



Is this post rigged, or some information on oil platforms.

Posted by [Heading Out](#) on October 2, 2005 - 3:23pm

Topic: [Supply/Production](#)

Tags: [drilling rigs](#), [hurricane katrina](#), [peak oil](#), [production platforms](#), [sakhalin](#), [tech talk](#) [[list all tags](#)]

I noticed, over the past week, that there is some increasingly technical talk about the various ways that we get oil out from underwater in the Gulf of Mexico. And while I suspect that most of those who comment on this site are vary familiar with all the terms, some of the more general readership may not be. Since this is going to be a fairly hot topic in the near term, as the impact (spelled out in earlier posts and comments) spreads from the oilfields to the refineries and then up the pipelines to the local distributors and gas stations let me therefore explain just a bit about some of the different words that are being used here - with reference, where I can find them - to pictures of the different types of structures that are being used. And if I miss some, please chip in either to ask or answer. This is replacing a chat I was going to have about Horizontal Drilling, but that will be along at some time in the future. Earlier technical posts are listed at the end of this one (with a comment on the levee question).

Just as on land, we need some form of drilling rig if we are going to drive a bit down through the rock and find us some oil. But, unless we are working somewhere like the North Slope where we can wait until the sea freezes over and drive ice roads out to build islands to drill from, we are going to have to find a different way of providing the infrastructure support for that bit. And here is the first distinction - because a **drilling rig**, in the offshore sense, is more of an exploratory tool, going out to find oil, rather that developing the known fields and bringing in production. That latter task is left more to **production platforms**, which can be sited where best to drain the field, and may not even use the initial holes drilled by the exploration rig.

As you may have read the [Minerals Management Service](#) keeps track of these and is [currently reporting](#) that 471 platforms remain evacuated and 33 rigs out of totals of 819 platforms, and 134 rigs that were working in the Gulf - pre-Katrina. Some of these operate in shallow water, there are also significant developments in the deep water such as Thunder Horse. But let's start at the shallow end.

In really shallow water, or the bayous, you might launch your bit from a **drilling barge**, where the derrick can be [assembled](#) once the barge has been towed to the right place. Barges can be flooded to rest on the seabed in relatively shallow operations.

However this is very susceptible to bad weather, and so, as one moves further offshore, then one might use a **self-erecting tender** from a barge, but would more likely move to something which could get the drilling floor stabilized and up above the waves. These are the **jack-up rigs**. Typically they have three legs, that are raised as the rig [moves around](#). Then when it has reached the desired site, the legs are lowered to rest on the sea floor and the entire structure jacks itself up out of the sea, and, hopefully, [above the waves](#). (You can get a paper model to cut out and [assemble](#) of this rig). They can do this to work in depths to around 500 ft. The discussion about

The Oil Drum | Is this post rigged, or some information on oil platforms. <http://www.theoil Drum.com/story/2005/10/2/152310/160>
[damaged rigs](#) gave links to the different rigs that have been damaged, and some of these have photos of the rigs in better days.

As one goes out to deeper depths, then one will look for a more substantial vessel and so one comes to the [Semi-submersible](#). These are built to either sail themselves, or to be towed out to the site, with the assembly floating, and then fluid is pumped into the bottom tanks to partially submerge the vessel and thus stabilize it. One can get some idea of the size of these from some of the photos shown where, (thanks to Ed Ames), [wikipedia](#) covers the subject..

Since these are floating there has to be a way of holding them in place. One way is to have them **dynamically positioned**, using thrusters to hold them in position, such as [these](#). Note that it takes about 3 years to build such a unit. The alternative is to have the rig attached to anchors on the sea bed using cables, or **tethers**. (And for those interested in natural gas production, note that the [same rigs](#) are used for both).

The connection between the well and the platform now becomes more flexible and special connecting pipes called **risers** are designed to reach from the **blow-out preventer** (BOP) at the top of the well, but on the seabed, and the platform. These must allow the rig to rise and fall with the tides and so [models](#) of behavior have to be written to design ways of allowing this.

An alternative is to use a [drillship](#) to do the exploration. The one referenced, for example, found the Mars field. It is the platform for that field that was recently shown, after suffering through Katrina. The drillship has the rig mounted in the middle of the ship, and can thus move around somewhat more easily than the others. It is generally held in position by dynamic positioning while drilling.

Once the field has been established, then a larger production platform can be brought out and placed where it can, using directional drilling, reach the best places to extract oil from the field. It is these large structures, such as that the [Yastreb](#) from which Sakhalin Island oil finally began to flow this weekend, or the [Thunder Horse](#), or Mars platforms. Although the former was [due to produce](#) by now, it has been [delayed](#) by damage from Dennis, while the Mars platform was extensively damaged by [Katrina](#). One of the problems with using these large platforms for Deepwater recovery is that they focus collection and so when these two are disabled, for example, they take about 400,000 bd out of production. And once they are damaged they are not so easily replaced.

Demand for rigs has been so strong that, as the International Herald Tribune [reports](#)

"If a customer comes today with an order, he'll have to wait until 2009 for delivery," Choo said in an interview last week. "That's how busy we are. If he's willing to pay more, he can get a rig by 2008 from our American shipyard."

The article notes that while it may only take 2 years to build a rig, the yard can only work on 8 at a time, and thus current deliveries are for 2009. But the value of the market is such that other yards are now eyeing the opportunity since

According to analysts, about 350 rigs worldwide are more than 20 years old and due for replacement or upgrade. Around 70 rigs have been built in the past 10 years and approximately another 50 are now on order.

By the way, for those interested in levee failure, it was actually more the flood walls that failed, and they failed because when the water overtopped them it fell vertically down over the open wall, hitting directly at the base of the wall, and eroded the foundation of the wall, in the same way as a waterfall has a big hole in the rock (the swimming pool?) where it falls. Thus the wall ultimately lost its footing. This does not happen as easily with the more gradual slope of a levee since the water flows across the levee without the higher impact velocity, and though it will, in time, eat its way down, if there is a strong core this can take quite a while.

The question was, in part motivated by the reality that doing a 3-D rendering, as some of you know, can turn into a candle-burning exercise, and thus if I started adding the illustrations the number of posts would drop quite a bit. For now, therefore, I will continue just referring to other folks pictures rather than providing my own.

This is part of an ongoing weekend series on technical aspects of oilwell (and natural gas) drilling. Previous posts can be found at::

[the drill](#)

[using mud](#)

[the derrick](#)

[the casing](#)

[pressure control](#)

[completing the well](#)

[flow to the well](#)

[working with carbonates](#)

[spacing your well](#)

[directional drilling 1](#)

[directional drilling 2](#)

As ever, if this is not clear, or if there is disagreement then please feel free to post, and I will try and respond.



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