

Drilling derricks have traditionally been designed using static and quasi-static analyses and follow custom practices enshrined in regulatory codes. However, in modern deep water drilling tasks, there are a convergence of factors, which can significantly enhance the dynamic component of displacement and stresses within the derrick structure and wire lines.

Just some of these factors are:

- High suspended masses on deep water riser strings
- Pressure on drill system weight to reduce overall top side weights
- High power and high speed draw works machinery
- New control systems and customisation for rapid drilling

Any one of these factors acting on their own is generally not a problem but, in combination with each other, they can contribute additional dynamic stresses which can be anywhere from 20% to 120% of the static stresses in the systems.

Because of these risks, it is considered prudent to either i) ensure the designs of new drilling systems and derricks, are carried out using structural analyses incorporating dynamic effects or ii) subject the existing designs to a thorough dynamic design audit. Such design audits can give reliable estimates of additional dynamic stresses and indicate the presence or absence of potential problems.



If there is a stress problem, the audit can also put forward relatively straightforward and low cost changes in the structure or drilling procedures that can eliminate the problem.

One valuable additional output of a derrick design audit is an estimate of the 'wire line fatigue life' from which a safe "cut and slip" procedure can be deduced.

In fact, with the level of sensor equipment built in to modern derrick

designs, it is perfectly feasible to provide an add-on system for direct on-line monitoring of wire line 'fatigue life utilisation and even to control "cut and slip" procedures using this.

The expertise and experience that BPP-TECH has developed in dynamic analyses of derrick design, and in design audits, can provide an additional layer of safety, and a longer operating life for modern drilling systems.