

**Contract:** High Island II Recovery  
**Client:** Transocean  
**Location:** Gulf of Mexico



### Challenge

The jack-up drilling platform *High Island II* was damaged by Hurricane Rita in 2005. Extreme foundation overload resulted in the hull taking up a 3-degree angle of trim. Initial attempts to level and remove the hull resulted in leg brace damage.

Noble Denton provided advice and consultancy to ensure a safe means of recovering the unit for repair.

### Expertise provided

Noble Denton provided structural engineering consultancy for the client's recovery team. This consisted of structural analysis of the damaged jack-up in order to advise on the structural consequences of various methods of recovery under consideration.

The analysis included an assessment of the role of the spudcan-foundation response which had an important role in the development of the recovery strategy. Non-linear structural analysis was undertaken to examine the leg stresses as the hull was jacked to a level condition.

The recommended recovery strategy included the use of a pull-back barge, so the analysis included calculation of the transient response of the jack-up following sudden failure of one of the pull-back lines. The loads in the mooring system for the pull-back barge spread were also determined and optimised by analysis.

A scheme was developed for plotting the measured response as the pull-back load was applied and the hull jacked up the forward leg. This enabled estimates to be made of the actual soil strength that was both resisting the righting of the angled legs but also providing a valuable resistance against catastrophic collapse in the absence of the pull-back force.

### Outcome and benefits

The unit was successfully recovered by levelling the rig after a critical part of the loading was removed from the legs by the means of pull-back winches located on an adjacent barge. This method minimised additional damage to the leg braces resulting in a safer tow to the repair yard and a faster and cheaper repair.

Noble Denton brought to the recovery team expertise in both theoretical analysis and experience in the engineering and marine practicalities of manipulating damaged jack-ups. During the recovery of the unit, Noble Denton provided a structural engineer to plot the measurements made of the operation and confirm that the operation was going according to plan.

Noble Denton's experience in the analysis of jack-up units covers the entire range of design types from tubular leg lift-barges to the largest mobile offshore drilling units operating in the world today. Noble Denton has thorough knowledge of the site assessment analysis techniques and codes of practice currently in use. The company is equipped with highly efficient in-house analysis software that permits complex jack-up analysis cases to be analysed quickly and accurately.

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