

A boiler explosion in france in 1994: mistakes and consequences

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Boiler is known as a device or apparatus designed to transfer and convert any liquid to vapour state. Boiler also can be called as power generation for every power plant involving steam. Boiler comes in several types which are fire tube boiler, water tube boiler, super heater, flash boiler and express boiler. These are the types of boilers that usually used at power plant. Most boilers used in conventional steam boilers are fire tube boiler and water tube boiler. In addition, boiler consists of furnace that is to transfer the heat from the combustion. As the growth of the technology, the manufactured of the boiler were changed and improved from being made from wrought iron to steel.

A boiler explosion was happened on March 30, 1994 in a district heating boiler plant at Courbevoie, France. It's believed that a very huge and violent explosion was occurred on that day which shocked the people even its kilometres away. It is located at a residential and light industrial zone which is 1 km from the ' Grande Arche' monument in the La Defense district, France. The boiler plant is build and operated in 1967 by following several principles which are cogeneration, producing hot water, ice water and electricity. When the explosion happened, there were five boilers that were operating at the plant which are two coal-fired boilers, two coal and natural gas hybrid boilers and last one is natural gas-fired boiler. The total power of 132 MW was installed and it can be reached 22. 45 tons for total quantity on onsite products.

Errors and mistakes

After proper investigation, the issues which believed increase the accident to take place is due to high gas leak rate. This is because the behaviour of coal
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dusts itself which contributed to the opacity of local atmosphere at Courbevoie, France. The leak occurred due to concentration of air gas cloud and high gas content. Because of this, the manual valve could not be closed. Besides, during the accident happened, coal fired boiler was one of the high possibility spot that trigger the most explosion to be happened. If there were mistakes or errors at the spot especially involving workers behaviour and attitude, the explosion will take place. The inspection regarding the pressure has been done on January 19, 1994 which was two months before the accident. Following the accident, the pressure reading could not be found and it's become the issue on how and why the accident happened at the plant.

One of major problems why this accident happened is because of the organizational and human errors. While working in power plant, only competent maintenance personnel have the authority to give decision and actions to the shift supervisor. As well as for plant operators, they got the approval to ask gas technicians as their assistance because it is a high risk work. Other error that was found is because the valve itself is not designed to be handled under pressure. The mistakes of the first boiler operator which was not verified the valve first was lead to the explosion. Because of the mistake, gas was spread from the inside of the pipe to the outside. While handling the guillotine and butterfly valves, they must follow the operating principles. In this case, the popped up issue is because the personnel had not been trained. The principles that needed to be followed are shift the lever opening, pull the gate, closure solid valve isolation, flow shutdown pipe decompression and normal flow rate with full opening.

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Consequences

Due to the explosion, it has been affected the employees and local people for the loss of death. Many injury took place whether in minor or major. There was a death involving second boiler operator which took place at the basement. Several workers were sustained serious injuries which involving shift supervisor, first operator while two staff members succeed to escape from the plant. The day the accident happened, a single family home was destruct and fully vanish due to the impact of the explosion. There was a 6 year old girl died after four days which is believed a direct result of the accident. From the report and survey, there were more than 200 victims of the local people who evacuated from their homes and transfer them to safe place which provided with facility as a temporary shelter. This will be a safety precaution for the victims and to avoid any minor injuries or incidents to take place. There were 140, 000 users including employees were having a shutdown of air conditioning product and also the failure operations of computing systems.

Inside the boiler plant, there were three boiler were destroyed which are also involving other boilers and it is believed that there's a damage of auxiliary equipment too. Because of violent explosion, the building is collapsed to the ground and debris was all over the site location. The electro filters were found damaged and in order to avoid and reduce the high risk of discharge, the supply from The Freon was cut. This is to make sure that there were no any extra loss could occur during that time. Any accident involving explosion does lead to loss and damaged of many buildings and this is lead to expensive property loss claims. In this case, the pressure and effect from the <https://assignbuster.com/a-boiler-explosion-in-france-in-1994-mistakes-consequences/>

explosion was spread to the North-North-East course. In total, there were 1051 of property claims were reported. As a result, this accident was cost 83. 2 million and for the loss of operating, it cost 52. 4 million in Euros. After further investigation, a result of 3750 Nm³ gas would have been released and it's also affect the economic issues during the accident took place.

The Investigation Result

From the investigation, it is believed that main problems that lead to the explosion in boiler plant at Courbevoie, France is due to leakage while handling valve. A first operator boiler is failed to close the manual valve due to high gas content. The reported cause of this accident is because the lack and poor of organizational management that allowed the human error to occurred in the plant. For actions taken, an emergency measure was proposed by the hazardous installations inspectors that focused on prefecture level decree. It will be measured safety features, destroy and eliminate all waste generated and prohibit resuming operations. The temporary installation of fuel oil has been made with total power 19. 55 MW to continue the service and the replacement of heating power station has also been provided.

The Lesson Learnt and Suggestion for Improvement.

Following the leakage of gas and human error issues, there were steps of precautions to be implemented. Firstly, the installation of fast acting cut off devices and controllable on the control room which is locally and remotely were installed. This is to make sure that if there's any emergency situation that likely to be occurred, the worker will not have to depend on the

operator. As for the valve, it will be located outside the unit of the building for the general installation supply network. Since the handling of guillotine valve is prohibited for unauthorized personnel, there will be a device to replace the mechanism of handling itself. Other than that, stations that provided with safety features would be placed and located outside the building. After the accident took place, the organizational come out with some of measures on how to minimize and reduce the risk. The awareness of safety while handling and operating the maintenance should be applied so that they will follow the guidelines. A manual of descriptions of safety recommendations focused on installations of gas has been drafted and provided to the employees. Regarding the location of the boiler was been located inside, the new recommended place was been specified to avoid any potential accident scenarios and possible effects to be occurred.