Oil platform types

An oil platform is a large structure used to house workers and machinery needed to drill and then produce oil and natural gas in the ocean. Depending on the circumstances, the platform may be attached to the ocean floor, consist of an artificial island, or be floating.

Generally, oil platforms are located on the continental shelf though as technology improves, drilling and production in ever deeper waters becomes both feasible and profitable. A typical platform may have around thirty wellheads located on the platform and directional drilling allows reservoirs to be accessed at both different depths and at remote positions up to 5 miles (8 kilometres) from the platform.

The Hibernia platform is the world's largest oil platform.Many platforms also have remote wellheads attached by umbilical connections, these may be single wells or a manifold centre for multiple wells.

Platform types

Larger lake and sea-based oil platforms and oil rigs are some of the largest moveable man-made structures in the world. There are several distinct types of platforms and rigs:

Fixed Platforms, built on concrete and/or steel legs anchored directly onto the seabed, supporting a deck with space for drilling rigs, production facilities and crew quarters. Such platforms are, by virtue of their immobility, designed for very long term use (for instance the Hibernia platform). Various types of structure are used, steel jacket, concrete caisson, floating steel and even floating concrete. Steel jackets are vertical sections made of tubular steel members, and are usually piled into the seabed. Concrete caisson structures, pioneered by the Condeep concept, often have in-built oil storage in tanks below the sea surface and these tanks were often used as a flotation capability, allowing them to be built close to shore (Norwegian fjords and Scottish firths are popular because they are sheltered and deep enough) and then floated to their final position where they are sunk to the seabed. Fixed platforms are economically feasible for installation in water depths up to about 1,700 feet.

Compliant Towers, consist of narrow, flexible towers and a piled foundation supporting a conventional deck for drilling and production operations. Compliant towers are designed to sustain significant lateral deflections and forces, and are typically used in water depths ranging from 1,500 and 3,000 feet.

Semi-submersible Platforms having legs of sufficient buoyancy to cause the structure to float, but of weight sufficient to keep the structure upright. Semi-submersible rigs can be moved from place to place; and can be lowered into or raised by altering the amount of flooding in buoyancy tanks; they are generally anchored by cable anchors during drilling operations, though they can also be kept in place by the use of steerable thrusters. Semi-submersible can be used in depths from 600 to 6,000 feet.

Jack-up Platforms, as the name suggests, are platforms that can be jacked up above the sea, by dint of legs than can be lowered like jacks. These platforms, used in relatively low depths, are designed to move from place to place, and then anchor themselves by deploying the jack-like legs.

Ship-board Rigs. Active steering of ships, especially based on Global Positioning System measurements, enables certain drilling operations to be conducted from a ship which holds its position relative to the drilling point, within the parameters for movement acceptable in a given circumstance — i.e. within the point at which movement of the ship would cause the drill string to break.

Floating production systems are large ships equipped with processing facilities and moored to a location for a long period. The main types of floating production systems are FPSO (floating production, storage, and offloading system), FSO (floating storage and offloading system), and FSU (floating storage unit).

Tension-leg Platforms, consist of floating rigs tethered to the seabed in a manner that eliminates most vertical movement of the structure. TLPS are used in water depths up to about 6,000 feet.

Seastars are mini TLPs of relatively low cost, used in water depths between 600 and 3,500 feet. They can also be used as utility, satellite or early production platforms for larger deepwater discoveries.

Spar Platforms, moored to the seabed like the TLP, but whereas the TLP has vertical tension tethers the Spar has more conventional mooring lines. Spars have been designed in three configurations: the "conventional" one-piece cylindrical hull, the "truss spar" where the midsection is composed of truss elements connecting the upper buoyant hull (called a hard tank) with the bottom soft tank containing permanent ballast, and the "cell spar" which is built from multiple vertical cylinders. The Spar may be more economical to build for small and medium sized rigs than the TLP, and has more inherent stability than a TLP since it has a large counterweight at the bottom and does not depend on the mooring to hold it upright. It also has the ability, by use of chain-jacks attached to the risers, to move horizontally over the oil field. The first Spar was Kerr-McGee's Neptune, which is a floating production facility anchored in 1,930 feet in the Gulf of Mexico. Dominion Oil's Devil's Tower is located in 5,610 feet of water, in the Gulf of Mexico, and is the world's deepest Spar. The first (and only) cell spar is Kerr-McGee's Red Hawk.