Fire safety:

Name:

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Date:

**Introduction**

Fire is a major cause of deaths and majority of the fires occur at home. Cooking is considered as one of the biggest source of fires in households and has caused many deaths. Fire is a major hazard put lives at great risks. Fire is very fast and spreads very quickly and this is why most of the time fire-fighters get to the scene while it is too late and the fire has already consumed most of the property. Another factor associated with the fastness in spread of fire is the inability of people inside to escape. Most people are usually asleep and wake up to find themselves trapped. The smoke caused by the fire is even more dangerous because it is what kills people even before the fire reaches them. The smoke suffocates people and kills them within minutes. The smoke is very toxic and is what poisons them to their deaths. Fires are very unpredictable and very fast. It is for this reason that there is a great need for fire safety. Fire safety is important because it ensure s that the lives of people at home and at workplaces are protected from the risks of fires. Fire safety is through various activities all of which lead to an overall safety measure. Of great importance is fire safety engineering which is associated with structures developed for the purpose of fire safety. Fire safety engineering is associated with the use of science and engineering knowledge as well as principles for the protection of property and people from the risk of fire. The structures associated with fire safety engineering include ones related to fire detection as well as fire suppression that prevent the fire from spreading. It is also associated with fire risk identification and the design of equipment that can be used to safeguard and prevent the effects that are associated with fires (Fire Dynamics, 2015).

**Fire safety engineering**

Fire safety engineering is associated with various aspects or discipline of fire. Of great importance is the fact that technological advancements have resulted to increased sophistication as well as development of better ways of fire safety. One aspect is the development of systems and software that have been developed for fire safety. Most of these software have been developed for the purpose of risk and hazard analysis. Fire safety engineering is begins with fire risk and hazard analysis and assessment. These are processes aimed at analyzing processes and procedures in buildings to identify fire risks and hazard. The assessment is then followed up by the development of fire safety plans that are in the form of guidelines that prescribe aspects such as building designs, fire detection mechanisms, fire suppression means, and evacuation strategies and among many other important fire safety measures. In this sense, knowledge about science and engineering is applied in fire safety for the prevention as well as the protection of people and property from the risk of fire.

Fire risk assessment is associated with various factors that include hazard identification in work places and households. Some of these hazards are directly associated with the factors that are involved with the development of fires. For example sources of ignition. Ignition sources may include electrical sparks from naked wires in the building, cookers in the kitchen and even electronics. The other factor is the source of fuel. Fuel includes any substances gaseous or in liquid state that are flammable. Flammable materials are very risky and should be kept safe and away from sources of ignition. The other factor is oxygen. Oxygen is what keeps fire alive and good supply of oxygen during a fire would be very dangerous. All these factors are associated with development of fire and their identification is the first step in hazard identification.

Another aspect of fire assessment is the analysis of the people who are probably at risk of fire. This is done through evaluating various sections of a work place or building and analysing sections with highest risk of fire and the people mostly associated with them. Risk assessment is important because it provides a good basis for decision making based on data collected. It results to the development of fire safety plans and strategies aimed at preventing the development and spread of fire. Another factor used for risk and hazard analysis is they use of hazard and operability study or HAZOP. HAZOP is a systematic and structured examination carried out at places of work aimed at the assessment of the procedures and process carried out with the aim of identification and evaluation of hazards. It is a qualitative method of hazard analysis that uses people associated with the particular premises to identify possible risks as well as problems associated with operations in the workplace. With the HAZOP technique the use of software is very important for the purpose of recording various aspects of hazards and risks such as probability as well as the consequences (What is Hazop, 2015).

 Another tool is the PHAST hazard analysis tool. This is software used in fire safety engineering for the purpose of analysis of hazards in the stage of design work place structures as well as during operations of the workplace. The software is very important because it evaluates incidences of risks occurring during all stages and helps in modelling possible spread and consequences. These are examples of software tools used for hazard analysis in fire safety engineering. They are effective tools in record keeping as well as modelling of possible consequences associated with occurrence of fires (PHAST, 2015).

They form qualitative methods of fire safety. There are other tools used in the process of fire safety engineering. Failure Mode and Effects Analysis FMEA is another tool. This is a technique that is used in fire protection engineering where it analyses failures as way to evaluate problems and malfunctions. It is also aimed at evaluating the reliability of a system or operation. These evaluations identify the causes of failures together with their effects. This tool is used in fire safety engineering where it analyzes failures that could lead to development of risks of fire. It is usually associated with analysis of effects of failure where they help in decision making for fire safety. It is important because it helps in the identification of hazards through failure in systems and operations and with its results leads to the improvement of systems and increases reliability of operations. It also increases efficiency of systems and operations by removing factors that lead to failure therefore increasing productivity while at the same time safeguarding people and property from risks of fire. The information gathered is useful for the development of fire safety plans which helps in prevention and protection from risks of fire. It is a technique aimed at helping in the prevention of risks and therefore assists in the reducing late response and this is very helpful in reducing costs associated with fire safety engineering measures aimed at reducing risks (Failure Mode Effects Analysis, 2015).

These factors are very important for fire safety. This is because they help analyze the different dynamics of fire in terms of different factors influence the development and spread of fire. Understanding these dynamics is very important because it helps in determining the best solutions to the problem which would be sustainable in nature (Fire Dynamics, 2015).

Fire safety engineering is an aspect that applies in a wide range of fields. Some of the aspects associated with it include fire detection through the use of warning systems in buildings that are triggered by occurrence of fire, suppression systems that are aimed at reducing active fires such as sprinkler systems, smoke management and control. Smoke caused by fire is very dangerous and is what kills people firsts. Fire safety engineering is associated with the establishment of systems aimed at controlling smoke. It is also associated with fire emergency measures such as escape plans. Building layouts as well as designs are also important and all must be made with consideration to fire safety plans and guidelines. Human behaviour is also a crucial aspect especially during fires and it is for this reason that fire safety engineering provides for measures such as fire drills that help prepare people in case of fires.

Other factors include understanding the dynamics of fire which has been explained above as well as fire modelling. Fire modelling is associated with prediction of how fire in terms of the heat and smoke spreads (Fire Dynamics, 2015). Fire modelling is important because it helps identify sections of buildings that are more prone to consequences of fire through the help of data from models. A good example of a fire model is the CFD the Computational Fluid Dynamics. This model is associated with the way fluids flow and how they spread heat and smoke it times of fires. The study of theses flows help speculate and predict the ways smoke and heat may spread in a building and this information is helpful in developing good designs that facilitate better safety measures (Fire modeling, 2015).

**Conclusion**

From the above information it is clear that fire safety engineering is very important. It is a factor that is involved with the application of scientific and engineering knowledge in fire protection and safety. Fires are major causes of deaths and destruction of property. It is for this reason that adequate measures should taken to safe guard lives and protects property. Various factors have been associated with fire safety engineering. Some of which include fire risk analysis that is aimed at identification of fire hazards. Other factors include understanding fire dynamics, application of fire modelling, fire detection as well as fire suppression. All of these factors are important and help in fire safety in the different operational fields.

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