

Fire Safety Protection Assessment of Industrial Technologies

Abstract:

An accident in petrochemical industry can cause serious damages to human and animal health, property, environment and economy. That was proved by many accidents in the past. National laws, regulations, national, European or international standards or accepted protection principles define minimal requirements for safety and security protection of technologies. This restriction defines specific protections and periodical personal controls. Companies in petrochemical industry are often split in branches with specific types of technologies – pumping stations, storages, distribution lines, etc. Each of these technologies represents specific hazards for employees, environment, surrounding area or economy (national, organizational). Especially oil storages and farms represent strategical importance for national safety and continuity. Increasing of protection is often organized individually in specific branches of the organizations. It can cause that the same organization has different protection of the same technology. That is the reason why many organizations design safety policy on higher level than is legally requested by insurance companies or by internal safety policy. The increase of policy is connected to increase of number of personal controls which can be implemented up to every hour per day, or to application technical protection.

The technical protection can include leakage sensors, sprinkler systems, emergency reservoirs, process monitoring (pressure, temperature, mass flow, etc.) or CCTV systems. The uniform protection within the organization on the same technologies can increase employees working time efficiency, increase level of protection and decrease financial losses. For these purposes the evaluation of technical protection with impact on number of personal controls have been designed and described in this paper.

Presented system of assessment evaluates specific hazards and possible impact including possible damages to human health, property or environment with considered type of technology. Moreover, the building and technological protection is considered, as well as the fire protection systems, alarm systems, and monitoring cameras systems. Final number of personal controls of technology is based on type of organization, hazards and protection. A resulting recommended number is compared with required legal number of controls.

Introduction:

The inherent part of oil and petroleum industry is storage and pipe transport. Manipulation with flammable liquids entails the risk of fire, explosion or leak and their consequences as injury, environmental pollution or material and financial losses. In order to prevent any incidents and ensure proper and safe operations, safety and security design and measures in petrochemical industry fulfil even higher standard level than required by laws, codes and insurance conditions in regular companies. Namely, consequences in case of accident can have big impacts on an organization, surrounding area, environment or in worst case entire nation [2][3]. A control screening assessment is a tool designed to estimate a number of personal controls based on type of technology, potential hazard and protection of technology. This tool respects all type of technologies, state of operation and their protection or law requirements.

Conclusion:

While data from the assessment of the case study branch Sedlnice will be post-processed, the verification of efficiency will be evaluated. Additional work will identify possible initiating events and component failure modes with dynamic fault trees. These trees will be developed in Bayesian network. For evaluation of efficiency and development of assessment Bayesian network will be used as a technique considering investigation of possible scenarios with domino effects. A mapping of scenarios with analysis of probability and evaluation should be included [9][10]. The impact of possible accidental scenarios can be additionally investigated with numerical modelling software such as ALOHA. This software can provide data for defining impact of various scenarios e.g. jet-fire, boil over or leakage. Obtained data will be compared with case study real conditions and with designed assessment procedure described in this article

Developed Intelligent Fire alarm system

Abstract:

The primary purpose of fire alarm system is to provide an early warning of fire so that people can be evacuated & immediate action can be taken to stop or eliminate of the fire effect as soon as possible. Alarm can be triggered by using detectors or by manual call point (Remotely). To alert/evacuate the occupants siren are used. With the Intelligent Building of the rapid development of technology applications, commercial fire alarm market demand growth, the key is to use the bus system intelligent distributed computer system fire alarm system, although installation in the system much easier than in the past but still cannot meet the modern needs, the installation costs of equipment costs about 33% ~ 70. The suggested technique in Fire alarm system used the addressable detectors units besides using the wireless connection between the detector in zones as a slave units and the main control unit as the master unit. The system shall include a control panel, alarm initiating devices, notification appliances, and the accessory equipment necessary for a complete functioning fire alarm system. In the wireless fire alarm, individual units are powered by primary & secondary batteries for the communication.

Introduction:

Most victims of fire succumb to the smoke and toxic gases and not to burns. Fire produces poisonous gases that can spread rapidly and far from the fire itself to claim victims who are asleep and not even aware of the fire. Even if residents awaken, the effects of exposure to these gases can cloud their thinking and slow their reactions so that they cannot make their escape. This is why it is so crucial for you and your family to have sufficient warning so that you can all escape before your ability to think and move is impaired. In addition, more than half of fatal fires in homes occur when people are asleep

(Ananthram,et al , 2007)

The fire alarm system can also be integrated with AC supply, access control, fire fighting systems, Building Management System (BMS).....etc. To indicate the area where fire exist fire indicating/fire alarm panels are used. So far, cables were used to integrate all the device of fire alarm systems, these cables carried the power & communication.

Conclusion:

The primary advantage of a home fire alarm system is increased reliability and the ability to place alarms and bells exactly where needed. However, the reason most people have them is that they wanted a burglar alarm system and the cost of adding fire alarm features to a residential burglary system is relatively small. Another advantage is that they are the only way to obtain remote monitoring services. This becomes important in cases where family members may not be capable of escaping from a fire without assistance. For example, if you have an older or physically impaired person in your home and a fire started when no one was home to assist that person, alarms alone might not be enough to assure their safety.

The role of the fire safety management in providing a guarantee of a fire protection

Abstract:

The safety of building's occupants is one of the most important things that should be considered in the design and construction process of a building. The provision of a reliable fire protection system could be the best way to provide a guarantee for fire safety. However, in a high-rise building, the evacuation process could be a problem when the occupants do not really understand about the evacuation procedure. Thus, a good fire safety management system is also needed to ensure that both the fire protection system and the evacuation procedure could run well when the accident happen. Through observation, documents review, and interview with the member of fire protection management as well as the building's occupants, this paper intends to assess the fire safety management organisation and its role to support the fire safety protection system of the 9th-floor building of Graha Rektorat of the State University of Malang. The assessment conducted will be based on regulation of the Ministry of Public Works no. 29/PRT/2006 on the fire safety protection and evacuation. It was found that the organisation of the fire safety management of the Graha Rektorat building is need to be optimized to meet the requirement of the regulation of the Ministry of Public Works no. 29/PRT/2006 as to serve a better support for the fire safety protection system in that building.

Introduction:

The fire protection system is one of the important factors in the building to serve a guarantee for fire safety. According to the regulation of the Ministry of Public Works no. 29/PRT/2006, the fire protection system is included in the set of safety requirement that should be provided in the building. In the time being, when the accident happened, people still rely the most on the firefighters while the readiness of the fire safety protection system in the building is sometimes still being neglected [1]. This statement is proven by the case of a fire accident in the Karya Building, the office of the Ministry of transportation on the 8th of July 2018. What happened in that accident is actually a small scale of a fire accident, but the smoke is already spread everywhere that caused the death of many people that mostly being founded in the emergency stairs [2]. This case tells us that good fire safety management is needed to support the performance of the fire safety protection system. The

fire safety management will ensure that the fire protection system could run well when the accident happens, besides ensuring that the building users have adequate knowledge on what to do during the fire accident.

Conclusion:

research found that the fire safety protection system that provided in Graha Rektorat building of the State University of Malang is quite sufficient as required by the regulation of the Ministry of Public Works no 20/PRT/M/2009. On the other hand, the fire safety system management is still needed to be optimized as it still does not meet the requirement of the Ministry of Public Works no 20/PRT/M/2009. In order to meet the requirement of the regulation of the Ministry of Public Works no 20/PRT/M/2009, Graha Rektorat building of the State University of Malang should be equipped with the fire safety protection management that is dedicated for this building only, instead of just rely on the Occupational Health and Safety unit that works for the whole complex building of the state university of Malang. Without the support good of fire safety protection management, it might be impossible that the fire safety protection system and the evacuation process can run well when the accident takes place.