

## ***An Incident-free working environment: an achievable goal or an improbable dream? The human factor.***

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### **Abstract**

I have recently carried out a work based research project for my Master's Degree, more precisely it was a research in the offshore drilling industry, carried out on board a Dynamic Positioned Drilling Ship working off the coast of Brazil with a multinational crew. I have researched and studied the risk assessment and the accident hazard in this business activity.

I have used a Case Study with a qualitative approach, through the use of different research techniques. I have used interviews, observations, policy-focused technique and documents organisationally based in order to gather the information needed to answer at my research questions. These are basically "how can we identify a hazard and assess a risk, what kind of tools do we have to do it?"

The environment plays an important role; the offshore oil industry is a recognised high-risk working activity and every operation is carefully planned and thought through beforehand. There are policies and procedures to manage risks. The Human Factor also plays a significant role in the safety system. The human being is interacting in the system and this can cause accident.

The final goal toward a good safety performance is to achieve an incident free working environment and this is the target set by corporate in my company.

In order to work in an incident-free workplace it is important to identify and assess the hazards and risks that are involved in the various operations and apply the risk assessment in use in the company to reduce the risk to As Low As Reasonably Practicable (ALARP). The ALARP method is a pragmatic concept of risk assessment, and one may argue that in order to get an incident free environment it is necessary to apply the politically driver approach zero risks.

With this approach the extreme consequence is to stop the operations and therefore losing its benefit. I wanted to investigate if it was possible to achieve the target set using the ALARP method. More precisely the hazard must be identified and then measures must be put in place to eliminate the risks or mitigate the consequences of the danger. The research has analysed the tools available on the ship to accomplish this task, if they are effective and if the personnel fully understand and use the resources.

## The human element

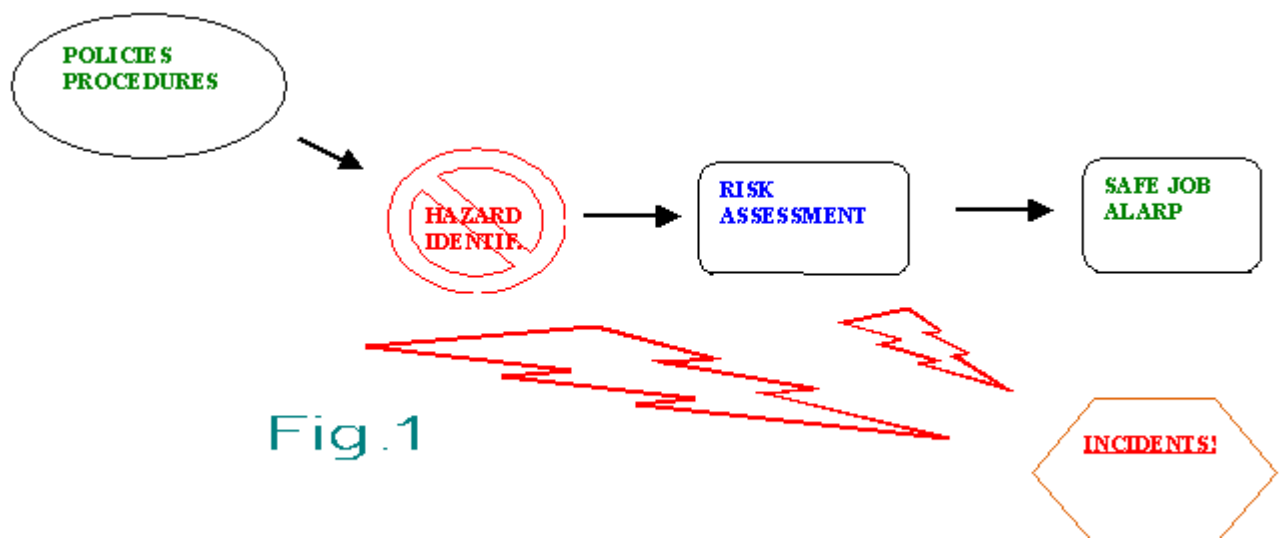
The human element plays a very important part in the research. Whenever there is a human being interacting with a system there is the human element issue, even if there are policies and procedures in place to prevent accidents.

According to the latest Offshore Reports, behaviour modification is currently being applied in several offshore oil and gas drilling facilities. There are good reasons to target safe behaviours as part integrated approach to safety management. A significant percentage of accidents can be linked directly to unsafe behaviour, which occurred near to the time of the accident. For example, a worker got a metal fragment lodged in his eye because he wasn't wearing the safety glasses as required while working in an offshore installation. There are procedures about that, obviously not followed and again the human element has messed up a system that theoretically was sound and capable to avoid accidents.

A number of offshore operators are redesigning behaviour modification systems, which have fallen into disuse. Conoco UK (Bell,R.G. 1999) has re-launched Du Pont's STOP behaviour based approach. Transocean Offshore has its own START (See-Think-Act-Reinforce-Track) (Nystrom,Senior 1999). This is a programme that replaces Du Pont's STOP.

Shell UK Exploration and Production's Cormorant Alpha workforce has, with full management backing and the help of a psychologist, designed their own "care-Plus" behavioural safety programme. (Hynd,Renton 1999).

One of the research questions in the project was about the human factor. I believe that if there are procedures adequate and accidents still occur the failure must be either in the wrong application of them or in the human factor.



On the diagram in figure 1 there is a schematic representation of the Risk Management process. We have policies and procedures to identify the hazard and assess the risk in order to perform a safe job, rated, in this case, as per company decision ALARP. I have represented that the accident can arise from the hazard

wrongly identified or from the risk incorrectly assessed. This does not mean that the procedures have failed, but in my opinion that they have been wrongly applied or not used at all, or yet that there was a human error.

As I mentioned earlier, behaviour modification is currently being applied in several offshore oil and gas drilling facilities. These for good reasons, a significant percentage of accidents can be linked directly to unsafe behaviour, which occurred near to the time of the accident. The solution is based on the knowledge that people repeat behaviours for which they receive positive reinforcement.

Skinner stated "*The major problems of the world today can be solved only if we improve our understanding of human behaviour*" (Skinner, B.F. 1974)

According to this theory consequences either enforce or discourage repetition of behaviours. However part of the literature (Smith, T.A. 1999) find that positive and negative reinforcement are different sides of the same coin. Basically either way are really saying "do this and you will get that".

Smith says also that all behaviour-based programs are based on the principle that the majority of work related accidents are only caused by the unsafe acts of the workers. At this point it is easy to think that in order to improve safety one must concentrate on changing behaviours of the workers. His argument instead is that you cannot achieve more safety that your system is designed to deliver. If you have accidents, there must be a failure on the system and not necessarily only because of an unsafe acts. However I believe, from my direct experience with a behaviour modification program, that this kind of program does not replace the need to modify unsafe conditions of work, make improvements or address root causes. This program is a support for safety management system in place in various companies.

As I mentioned before the Human Factor plays an important role in the safety system. This is quite obvious, but the assumption that if only employees would do as they are told no accidents would occur is, in my opinion, very reductive.

I believe that the behaviour-modification approach is appropriate in an international contest, where we have to deal with different nationalities, believes and cultures as we have in the majority of the companies.

If applied correctly this is the tool to reduce the human error, positive feedback will help to change dangerous behaviours and then improve safety.

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