UNDERNEATH THE EXPLENATION OF WORKING PRINCIPLE OF SAFETYBALL Bergschenhoek , 24-1-11'

The safetyball concept is based on fail safe principles used in airplane design. Fail safe means that the item can fail but that the system as a total is still safe. For example I mention the connection of the wings to the fuselage of an airplane. This connection is made by bolts and nuts. If one or two bolts might break during flight the wing will not break off the airplane. That is why we call this system fail safe. A sub system can fail but the main system will not fail.

I would like to bring this concept to the oil industry because a disaster like happened in the Gulf of Mexico in may 2010 must not happen again.

The concept is really simple. Simple systems have less chance of failing in their functioning compared to more sophisticated systems.

EXPLANATION OF THE CONCEPT

We assume that oil spill will happen when the riser pipe breaks. This has happened in Mexico. We design the riser pipe in such a way that there is a weak point in the pipe. We deliberately make a weak point in the riser pipe so we know if an accident occurs the pipe will break exactly at that point. Above this point we connect a steel cable with the riser pipe. The steel cable is placed in a separate steel pipe with small diameter that is connected to the riser pipe on the outside of the riser pipe (see the PDF).

The other end of this steel cable is connected to the safetyball and a plug. The safetyball is maintained in position due to a retaining construction. A steel plate which is part of the retaining construction will direct the oil flow so no extra resistance is introduced by the ball. So the safetyball will stay away of the drilling head.

When the riser pipe will break at its weak point the pipe above this breaking point will pull on the steel cable. Due to this pulling force on the steal cable the safetyball will break away from its retaining construction. The ball is now pulled towards the small steel pipe through which the steel cable is lead above the weak point in the riser pipe. At high enough force the ball will break loose from the steel cable without breaking the cable. Due to oil flow or/and upwards force due to buoyancy of the ball the ball will move towards the conical part of the riser pipe and will get stuck. Now the force of the steel cable will pull a conical plug in the conical part of the small steel pipe and closes the small hole. Now both holes are closed.

We design the steel cable and its connections with the retaining construction, the ball and the plug so that the cable will break at the right time. We also do strength design calculations so connections will break in the right sequence. The retaining construction is off course stronger than the force of oil flow on the safetyball.

Best regards,
Practical Solution

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