PROPOSAL FOR CONTROLLING DISFUNCTIONAL ‘BLOW OUT PREVENTER’
Of shore of Louisiana, Golf of Mexico

Apparatus for Controlling Oil Pipe Leak in Extreme Situations (3)

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Technical field

This invention relates generally to the effective method for controlling oil leak in extreme situations under water when ‘blow out preventer’ have failed such as resent oil leak of shore of Louisiana, Golf of Mexico.

Previous attempts

So far, it has not been much failure of blowout preventer, but when it happens results are catastrophic. There have been several unsuccessful attempts to stop recent leak in Golf of Mexico. One was lowering four story tower, hundred tones of weight, to capture leak over fallen raiser pipe;
Second was similar attempt with smaller dome;
Third was to insert tube of smaller diameter into end of fallen raiser pipe;
Unsuccessful attempt was made to insert heavy mud into ‘blow out preventer’;
Recently, after unsuccessful attempt to make clean cut of the fallen raiser pipe, finally on day 45 of the accident rough cut was made with powerful shear (cutting tool) just above ‘blow out preventer’;
Today was first attempt to position modified small dome over rough cut on top of the ‘blow out preventer’. Modified small dome is lowest part of the pipe line which supposedly will capture and transport most of the oil to the tanker on the surface. It might reduce leakage but substantial amount of oil is expected to continue to leak.

After recently disclosed information that inside fallen raiser pipe there is still a drilling pipe, which makes my two previous solutions with special harpoon-alike plugs unusable, and after recently disclosed information that successful, at least rough, cut-off of the raiser pipe, just above ‘blow out preventer’ was made, I am sending the present invention as a new solution for sealing damaged well considering information of most recent development.

DISCLOSURE OF THE INVENTION

The present invention is a new method for temporally controlling oil pipe leak in extreme situations under water when ‘blow out preventer’ have failed.
The present solution/method for controlling oil pipe leak under water in extreme situations consists of:

1. A special flapper valve which can be operated and controlled by hydraulic and/or electrical means;

2. A special seal positioned inside wall of lower section of the valve connector which consist of: A bladder; and Fluid delivery system.

3. A special in-line pump for producing sucking force necessary during installation of the valve and pushing force necessary if fluids needs to be pumped up to the surface; and

4. Submarine robots (Remote Operated Vehicles) as observers and participant.

1. A special flapper valve consists of: Valve housing; Valve flap; Rubber seal ring; Operating mechanism; Lower connection section; and Upper connection section. Diameter of the valve housing is enlarged enough to accommodate hinged flap. The valve housing also has extended compartments to accommodate operating mechanisms for opening, closing and securing hinged flap inside valve housing. At this presentation operating mechanism is illustrated as common hydraulic cylinder with piston rod and locking solenoid switch although alternative mechanisms could be applied. One end of the hydraulic cylinder is pivotally secured inside wall of the extended compartment and one end of the piston rod is pivotally engaged to the hinged flap. At closed position the flap pushes against rubbery seal ring.

2. The special seal positioned inside wall of lower section of the valve connector consist of: A bladder; and Fluid delivery system. The bladder is a sealed enclosure with provided channels or tubes which expends when filled with fluid. The bladder is connected with a fluid container and an inline pump through a tube. When pump is activated the bladder is rapidly filled with fluid which then rapidly increases the volume and consequently seals the space between two critical surfaces - inside wall of lower section of the valve connector and radial surface at the top of the dysfunctional ‘Blow Out Preventer’ on which lower section of the valve connector is sited.

3. The in-line pump is an electro motor which consists of a rotor and a stator. The rotor consists of a hollow shaft which is fixedly engaged with an electromagnetic coil. The stator consists of a cylinder which is also housing of the motor and is fixedly engaged with electromagnetic coil. Stator and rotor are engaged through two sets of ball bearings and additional set of seal bearings. The cylinder of the motor has diameter reduction on each end and is aligned with the segments of the main, new, raiser pipe. The hollow shaft has continues spiral blades formed on the inner side of the shaft. When electro motor is activated the hollow shaft which is central element of the rotor rotates and provides suction force at the lower end, necessary during installation of the valve, and push force on the upper end of the in-line pump, necessary if fluids needs to be pumped up to the surface. The oil and gas are pumped up through raiser pipe to the next in-line pump for
farther pumping. The in-line pump segments are repetitively installed as needed for fluids to reach Ocean surface.

4. At locations such as depths of Ocean flour where tremendous hydrostatic pressure exist where humans can not operates then submarine robots are solutions for providing lights, video, operating tools, moving apparatus at the appropriate location with robotic arms, providing pushing, puling, cutting or rotating functions. They are controlled from the control center on the surface.

BREAF DESCRIPTION OF THE DRAWINGS

FIG. 1. is a cross sectional view taken along line 1-1’ of FIG. 2 of an apparatus, for temporally controlling oil pipe leak on the dysfunctional ‘Blow Out Preventer’ at the bottom of the Ocean, of shore of Louisiana, Golf of Mexico.

FIG. 2. is a cross sectional view taken along line 2-2’ of FIG. 1 of an apparatus, the valve, for temporally controlling oil pipe leak.

FIGS. 3. is a plain view of a special seal assembly with fluid delivery system used at lower connection section of the valve illustrated in FIGS. 1-2.

FIG. 4. is a cross sectional view taken along line 4-4’ of FIG. 3 of an empty bladder.

FIG. 5. is a cross sectional view taken along line 4-4’ of FIG. 3 of an fluid filled bladder.

FIG. 6. is an enlarged cross sectional view of an alternative sealing method of the lower connection section of the valve assembly illustrated in FIG. 1.

FIG. 7. is a plain view of a special sealing elements used in an alternative sealing method illustrated in FIG. 6.

FIG. 8. is a cross sectional view taken along line 8-8’ of FIG. 9 of an in-line pump assembly used, in this instance, to support installation of the valve illustrated in FIGS. 1-7 and to transport fluids to the surface.

FIG. 9. is a cross sectional view taken along line 9-9’ of FIG. 8 of an in-line pump assembly used, in this instance, to support installation of the valve illustrated in FIGS. 1-7 and to transport fluids to the surface.
DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. 1; here is illustrated a new method/solution for temporally controlling oil pipe leak in extreme situations under water when blowout preventer have failed. The present assembly 10 for controlling oil pipe leak consists of: Valve housing 22; Valve flap 24; Rubber ring seal 26; Operating mechanism 30; Lower connection section 40; Upper connection section 50; and in-line pump 90. Diameter of the valve housing 22 is enlarged enough to accommodate flap 24 which is engaged to hinge 25. The valve housing 22 also has extended compartment 60 to accommodate operating mechanisms 30 which consist of common hydraulic cylinder 32, fluid container 34, and pump 36 (tubes not illustrated) for opening and closing flap 24. The valve housing 22 on the other side also has extended compartment 62 to accommodate alternative locking device which can be solenoid switch 64. One end of the hydraulic cylinder 32 is pivotally secured inside wall of the extended compartment 60 to pivot 33. One end of the piston rod 35 is engaged to the hinged flap 24 through pivot 38. At closed position the flap 24 pushes against rubbery seal ring 26.

Here is also illustrated a section of a special in-line pump 90 for producing sucking force necessary during installation of the valve 20 and pushing force necessary if fluids needs to be pumped up to the surface. The in-line pump 90 is explained in FIGS. 8 and 9.

Here is also illustrated upper portion of the ‘Blow Out Preventer’ 15; section of the fallen raiser pipe 16 (in dash line) which is already cut-off; and remaining section of the raiser pipe 17.

Here is also illustrated a special seal assembly 70 positioned inside wall of lower section of the valve connector 40. The special seal assembly 70 consists of: bladder 80; fluid container 72; in-line pump 74 and tube 76. The bladder 80 is a sealed enclosure with provided channels or tubes 82 which increases the volume when filled with fluid and consequently seals the space between two critical surfaces - inside wall of lower section of the valve connector 40 and radial surface at the top of the dysfunctional ‘Blow Out Preventer’ 15 on which lower section of the valve connector is sited.

Referring now to FIG. 2; here is illustrated a cross sectional view taken along line 2-2’ of FIG. 1 of an apparatus, the valve, for temporally controlling oil pipe leak. Here are illustrated most of elements described in FIG 1. Here are visible: valve housing 22; extended compartment 60 which accommodate operating mechanisms 30 with cylinder 32, piston rod 35, pivot 33, valve flap 24, hinge 25; extended compartment 62 which accommodate alternative locking device solenoid switch 64; Rubber ring seal 26; Also, here is illustrated remaining section of the raiser pipe 17.

Referring now to FIG. 3; here is illustrated a plain view of a special seal assembly 70 with fluid delivery system used at lower connection section 40 of the valve 20 illustrated in FIGS. 1-2. The bladder 80 is sealed enclosure with provided channels or tubes 82 at the mid section 84. The space between seals 83 which forms channels 82 is reduced towards each end of the section 84 to provide smooth transition to the rubbery sections 86 and 88 to provide better seal. The bladder 80 is connected with a fluid container 72 and an in-line pump 74 through a tube 76. When pump 74 is activated then
the bladder 80 is rapidly filled with fluid which then rapidly increases the volume and consequently seals the space between two critical surfaces - inside wall of lower section of the valve connector 40 and radial surface at the top of the dysfunctional ‘Blow Out Preventer’ 15 on which lower section of the valve connector is sited.

Referring now to FIG. 4; here is illustrated a cross sectional view taken along line 4-4’ of FIG. 3. of the bladder 80 in an empty stage.

Referring now to FIG. 5; here is illustrated a cross sectional view taken along line 4-4’ of FIG. 3 of the bladder 80 in a fluid filled stage.

Referring now to FIG. 6; here is illustrated an enlarged cross sectional view of an alternative method 11 for sealing the lower connection section 40 of the valve assembly 10 illustrated in FIG. 1 to the upper portion of the ‘Blow Out Preventer’ 15. The alternative sealing method 11 consist of inserting several radial sections 12 at space between inside wall of lower section of the valve connector 40 and radial surface at the top of the dysfunctional ‘Blow Out Preventer’ 15 on which lower section of the valve connector is sited and then welded. The radial sections 12 when assembled forms a circle and have triangle profile to provide better conditions for welding.

Referring now to FIG. 7; here is illustrated a plain view of several special sealing elements 12 used in an alternative sealing method 11 illustrated in FIG. 6. The radial sections 12 when assembled forms a circle and have triangle profile to provide better conditions for welding between inside wall of lower section of the valve connector 40 and radial surface at the top of the dysfunctional ‘Blow Out Preventer’ 15 on which lower section of the valve connector is sited.

Referring now to FIG. 8; here is illustrated a cross sectional view taken along line 8-8’ of FIG. 9 of an in-line pump assembly 90 used, in this instance, to support installation of the control valve 20 illustrated in FIGS. 1-7 and to transport fluids to the surface. The in-line pump 90 is an electro motor 91 which consists of a rotor 92 and a stator 94. The rotor 92 consists of a hollow shaft 240 which is fixedly engaged with an electromagnetic coil 93. The stator 94 consists of a cylinder 96 which is also housing of the motor 91 and is fixedly engaged to electromagnetic coil 95. Stator 94 and rotor 92 are engaged through two sets of ball bearings 97 and additional set of seal bearings 98. The cylinder the housing 96 of the motor 91 has diameter reduction on each end and is aligned with the segments of the main, new, raiser pipe 71. The hollow shaft 240 has continues spiral blades 242 formed on the inner side of the shaft. When electro motor is activated the hollow shaft 240 which is central element of the rotor rotates and provides suction force at the lower end, necessary during installation of the valve, and push force on the upper end of the in-line pump 90, necessary if fluids needs to be pumped up to the surface. The oil and gas are pumped up through raiser pipe 71 to the next in-line pump for farther pumping. The in-line pump segments 90 are repetitively installed as needed for fluids to reach Ocean surface.
There are two brackets 99 secured on each end of the in-line pump 90 with recesses 118 provided for additional supply line, tubes. Although in-line pump 90 is a part of my still developing project, still patent pending application, I am including it in this proposal because of perfect fit for present mission to speed up recovery process in Gulf of Mexico.

Referring now to FIG. 9; here is illustrated a cross sectional view taken along line 9-9' of FIG. 8 of an in-line pump assembly 90 used, in this instance, to support installation of the control valve 20 illustrated in FIGS. 1-7 and to transport fluids to the surface. The excavation pump 90 is an electro motor 91. Here is illustrated a hollow shaft 240 with continues spiral blades 242 formed on the inner side of the shaft 240. The hollow shaft 240 is fixedly engaged with an electromagnetic coil 93 which represent rotor 92. Also, here is illustrated a stator 94 which consists of a cylinder 96 which is housing of the motor 91; and electromagnetic coil 95. Also, here is illustrated bracket 99 with extra recesses 118 provided for additional line, if needed. Also, here is illustrated transformer box 190 with electric cable line 45 for supplying electric power to the in-line pump 90, various sensors, cameras, lights, etc. (not illustrated).

OBJECTIVES OF THE INVENTION

1. Main objective of the present invention is that the apparatus consisting of: control valve, suction in-line pump and special seal(s) for connecting apparatus to the top of the dysfunctional ‘Blow Out Preventer’ is workable solution at the present situation and can be used in similar situations in the future.