How to close the wellhead

A project by: Stivaletti Roberto and Mario

Email: stopthespill@dingoforum.it

Website: www.dingoforum.it/stopthespill

Project Description:

The aim of this project is trap the broken duct of the wellhead for seal up the oil spill.
A cylinder with opened valve, allows at first to anchorage the structure in the backdrop and than to seal up the spill by cement.

The structure is composed by two elements: cylinder and valve.

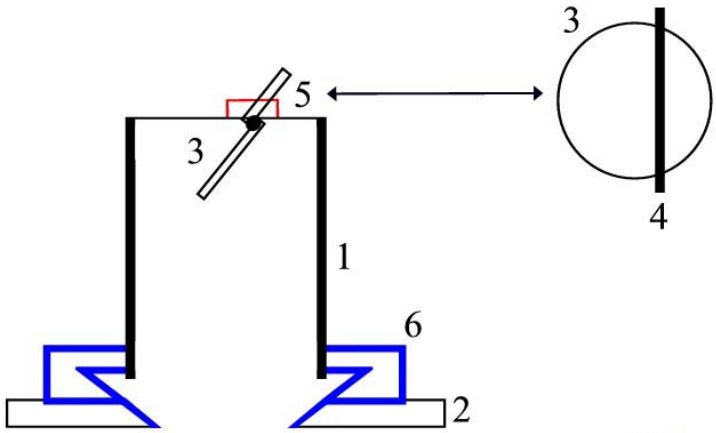
The cylinder:
The cylinder must to be big enough to cover all the duct and it will have a conic base, so the pressure of the oil when the valve will be closed cannot affect the structure.
When the cylinder is fixed in the backdrop, we can put cement inside it
We can start to close the valve just when the cement will be dry.

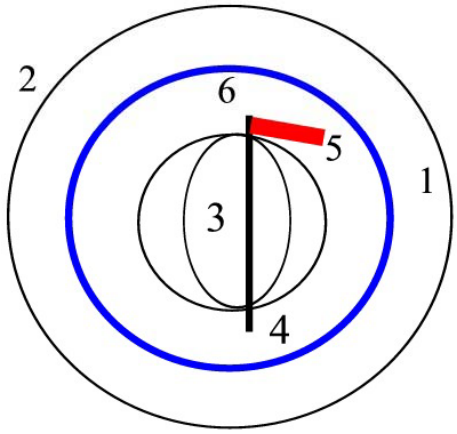
The valve:
The valve is indispensable for put the cylinder in the backdrop without having problems by thrusts generated by oil spillage and to anchorage the structure in the backdrop with poured concrete.
The valve is composed by a circle shared in two parts with different surfaces. The biggest surface is inside the cylinder and the smallest it's out.
A **rotation pin** is situated in the separation zone of the surfaces valve and it works for the valve movement.
The pin must to be in asymmetric position on the surfaces, so the oil thrust will push automatically the valve in closed position because of unlike surfaces.
The valve seal is made at first by the oil thrust and than by the internal pressure, also guaranteed in cases of hard pressures.
The valve must to be made perfectly for seal up the cylinder (hermetic) when it's in horizontal position.

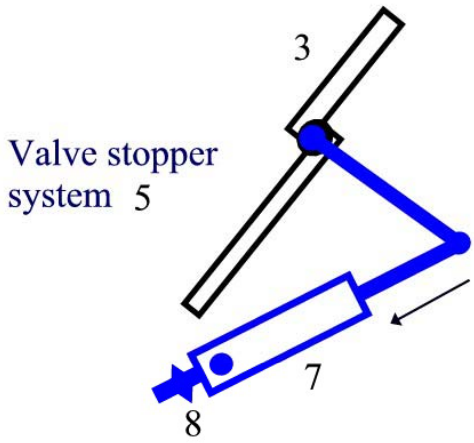
The mechanism that lets the valve open is composed by a hydraulic piston and tap. When the stop phase starts, it's necessary open the tap, so the oil spill thrust will pushes the valve and the valve will pushes out the liquid inside the piston till complete closure. The speed of closing step is determined by manual open-close tap operator.

The stop phase:
When the cement is solidified, we have to remove the valve-block, so the valve will close automatically the cylinder and the oil flow will stop.
The valve must to be just little oblique, not in vertical position, so the oil flow can starts to push right the valve.
The closing step is the part of the process we must be very carefully and very slowly, it's important don't fight against kinetic energy created by the mass of fluid pressing on the top of cylinder.
So it's important decrease slowly the speed of fluid inside the cylinder till when is totally full.
If the closing is to much fast the pressure can damage the oil pipe and also the cylinder structure.
When the valve block is removing away, the oil flow will pushes the lower part of the valve with stronger power, because of unlike surfaces, so automatically the flow closes the valve.
Now, the oil pressure keeps closed the valve just because of unlike surfaces in respect of axis of rotation of the pin.
The cement on the base and the valve on the top will ensure total isolation.
Now it's possible complete the work with new poured concrete that will submerge the structure at all.

System description





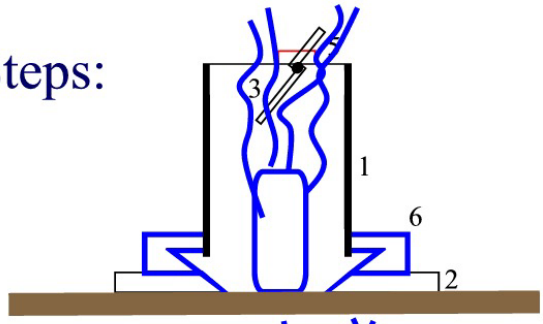


System Description:

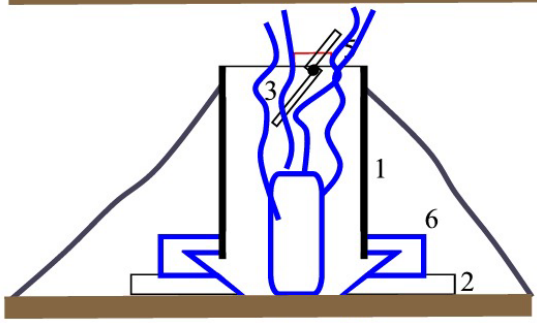
1) One cylinder big enough to hold the valve
2) Base for anchorage in the backdrop
3) Asymmetric stopper valve
4) Pin for valve rotation
5) Valve stopper system
6) Conical base
7) Piston
8) Tap

Operational Steps:

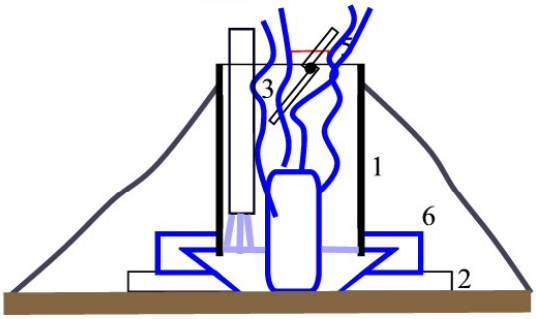
Step 1:
cylinder positioning



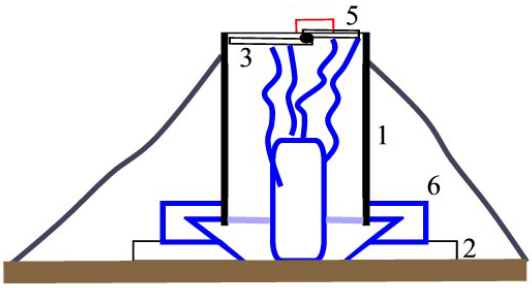
Step 2:
seal the base with poured concrete



Step 2A:
charge cement inside the cylinder
for plug the base and
to create a closed chamber



Step 3:
close the valve,
it forms a sealed chamber where
the pressure stays inside the cylinder



Step 4:
totally closing the well
with poured concrete