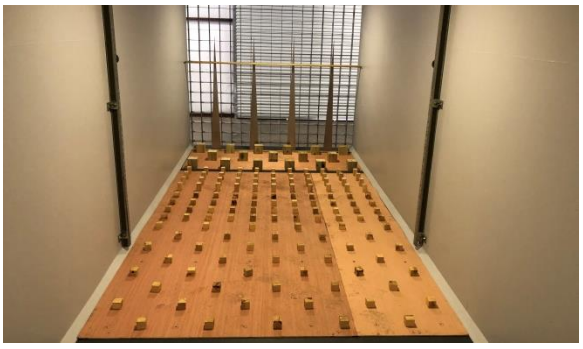


A traversing mechanism is in place behind the test section. It has a travel of 64 in on the z direction and is controlled by stepper motors. For the normal test section survey it carries a pitot static probe and a single wire CTA probe. Other probes can be used as needed for a test requirement. The mechanism is left in place if used to survey the test section for a test in order to keep a constant blockage effect.



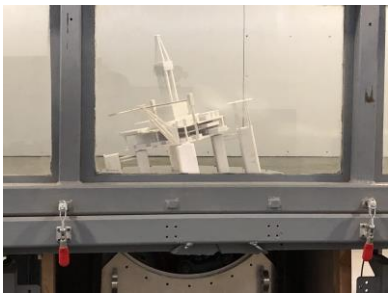
A large turntable is also available for other mounting options. The turntable is designed to be mounted on top of the platform with a 36 in diameter controlled by stepper motors and a 0-360 deg rotation range.

Boundary layer profiles can be accomplished with either spires/ blocks or with a tubing fence.



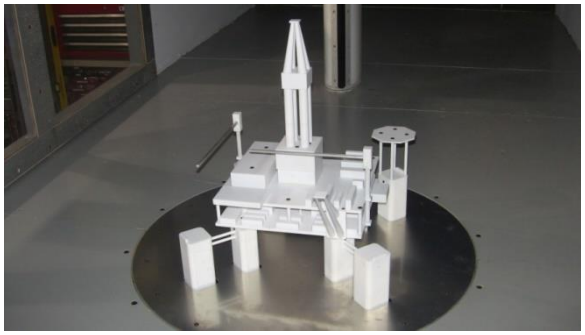
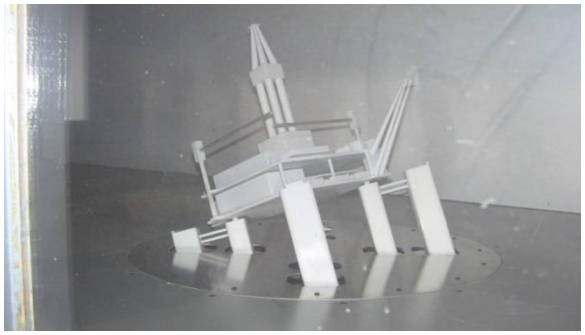
A smoke generator with a 6 ft handheld wand is available for flow visualization. The wand can be used from outside through the side wall of the tunnel or by an operator inside the tunnel. Other flow visualization techniques including tufts and tempura paint can be used as required or needed. Other techniques can be used, but depend on the model and setup. Cleanup is always the main concern with some techniques.





Tests have been successfully performed on offshore platforms and full scale mirrors. But like any other wind tunnel the possibilities are only limited by the test requirements, equipment available and imagination.

Data acquisition and hardware control software is all done in house and can be modified to meet test requirements. All data processing and reduction is done offline using Excel and can be modified to meet any requirements.

Model and mounting systems can be designed in house using Solidworks. In house fabrication capabilities are limited at this time but growing. A 3 d printer and Small CNC mill are available in house, along with welding and wood working tools. JLMLLM Consulting has a good relationship with several local machine shops which are used to fabricate the parts or models needed.

Contact Information:

JLMLLM Consulting
Jorge L Martinez
3900 Ravenwood Dr
Bryan, Texas 77802
jmartinez@jlmllmconsulting.com
Http://www.jlmllmconsulting.com