

APS1018 – History and Philosophy of Engineering

The Deepwater Horizon Disaster

Executive Summary

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Background

Deep-sea oil drilling is a very profitable industry that has evolved greatly in the last century. Current deep-sea rigs are capable of drilling in over a kilometer of water and up to nine kilometers into the earth. They employ risers to dig wells and pump fluid, as well as a number of safety measures like blowout preventers.

The Deepwater Horizon was one such rig. It was a dynamically positioned, semi-submersible, deep-sea drilling platform that was top of the line when it was built. It was responsible for the deepest hole ever drilled in 2009. It had a good safety record on paper, though after the accident some unreported issues came to light.

Disaster

April 17, 2010 – Deepwater Horizon completes its drilling and the well is being prepared to be cemented for future production rig.

April 20, 2010, 9:56pm – Gas, oil, and concrete erupt from the wellbore onto the deck and after a short time, ignite into explosions killing 11 and injuring 17.

April 22, 2010 10:21 am – Rig sinks, resulting damage to riser and drill pipe near BOP initiates the massive underwater leak of 4.9 million barrels of oil over the next two months before being capped.

Root Causes

- Cement Job Was Inadequate - Well Not Sealed
- Influx of Hydrocarbons went unrecognized – entered riser.
- Gas on Rig not adequately managed - precipitated explosions.
- BOP Failed to Seal Well – Critical Flaw in design

Fallout

The Deepwater Horizon is the largest accidental marine spill to date, with approximately 4.9 million barrels of oil were spilled into the Gulf. Clean up efforts by BP where met with controversy when,

among other methods, the use of the chemical dispersant Corexit was selected. This is believed to have increased the toxicity of the spill for humans, animals, and the ecosystem in general.

Environmental and health damages caused by the DWH spill were very visible, which together with the apparent lack of willingness to take responsibility of the problem, was a big hit for BP's reputation. The species damaged range from microorganisms to marine mammals, with turtles, fish, and coral reefs in between. Health issues such as skin and lung problems were also reported in workers involved in the clean-up, as well as general population exposed to the oil/corexit mix.

The DWH spill was a big costly accident: for BP it has costed around \$62 billion dollars in cleanup, settlements, and penalties; while on the side of the fishing industry, the accumulated losses by 2020 are expected to be up to \$8.7 billion.

Although no new rules have been put in place for deep sea drilling, the DWH disaster encouraged the creation of strict regulations for Arctic drilling, which might temporarily discourage oil-searching exploration in this area.

Progress since the disaster

The US government has made some efforts to improve the Deep Sea drilling regulations since the Deepwater Horizon disaster. One of its first tasks was to retransform the ineffective Mineral Management Service. Since the disaster, the number of inspectors employed by the Bureau of Safety and Environmental Enforcement has nearly doubled to 92 inspectors. (Cain, 2015) In addition, the safety audits required by oil and gas companies have been more detailed and robust. However, there are still critics that are not satisfied with the progress made in the Deep Sea drilling industry and believe that progress is too slow.

Recommendations

- The federal government should continue to tighten the regulations imposed on the offshore drilling industries.
- Corporations such as BP should be liable for an amount proportional to the damage they have caused to the public and the environment.
- The work culture on the rigs should be redefined with safety as a priority.
- The work culture should reward and encourage the reporting of unsafe and negligent practice instead of reprisal.
- Oil and gas companies have the ethical responsibility of putting public safety ahead of their financial interests.

- As well, all engineers employed by these oil and gas companies should have the responsibility to conduct their work professionally and ethically.