

Analysis of Fire and related incidents in Korea, 1999-2008

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1. Introduction

1.1 Background and Purpose of Study

Fire is the cause of many fatalities. Each year, fire is the cause of many deaths and causes an enormous loss in property expenses throughout the world.

Often, fires are ignited by electrical short circuits and carelessness. Fires can start in motor vehicles and nearly any kind of building (*i.e.*, industrial buildings, office buildings, etc.). In areas with occupants, the reason for planning and designing facilities for fire safety is to create an environment with a low probability of the loss of life and property. Another purpose is to limit the environmental destruction caused by fires, where the main concern is to limit the emanation of gaseous pollutants and combustion products to the atmosphere.^{1,2)}

Casualties happen comparatively occasionally in fire that are informed to fire division. Also, most fires result in very few injuries and casualties and furthermore the big majority of casualties happen in these fires. Most injuries and fatalities are the result of comparatively occurrence from specific types of fire and situations. Thus, it is significant to identify and address in design fire locations and types.

Korea has suffered a number of deaths, injuries, and property losses as a result of fires occurring in different places each year. The source of statistical data on fire is the National Emergency Management Agency.³⁾ However, these records only contain fires that were reported to the NEMA. The NEMA investigates accidental fires in an effort to prevent future occurrences. It began to publish annual records for fire incidents several years ago. These reports may be used to study accidental fires and determine future regulations, as well as enable assessment of current fire safety plans.

The purpose of this paper is to assess how safety is affected by fires year after year. Moreover, the restricted statistical data reported to the NEMA in Korea from 1999 to 2008 are analyzed. The results will make an important contribution to the development of effective strategies for ensuring fire safety.

2. Analysis of fire data

The accidents reported in this paper occurred from the period of January 1st, 1999 to December 31st, 2008. These accidents resulted in fires and were reported to the NEMA, 2006. The fires reported to the NEMA have been regrouped into two types: structures and vehicles (Table 1).

The overall number of injuries and deaths for each year is presented in Table 2. Table 2 illustrates the fact that over the last ten years the fires in 2003 caused the highest number of

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civilian deaths. In this year, the deaths increased sharply by 34.0% on the previous year's deaths. Most of the victims died due to subway fire disaster broken out in Dagu city, February 2003. However, the deaths decreased by 11.68% on the previous year's deaths in 2006.

2.1. Number of fires per year for 1999 to 2008.

This section reviews the fire statistics in Korea. Fire incidents are thought to be high in Korea; the overall number of reported fires is 363,575 from 1999 to 2008 (Table 1). The total of number of structure fires includes fires that occurred in residential homes and apartments, industrial plants and work places, restaurants, stores, and others (warehouses, business offices, hotels and inns, schools, etc). Vehicles include motor vehicles, ships, and airplanes.

Table 1 shows that the number of fires is nearly uniform from 1999 to 2008 and shows that in 2008 the number of fires was higher (49,631 fires) than in the other years.

3. Discussion

Many statistical methods facilitate a better understanding of accidents. One approach is to calculate the death number per year.⁵⁹⁾ This method is helpful because it forecasts the cost in human life and can inspire preventive policies. Table 3 compares the death number obtained for each year during the 1999 to 2008 time period. It is obvious that many activities in daily life are more hazardous than working in industrial plants and workplaces.

It is difficult to forecast the trend of the numerical values; however, over the last ten years, the numerical values show a slight decrease except in 2003. This may be due to the continuous efforts of various governmental systems (especially the NEMA) to educate the general public on how to prevent fires.

The ignition sources, which were determined as the cause of the fires, were analyzed for over 360,000 fires. Fig. 1 lists the type of cause for each fire. The causes of the fires are numerous; consequently, it is not possible to remove all risks.

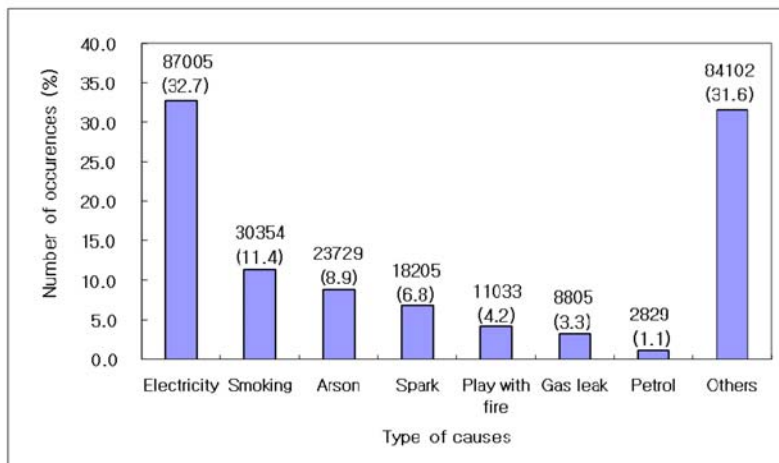


Fig. 1. The cause of fires that occurred from 1999 to 2008.

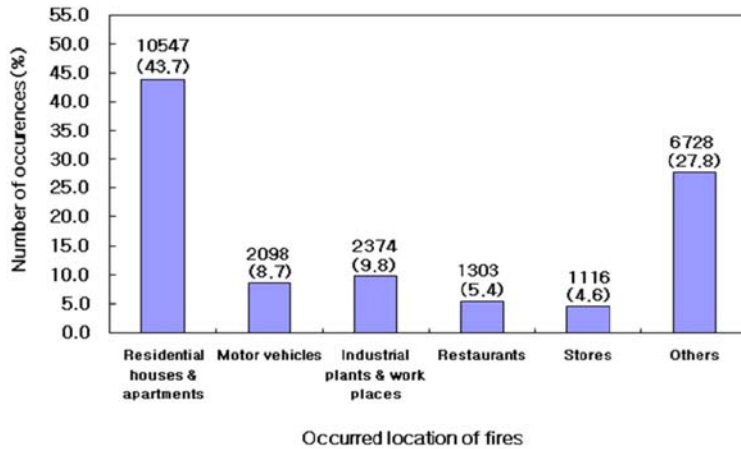


Fig. 2. The percentage of fires that occurred at a particular location from 1999 to 2008.

The ignition source with the greatest probability of fire occurrence should be greatly considered (such as electricity, which accounts for about one-third of the total number of causes). Usually, most electricity fires in Korea are caused by overloaded equipment or overheated wires. Based on these results, to control fires effectively, it is necessary to apply safer maintenance procedures and to use normal loads. Fig. 1 also indicates that smoking is the second highest source of ignition. This is a significant problem in Korea as well as many other countries.⁶⁻⁸⁾

Efforts can be made to reduce the probability of fire occurrence but it is impossible to prevent all fires. The highest degree of protection may be achieved through technical safety standards. To enhance the safety requirements, it is necessary to determine the occurrence percentage of each input category for the total number of fires during the period of 1999 to 2008. Fig. 2 lists the percentage of each category. It can be seen that fires in residential buildings and Industrial Plants & Work Place account for 43.7% and 9.8%, respectively, of the total number of fires in Korea. These figures are similar to the reports of many counties around the world, which is due to the fact that these two categories account for almost 53% of the total number of fires. Fire reports must include information that, upon analysis, will help the NEMA to make policy congress and working findings. This is in addition to the general aim of other government departments to reduce the number of fire incidences and related death, injury and damage.

The most important reason for providing fire safety in controlled places such as residential buildings, shopping malls and industrial plants is to ensure the protection of lives and property. National codes must give more emphasis to personal safety than property protection.²⁾

It is also necessary to provide facilities for detection and notification of fires, along with safe travel paths for the movement of occupants and fire-fighters and barriers to control the spread of fire and smoke that will not prematurely collapse when exposed to fire. Also, to enhance fire safety, the planning of emergency procedures, practicing of emergency drills, and enhancement of fire education are all important measures to take. To lower the risk of fire, it is necessary to do some research on fire and fire protection.

4. Conclusions

Fire accidents in Korea reported to the National Emergency Management Agency (NEMA) during the period of 1999 to 2008 were investigated.

A survey of 24,166 accidents due to fires is presented. It is difficult to forecast the trend of the numerical values; however, over the last ten years the numerical values show a slight decrease except in 2003. This may be due to the continuous efforts by various governmental systems (especially the NEMA) to increase the general understanding of risk prevention.

The results obtained indicate that 43.7% of the total number of fires occur in residential houses and apartments, while 9.8% involve Industrial Plants & Work Place. It is obvious that many activities in daily life are more hazardous than working in industrial plants and workplaces.

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