

# Current Status of Safety Management of Protestant Religious Facilities

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**Abstract** This study aimed to investigate whether protestant religious facilities are maintained appropriately for people and regular inspections are conducted. As a study method, survey and site investigation were conducted. The survey questionnaire aimed to know the perception of users or responsible persons about safety management and current status of safety management systems while the site investigation aimed to inspect structural conditions by a visual inspection such as proper installation of fire protection equipment and whether regular inspection were conducted. It was found, through the inspection of the current safety management status, that the safety management related persons did not know which parts and how much they manage incorrectly, and did not know the follow-up actions in case of accidents. Therefore, it is essentially required to assign a proper person to the facilities for safety management and to have safety consciousness education. Furthermore, although more than 80% of the surveyed subjects responded that they were familiar with the way to use safety management related facilities and overall instructions, the respondent were concerned about the correspondent training for emergent circumstances.

*Keywords: Religious Facility, Protestantism, Safety Management, Current Status Investigation, Survey*

## 1. INTRODUCTION

Recently, Republic of Korea has experienced many accidents related to safety issues such as roof collapse in Mauna ocean resort in Gyeongju, past food homes in Fenghua, Sewol ferry disaster, apartment collapse in Asan, collapse of ventilation hole in Pangyo and apartment fire in Uijeongbu. These accidents have caused not only property damage but also great human casualties. Therefore, it is urgently needed to establish countermeasures against safety related accidents and a series of safety related accidents have also alerted churches in Korea as multi-use facilities against safety related accidents. In particular, since the collapse of Seongsu Bridge in 1994 and the collapse of the Sampoong department store

in 1995 had caused massive loss in both properties and human resources, Special Law for the Safety Management of Facilities were enacted and regular safety inspection, safety diagnosis, and precise safety diagnosis have been conducted for the buildings over a certain size to ensure safety management. Nonetheless, most protestant religious facilities and buildings in South Korea were not subject to the Special Law for the Safety Management of Facilities, which made protestant religious facilities and buildings under blind spot (Kim. 2013, Korea daily. 2015, Yonhap news agency. 2014, The Kukmin daily. 2015). Accordingly, this study aimed to derive improvements and measures for safety of protestant religious facilities in South Korea through surveys and site inspection as part of current status investigation.

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## 2. STUDY METHODS AND CONTENTS

### 2.1 study methods

The current status investigation of protestant religious facilities in South Korea was consulted with the Communion of Churches in Korea (CCIT) to select sampling target church buildings and after preliminary survey about the selected churches, church sites were visited to conduct site inspection and survey study simultaneously.

The survey study was conducted based on church managers of the selected churches to know the current status and perception about safety management in principle. According to Table 1, survey questionnaires were configured and mainly divided into three parts:

church generals, safety management perception survey, and survey on current status of safety management system in order to derive improvement and measures for safety management by diagnosing vulnerabilities and limitations of safety management, risk factors and problems.

Table 1. Question Investigation

Division	Content	Item Number
General Aspects of the Church	Denomination, Number of Believer, Response Position, Building Type	4
Safety Management the Investigation of Awareness	Administrator Whether, Consciousness of the Safety Management	14
Safety Management System Present Condition Survey	Fire Extinguisher, Fire Hydrant, Sprinkler, Fire Exit, Exit-Guide Light	12

In the site survey, excessive deformation or deflection, crack occurrence status, concrete peeling and loss, and exposed and corroded rebar that can affect structural safety were visually inspected according to Table 2. Moreover, fire prevention-related sprinkler installation, evacuation passage provision, installation of hydrant and fire extinguishers, and surrounding conditions were investigated.

The selected church buildings were located in two regions from Seoul Metropolitan City and major metropolitan cities in Korea and two rural and fishing regions from non-metropolitan cities for each of ChungCheong, Youngnam, and Honam Areas, resulting in four churches in each of four regions thereby having 16 churches and one dormitory, which made total 17 facilities.

Table 2. Field Survey

Division	Content	Item number
Safety Management Status	Safety Inspection Record, Evacuation Drill Record, Manual Status	10
Management of Building Structural Status	Check the Status of Drawings and Construction, Check the Status of Each Structure	8
Electrical Gas Field	Check the State of Electrical Fields, Check the State of Gas Fields	13
Fire Protection System Status	Fire Extinguisher, Fire Hydrant, Fire Exit, Exterior Stairway, Descending Life Line, Exit-Guide Light	30

**2.2 Analysis on the Current Status**

Religious facilities were classified according to the current Building Act in Korea. In accordance with Article 2 of the Building Act, “the purpose of buildings” refers to the building types classified according to similar structure, use purpose, and types. The purpose of building is classified as follows and detailed purposes of buildings as per use purpose are established according to the Presidential decree. Religious meeting halls and chanel houses

that do not belong to Class 2 neighborhood living facilities are also included in religious facilities. Class 2 neighborhood living facilities refer to the religious facilities whose total floor area is less than 300 in accordance with the Building Act. Among religious facilities, the buildings whose total floor area is more than 5,000 are classified as a multi-use building (Kim and Yang, 2007, Jang, 2014).

The use status of protestant religious facilities was displayed by depicting a trend of recreational activities at weekend and public holiday by Korean people in data from Statistics Korea. As shown in Figure. 1, religious activity accounts for approximately 9%, which is ranked top 4 following TV watch, household chores, and rest. That is, safety management of religious facilities is closely related to citizen’s safety and the need of safety management is essential (Jang, 2014).

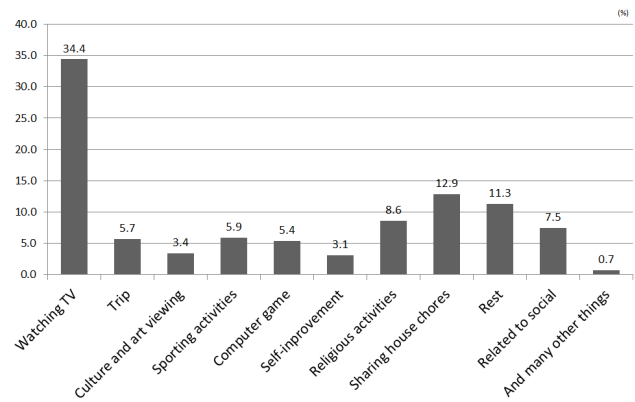


Figure 1. Religion Facility of Used Status. (Statistics Korea, 2013)

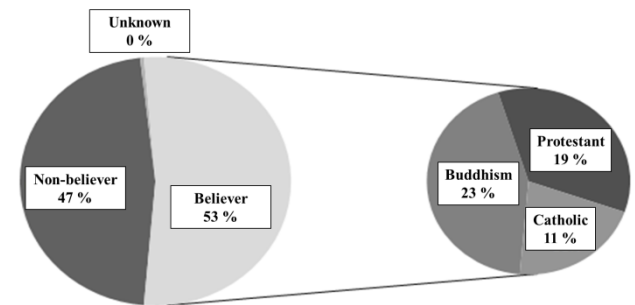


Figure 2. Religious Population Status. (Statistics Korea, 2005)

Table 3. Religious population status (NSO, 2005)

Korean		Religions			
47,041,434		24,970,766			
Buddhism	Protestantism	Catholic	Confucianism		
10,726,463	8,616,438	5,146,147	104,575		
No Religion		Unknown			
21,865,160		205,508			
Won Buddhism	Jeungsan gyo	Cheon Doism	Remnant		
129,907	34,550	45,835	163,085		

unit : person

Figure 2 and Table 3 show the current status of religion distribution in Korean people obtained via Statistics Korea data.

As shown in Figure. 2, religious population accounts for 53% approximately of total population. This means more than half of the people observe religion. For more details, the number of protestant Christians is 8,646,438 persons, which accounts for 34.5% of total religious population (24,970,766 persons), which is proportionally high as ranked the second following Buddhists (approximately 43%). Basically, safety management is to improve productivity and to minimize property loss. It involves activities that maintain a state where no safety accidents occur by removing inefficient factors. That is, it involves strategic and systematic activities to protect human lives and properties from disasters. The main objectives of safety management are: first, protection of human lives, second, increase in social welfare, third, improvements in productivity, and fourth, improvement in economic feasibility (Park and al. 2008, Ministry of Culture Sports and Tourism. 2002).

**2.3 Analysis on Safety Accident Types**

Study on safety accidents in religious facilities. Although statistical data in relation to safety accident in religious facilities are not available, the risk of safety accident in religious facilities can be inferred via Disaster Yearbook published by the National Emergency Management Agency. Statistics of man-made disasters indicate that safety accident increased yearly as shown in Table 4 from 2010 to 2012. In 2010, 280,607 accidents occurred and in 2011, 286,851 accidents occurred, which was increased by 2.2% from previous year. In 2012, 303,707 accidents occurred, which was increased by 5.8%. As shown in the above statistics, safety accidents were increased every year, which implies urgent needs of safety management for users of religious facilities. The factors of man-made disasters are various including fire, bush fire, collapse, explosion, road traffic, and environmental pollution as shown in Table 5.

Table 4. Occurrence of Human disaster (NSO, 2005)

	2010	2011	2012
Generation number	280,607	286,851	303,707
Total	366,911	365,947	383,129
Damage of Human Life			
Decease	6,758	6,709	7,322
Injuries	360,153	359,191	375,807

unit : case

Table 5. Factors of Human disaster. (MPSS, 2012)

Division	2012						
	Fire	Forest Fire	Coll-apse	Expl-losion	Road Traffic	Environ-mental Pollution	Rem-nant
Generation Number	43,249	197	402	48	223,656	92	34,420
Damage of Human Life (case)	Total	2,213	2	241	86	349,957	67
	Decease	257	1	43	4	5,392	11
	Injuries	1,956	1	198	82	344,565	56
Damage of Property	2,895	25	0	5	0	263	451

unit : case

The most frequently occurred accidents in relation to buildings are fire-related accidents followed by a collapse and then an explosion. The number of fire accidents was 43,249 cases and that of collapse accidents was 402 followed by explosion, which were 48 cases. As shown in Table 6, a gas leakage had 0 case in 2009 but 4,733 cases in 2011 and carelessness accounted for 16% in 2009 but it was increased to 23% in 2011.

Table 6. Damage situation according to Ignition factor on the Fire accident. (NSO, 2005)

Burned Site	Ignition Factor	2009(year)	2010(year)	2011(year)	
Set of facilities	Religious facilities	Total	2,239,446	2,361,639	1,973,925
		Biographical Factor	730,014	648,078	551,578
		Mechanical Factor	51,690	28,670	54,498
		Chemical Factor	-	453	-
		Gas Leak	-	330	4,733
		Carelessness	351,080	400,537	450,858
		Remnant	3,978	1,312	7,297
		Natural Factor	2,129	68,336	105,663
		Arson	89,009	581,744	161,878
		Suspected Arson	120,540	129,546	32,551
		Unknown	891,006	502,633	604,869

unit : case

**2.4. Regulations and Systems Related to Safety Management in South Korea**

The legislation set by the Ministry of Public Safety and Security (MPSS) about contract with local governments including the systems of disasters and safety management, the systems of building maintenance, the guidelines of building safety inspection, and related guidelines and standards in government ministries are as follows:

The Framework Act on the Management of Disasters and Safety (FAMDS) was enacted to establish the disaster and safety management systems of central and local governments, and specify systems required for disasters and safety management, prevention, preparation, response, and recovery of disasters, and safety culture campaign activities in order to protect territorial integrity as well as citizen's lives, physical bodies, and properties from various disasters.

The Paragraph 2 of Article 27 in the FAMDS specifies the measures required for establishment and enforcement of short and long-term planning, safety inspection or diagnosis, and management and maintenance in order to eliminate the risk of disaster occurrence for the buildings specified as the subjects for special management. Protestant religious facilities were included in the special management required facilities in the act but there were criteria regarding facility sizes. A total floor area of religious facilities that were included in the special management required facilities was specified as 300 m<sup>2</sup> to 5,000 m<sup>2</sup>.

The enforcement decree of the FAMDS was aimed at specifying the required items commissioned by the FAMDS and their enforcements. In Article 34 of D(La) of the enforcement decree, privately owned facilities were excluded from government subsidies. However, guidance and legislation were needed to establish the systems and structures for safety management of protestant

religious facilities through some assistance from the government.

D("La"). Article 34 (Government subsidy) The government may subsidize some or full cost if short and long-term planning is established by the head of local government to minimize risk in special management required facilities (privately owned facilities among special management required facilities managed by local governments are excluded) according to Article 33.

The enforcement rule of the FAMDS was aimed at specifying the required items commissioned by the FAMDS and their enforcements. In relation to risk minimization planning in Article 7 Emergency Safety Inspection Required Facilities and Local Management Card Section in B("Na"), it is necessary to recover the trust between protestant religious facilities and companies for diagnosis and maintenance by clearly specifying a scope of responsibility such as enforced contents and companies through short and long term planning.

### 3. INVESTIGATION

#### 3.1 Generals

In this study, the site inspections were conducted based on the selected churches with a consultation of CCIT for the purpose of establishing a measure for safety management by diagnosing safety management-related vulnerabilities, limitations, risk factors, and problems after investigating the current status of safety management in protestant religious facilities.

In the survey questionnaires mainly consisting of three parts, first, manager and user's attitude toward safety, and current status and perception of safety management were investigated including denomination of churches, the number of congregation, position of respondents, and building types. Second, in the safety management perception survey, whether safety-related managers are placed and their attitude toward safety management were surveyed. Third, in the survey about the current safety management system status, it was questioned about the locations of hydrant, fire extinguishers, fire prevention-related sprinkler, emergency exit, and evacuation passages including whether the regular inspections were conducted.

For the site investigation, first after questioning about overall structural safety of facilities, locations or usage regarding hydrants and extinguishers for early fire extinguishing, and site visit to evacuation passages based on facility managers or safety related managers in order to understand overall current status of safety management. Then, deflection or excessive deformation of main structures in facilities, crack occurrence in structural members, water leakage, peeling or removal of covered concretes, exposed rebar and corrosion were visually inspected. Furthermore, the inspection was focused on whether sprinklers were installed, whether hydrants and fire extinguishers, evacuation passage, outdoor evacuation stairs were provided because early fire extinguishing is the most important . If there are annex buildings such as education hall, those were also investigated in the same manner.

#### 3.2 Investigation Methods

In the current safety management status inspection table, general status about facilities, current inspection results, and inspector's comments are listed. The current safety management status inspection was conducted visually to check the current status

of safety management, structural malfunctions or performance degradation of building materials of the surveyed buildings and annex facilities. The inspection method of the current safety management status was as follows: first, building's safety management status was identified through interview with building users and inspection items were investigated. Then, inspection results were filled in the current safety management status inspection table and photos about safety management status were shot to record them visually.

#### 3.3 Results of Investigation

Both survey and site inspection were conducted according to the safety management investigation method for the targeted buildings where inspection of safety management was required. In this section, improvements and measures for safety management were derived by diagnosing vulnerabilities and limitations of safety management, risk factors and problems based on the inspection results. According to the survey result regarding the "safety management perception", it showed the lack of resources who is in charge of a safety management in non-urban regions compared to urban areas and 60% of the respondents indicated that safety management-related educations for religious facilities were needed.

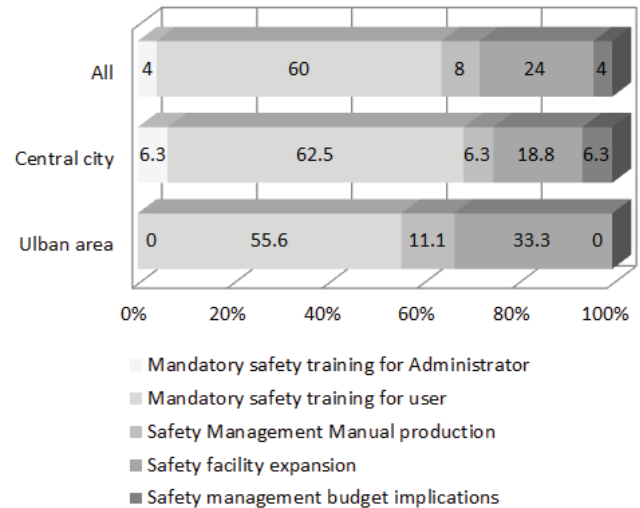


Figure 3. Result of Safety Management Awareness Investigation.

As shown in Figure 3, 50% of the respondents in non-urban areas answered that they needed subsidy of safety management cost, which indicated relatively poorer safety management status in non-urban areas than urban areas. According to the survey result about "current safety management system status", all respondents answered that they had education for the fire extinguisher but 20% of them did not know the exact locations of fire extinguishers. For sprinklers, 20% of the respondents answered that they did not know whether sprinklers were regularly inspected or not and 80% of them said that sprinklers were regularly inspected but few managers understood detailed knowledge about fire prevention facility inspection. Approximately 10% of the respondents answered that emergency exits were used as multi-purpose spaces and 20% of them did not know about whether evacuation exit guidance lights were correctly working or not.



### 3.4 Results of site inspection



Figure 4. Problems of Church Exit



Figure 6. Problems of cracks on walls



Figure 5. Problems of closed a Fire hydrant



Figure 7. Problems of Church Chapel

The comparison and analysis results of both survey and site inspection showed that 80% of the respondents answered that they knew locations of fire extinguishers, indoor and outdoor hydrants, and emergency exits and how to use them in case of emergency in the “current safety management system status” but management problems were found such as locking of safety pins of fire extinguishers and hoses of hydrants separated from the valves.

As shown in Figure 4 and Figure 5, evacuation paths were not secured clearly in case of emergency due to many obstacles around the emergency exits as well as the indoor and outdoor hydrants. Around 10% of the respondents answered that emergency exits were used as multi-purpose spaces.

In the site inspection of current safety management status, it was confirmed that fire prevention-related equipment and provisions were not used as intended with more than twice of respondents. Thus, advertisements and educations for securing emergency exits are needed through advices or sprinklers, 20% of the respondents answered that they did not know whether sprinklers were regularly inspected or not and 80% of them said that sprinklers were regularly inspected but few managers understood detailed knowledge about fire prevention facility inspection. Furthermore, more than 20% of the respondents did not know about whether evacuation exit

guidance lights were installed and correctly working or not.

There were cases where evacuation exit guidance lights were not used correctly even if evacuation exit guidance lights were installed in the site inspection of the current safety status. As a typical example, chairs in the church blocked the evacuation exit guidance lights as shown in Figure 7. In the structure and non-structure safety inspection, which is the last part of the site inspection, cracks or other safety-critical damages were insignificant overall but many aging buildings were observed and peeling and removal of concretes exposed rebar due to concrete neutralization.

### 4. CONCLUSIONS

Protestant religious facilities can be included in Class 2 neighborhood living facilities according to building purpose in accordance with Article 2 of the Building Acts or included in multi-use buildings according to total floor area. Religious facilities are also frequently employed since 53% of Korean people are doing religious activities regularly. However, due to the lack of proper safety management systems, the number of safety accidents occurred for the past three years has increased. Religious facilities are used by Korean people quite often. Therefore, they are closely related to the safety of Korean people, which also requires proper

establishment of safety related legislation.

It was found, through the inspection of the current safety management status, that the safety management related persons did not know which parts and how much they manage incorrectly, and did not know the follow-up actions in case of accidents.

Therefore, it is essentially required to assign a proper person to the facilities for safety management and to have safety consciousness education. Furthermore, although more than 80% of the surveyed subjects responded that they were familiar with the way to use safety management related facilities and overall instructions, the respondent were concerned about the correspondent training for emergent circumstances. Accordingly, much attention is needed for not only protestant religious facilities but also other religious facilities by national agencies and other sectors, and regular contingency training in case of emergency is needed. It is also recommended that persons for the safety management in religious facilities should be replaced by persons who hold the national certificate in safety management.

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