RAISED CANTILEVER FOR EASY ACCESS (RCEA)
USED ON SELF ELEVATING DRILLING RIGS
(*OFFSHORE ENERGY SECTOR*)

DESCRIPTION

Field of the Invention

This invention relates to an arrangement of an apparatus so as to improve personnel access to and from either side of this apparatus during its operation. Such an apparatus is normally called the cantilever of a self-elevating drilling rig used in the offshore energy sector. This invention is applicable to self elevating drilling rigs, non-drilling platforms or vessels in offshore applications. Fundamentally, it is innovative in idea enabling personnel access from either side of the apparatus (or cantilever) so as to significantly improve operational efficiency of the drilling rig.

The idea, through special physical re-arrangement of the components involved, is unique and innovative when compared with typical cantilevers found in self elevating drilling rigs or vessels.

Because its application is essentially more pragmatic, the invention of this arrangement is called "**Raised Cantilever for Easy Access**" or RCEA. The conventional arrangement of similar cantilevers found in self-elevating drilling rigs is not raised to a point which allows easy personnel movements between both sides of the rig. Another added feature of this invention of arrangement is that it creates more space below the cantilever for installations of deck items including ventilators which otherwise are required to be placed at the sides of the rig. The ventilators when properly arranged and located below the cantilever, in turn can provide an air

draft that can enhance safety aspect of ventilation at the drill floor and BOP (blow out preventer) vicinity.

A typical cantilever on a self-elevating drilling rig is depicted in ***figure 1***. The following terminologies common in a drilling rig are defined for the better understanding of the application of the invention.

Terminology	Description
Cantilever	The part of a self-elevating drilling rig which is made movable and is able to extend aft-ward so that the drill floor located above the cantilever can perform its drilling function over a space envelope aft of the rig transom.
Push-Up structure	This refers to a support structure located at aft of the rig to hold up the cantilever. When the cantilever is stowed or extended aft-ward, this structure performs a push-up reaction to the cantilever. This structure comes in as a pair and they support the side beams of the cantilever throughout its longitudinal travel (see ***Figure 1A***).
Hold-Down structure	This refers to a structure located forward of the push-up structure and provides support of the cantilever when stowed in forward position. When the cantilever is extended aft-ward beyond a point where its centre-of-gravity (CG) is behind the rig transom, this structure holds down the cantilever and prevents it from tipping over the transom. The structure comes in as a pair and they support or hold-down the side beams of the cantilever during its longitudinal travel (see ***Figure 1A***).

Background of the Invention

Cantilever is a common feature of self-elevating drilling rigs, while not so common on vessels or offshore platforms. Its purpose is to carry the drill floor located above it at the aft-end and move the drill floor over a drilling area envelope described by the cantilever and drill floor movements. The cantilever moves longitudinally whereas the drill floor moves transversely.

While such apparatus described above and other variations of such design achieve their objective in drilling over an area envelope, the cantilever is normally located low close to the main deck of the hull body (see ***figure 1***). The clearance between cantilever and hull main deck is normally between 0.8-1.2m in height or thereabout. Since the cantilever, in its stowed position takes up quite a long and central area of the hull, personnel or man-handled materials crossing between port and starboard sides of the rig is relatively ineffective and requires a person or the material to move forward, turn around the forward end of the cantilever and reach back to other side of the hull. Even when the cantilever extends aft-ward, there is still this blockage of access between port/starboard sides.

Further, the long and central space occupied by the cantilever close to main deck takes away valuable space for deck outfits (air vents, sounding heads, remote-operated valve deck handles, ventilators etc.) which are pushed to the sides when they could be installed in the middle portion of the rig.

The background of the Invention lies in a re-arrangement of the components by raising the cantilever vertically up to a suitable height from the main deck thus allowing better and easier access of personnel reaching from one side of the rig to the other side (see ***figure 2***). At the same time, it creates more deck space for outfits to be installed in the central portion of the rig.

First significant difference and substantial advantage of the present invention is that the **Raised Cantilever for Easy Aeeess (RCEA)** provides for better movement of personnel between port and starboard sides of the rig.

Second significant difference and substantial advantage of the present invention is that RCEA frees the central portion deck space allowing outfits to be located and operated in relation to tanks or space directly below the deck (eg. Air vent, sounding pipe, remote-operated valve deck handle, ventilator etc.). This has cost and space savings impact.

A third significant difference and substantial advantage of the present invention is that if the ventilators are arranged for natural exhaust as is the case if the exhaust ventilator is directly above the compartment below, cost savings from eliminating the necessity to provide forced exhaust is achieved. At the same time, a stream of exhaust air below the cantilever can be directed toward the aft-end of the rig thus reducing or preventing any hazardous or toxic gases to flow forward to living quarters.

A fourth significant difference and substantial advantage of the present invention is that the raised cantilever results in more air gap from sea level. Without further raising the hull, the cantilever can be made to reach over a production platform to perform work-over activities.

Needless to say a RCEA arrangement optimizes apparatus-rig (or vessel or platform) engagement utilization. As a result, operational efficiency is improved.

The Objective of the Invention

The objective of the invention is to provide an innovative, improved and alternative arrangement for ease of personnel and material access and movement between port and starboard of the rig, along with which comes other usefulness as mentioned in the preceding chapter.

The RCEA arrangement design will obviate or mitigate the aforementioned situation of less operational efficiency, lack of usage optimization and space sharing, or one which will at least provide the public with a useful, operationally more effective and cost saving choice.

Statement of the Invention.

The RCEA works on rearranging certain components thus elevating the whole cantilever vertically and creating space below the cantilever for useful operational advantages.

Both the 'push-up' and 'hold-down' structures are reinforced and increased in height so that the whole cantilever when supported is about 2m to 3m above the main deck of the rig. In other words, the cantilever will operate at this height from the main deck in all positions when it moves longitudinally (see ***figure 2***)

The raising of the cantilever is done purposely so as to achieve some advantageous results.

The end-result of this invention manifests the following advantages:

1. The raised cantilever provides better movement of personnel between port and starboard sides of the rig.

2. The raised cantilever frees the central portion deck space allowing outfits to be located and yet attend-able by men for maintenance or during operation.

3. In the freed-up space below the cantilever, ventilators can be located and if the ventilators are arranged for natural exhaust as is the case if the exhaust ventilator is directly above the compartment below, cost savings from eliminating the necessity to provide forced exhaust is achieved. At the same time, a stream of exhaust air below the cantilever can be directed toward the aft-end of the rig thus reducing or preventing any hazardous or toxic gases to flow forward to living quarters.

4. The raised cantilever results in more air gap from sea level and without further raising the hull, the cantilever can be made to reach over production platform easier in performing work-over activities.

Results and Discussion

The following table highlights and compares the RCEA advantages over typical similar cantilevers of other self-elevating drilling rigs. The table is in no way meant to be an exhaustive exploration of all of the features of the invention, and many of those not discussed will become readily apparent to a skilled reader once the full scope of the invention is understood.

No.	Features	Invention	Conventional
1.	Raised cantilever to a height of about 2m to 3m from main deck level	This innovative concept and re-design of the push up' and 'hold down' structures immediately provides a free vertical space for personnel and material access &	Similar cantilever on self-elevating drilling rigs sits close to deck level and this impedes accessibility between port and starboard

		movement between port and starboard side of the rig.	side of the rig
2.	The freed-up vertical space also clears up deck space that can be utilized for installation of outfits directly relevant to tank or space below deck	Immediately, deck outfits such as air vents and sounding pipes including tank dump valve remote deck handless concerning tank/s directly below need not be routed to sides of rig and this saves material and space.	Without usable central space being made available, deck fittings such as air vents and sounding pipes including dump valve deck handles have to be routed to sides of rigs and congesting valuable deck space at rig sides.
3.	Ventilators for compartments directly below can be installed in this central deck space	Natural exhaust ventilators can now be used and this reduces the number of forced ventilators required (forced supply and natural exhaust)	Ventilators for compartments directly below cantilever need to be routed to rig sides and forced ventilators (forced supply and forced exhaust) must be used and this increases cost..
4.	Exhaust ventilators arranged in central deck space	These exhaust ventilators can provide a strong air draft and when directed aft-ward, it can improve ventilation around BOP and cellar deck area. Hazardous or toxic gases, when present, can be partially prevented from moving forward to living quarters by this continuous aft-ward air draft.	Cellar deck hazardous or toxic gases, when present, can move forward into cantilever and forward to living quarters.

5	Increased cantilever air-gap from sea level	The raised cantilever height of 2m-3m from main deck provides the additional air gap for the cantilever to work over production platform without increasing hull air gap. Reduced hull air gap improves the rig's performance against forces of the environment (wind, wave etc.)	To reach over the platform, the rig will have to have more hull air gap exposing the rig to more environmental loads

Modifications of the Preferred Embodiments

While the invention has been described with particular reference to certain embodiments thereof, it will be understood that various modifications can be made to the above-mentioned embodiment without departing from the spirit and scope of the present invention. The examples and the particular proportions set forth are intended to be illustrative only.

Information Disclosure References

Information relating to inventions that may have been previously filed in by others and that is of similar invention can only be determined after a search by the authority.

THE INVENTOR'S CLAIM

1. A self elevating drilling rig, platform, vessel or system suitable for off-shore oil and gas drilling or production and other operations comprising:

   a cantilever that is fixed on the hull main deck and is able to move longitudinally while carrying a drill floor above to provide a drilling envelope when extended aft of the rig transom; and

   the conventional design is to have the cantilever fixed vertically close to the main deck and supported by the 'push-up' and 'hold-down' structures, and the air gap between the cantilever and the main deck is insufficient for personnel access between port and starboard sides of the rig;

   characterized in that the cantilever is now raised up by re-designing the 'push-up' and 'hold-down' structures to enable the cantilever to be fixed at a vertical height of about 2m to 3m from the main deck level that is novel in the arrangement design and this frees up a large space below the cantilever, which allows not only personnel and man-handled material access between port and starboard sides of the rig but also creates several advantages to be realized to improve operational efficiency of the rig.