

# A Study on a Sense of Safety and Security

J TAKASE, S SUGAHARA, T NARUSE, M TAMURA and H KONISHI

Department of Architecture

The University of Tokyo

Hongo 7-3-1, Bunkyo-ku, Tokyo 113, Japan

## ABSTRACT

In recent years, safety performance of buildings has advanced remarkably by the development of disaster prevention facilities. However their systematic functions have not been improved enough for users' security feelings. As for a tall or large-scale building, the potential risk is rapidly growing according to the increase of both the size of space and the complication of functions which psychologically influences to safety senses of the users. Even if a building is built according to legal standards and some experts ensure the safety, the users wouldn't always have feelings of security. Safety standards including individual safety, i.e. security, are becoming more indispensable through enlargement and complication of buildings. Human sense of security is variable according to age, sex, race, knowledge, environment, and so forth. In Japan, the population of elderly people is increasing, which causes a considerable change of security sense. For renovating buildings safety, we have to understand what the sense of both safety and security is, together with the relationship between them, which would be helpful to establish some kind of evaluation method for fire safety in buildings.

In this study, we present questionnaires to fire fighting personnel and college students in architectural course, so as to examine how to grasp "safety" and "security" through their knowledges or experiences on disaster prevention. As a result, it was found that persons with less knowledges on disaster prevention felt uneasy about various disasters, which induces a cause of panic, and security was psychologically allocated among individual safety senses including healthy features.

## INTRODUCTION

In recent years, taller and more large-scale buildings have been made. With it, the safety performance of them has advanced remarkably by the development of disaster prevention facilities and fire prevention management system. However their systematic functions have not been improved enough for users' security feelings. Even if a building is built according to legal standards and some experts ensure the safety, people wouldn't always have feelings of security. In addition to the systematic function improvement, safety standards including individual safety, i.e. security, are indispensable in these buildings so that users can use them with security.

In these buildings, it is necessary to separate a building into independent spaces in terms of disaster prevention, considering refuge or information. But we can't help considering it as the situation of accumulation as a whole, because the lifeline like energy, sewer pipes, and carrier facilities pierces each independent space. In disaster prevention, fatal damage is avoided by the separation of functions. On the other side, the frequency of equipment's accidents increase, which causes a lot of small damage. The accumulation makes functional efficiency improve, but the functional accident causes huge damage. These buildings have a lot of disaster prevention problems to be solved like the prevention of causing fire and fire spread and the safety of refuge. A lot of people are in it and they would be in a panic if serious disaster happen in it. Therefore, the enlargement and complication of buildings make the risk increase and influence psychologically to safety sense of the users.

Risk is fixed by the frequency of disasters and the extent of damage. We need to take suitable measures like avoidance, separation and reduction in advance by estimating the possible damage. In these buildings, the risk increases by the accumulation of spaces and functions. But the improvement of disaster prevention facilities and fire prevention management system can reduce the risk. On the contrary, without repair and renewal for them, the safety level would become low and the risk would increase because they become decrepit year by year. Security sense is influenced by risk sense and risk sense is influenced by their recognition on building' risk. Therefore we can't consider security sense by only reducing the fixed risk.

Security sense means people feel that things are done in order to keep someone or something safe. In Japan, a building is built according to regal standards which assure least safety performance. But the users don't seem to ask for stronger safety performance which consider security sense. One reason is that the users can't understand the safety performance because the difficulty and complication of legal standards. To make a comparison between Japan and Europe-and-America about the safety and security sense, safety is prior to security in Japanese buildings. On the contrary, security is prior in

Europe-and-America. This problem is caused by the difference between their spirit and life basis. The Japanese have group principle and don't try to assert themselves. The Europeans and Americans are individualistic and assert themselves. The sense of hazard or risk of the Japanese is weaker than that of the Europeans and Americans. For buildings that users can use with security sense, they must understand the risk and improve the spirit of the self establishment that tries to satisfy their own security sense.

Human sense of security is variable according to age, sex, race, knowledge, environment, and so forth. In Japan, the population of elderly people is increasing, which will cause a considerable change of security sense. For renovating buildings safety, we have to understand what the sense of both safety and security is, together with the relationship between them, which would be helpful to establish some kind of evaluation method for fire safety in buildings.

In this study, we present questionnaires to fire fighting personnel and college students in architectural course, so as to examine how to grasp "safety" and "security" through their knowledges or experiences on disaster prevention.

## METHODS

We presented questionnaires to 47 college students (in third year, architecture course) with less knowledge on disaster prevention and 54 fire fighting personnel (the average of ages is 43.5) with the expertise.

In Question 1, after we showed various kinds of disasters, we asked them to choose one of some choices about each relationship between preventing damage by each disaster and safety or security. The choices were "very," "quite," "a little," "related to both" and "no relation to both."

Next, in Question 2, we asked them how the possibility of death by being involved in each disaster all their life was. There were "there is no possibility of death," "perhaps there is some possibility of death" and "there is some possibility of death" as three choices.

Finally, we showed some measures against earthquake from physical side such as the improvement of equipment or structure and human side such as the education of volunteer with large-scale fires in Great Hanshin Earthquake in mind, and asked them to choose three effective measures about each. We examined the difference of their understanding on disaster prevention.

## RESULT AND DISCUSSION

### A sense of safety and security

Each percentage of three degrees of “safety,” and “security” is tabulated in Table 1.

First of all, as for “safety,” both of the students and the fire fighting personnel chose “very” most about “nuclear power plant accident.” Especially, the fire fighting personnel’s percentage was higher than the students’, and nearly 80 percent. It shows the fire fighting personnel claim higher safety. And also, “very” was chosen more than “quite” and “a little” in “big earthquake,” “ozone layer depletion,” “jumbo jet crash” and “war”. These disasters tend to cause serious damage widely. On the contrary, in “traffic accident” and “falling off scaffold” that cause rather a little personal damage, the percentage of “quite” was highest.

Next, as for “security”, there was more difference between the students and the fire fighting personnel in comparison with “safety”. Disaster which showed a high percentage of “very” was “war” and “sarin-gas attack”. In the meantime, the fire fighting personnel chose “quite” more than the students about “residential fire”, which was noticeable.

S: students F: fire fighting personnel

Disaster	safety						security					
	very		quite		a little		very		quite		a little	
	S	F	S	F	S	F	S	F	S	F	S	F
Nuclear power plant accident	53.2	77.8	12.8	9.3	4.3	1.9	10.6	3.7	12.8	3.7	0	0
Ozone layer depletion	42.6	27.8	19.1	25.9	2.1	0	14.9	22.2	12.8	11.1	8.5	5.6
Tanker fire	21.3	16.7	34	29.6	12.8	29.6	0	3.7	14.9	3.7	4.3	11.1
AIDS	19.1	13	4.3	11.1	6.4	5.6	19.1	33.3	34	24.1	8.5	3.7
Sarin-gas attack	21.3	22.2	8.5	11.1	0	5.6	34	29.6	12.8	14.8	6.4	3.7
Bullying damage	4.3	1.9	0	5.6	0	3.7	21.3	24.1	29.8	38.9	17	7.4
Residential fire	34	18.5	21.3	27.8	0	3.7	6.4	22.2	21.3	14.8	4.3	9.3
Rape	10.6	3.7	17	9.3	0	5.6	34	14.8	17	29.6	8.5	18.5
Shinkansen derailment	31.9	31.5	29.8	37	8.5	11.1	4.3	3.7	17	7.4	2.1	3.7
Electromagnetic waves	6.4	7.4	8.5	25.9	19.1	11.1	2.1	3.7	14.9	13	12.8	11.1
O-157	17	5.6	10.6	13	6.4	5.6	29.8	22.2	19.1	35.2	6.4	14.8
Volcanic eruption	8.5	16.7	12.8	18.5	4.3	11.1	14.9	9.3	29.8	13	12.8	7.4
War	25.5	29.6	4.3	7.4	4.3	0	29.8	38.9	14.9	5.6	2.1	5.6
Flood	25.5	24.1	23.4	29.6	12.8	5.6	6.4	11.1	14.9	14.8	6.4	5.6
Traffic accident	27.7	18.5	48.9	44.4	6.4	9.3	2.1	7.4	6.4	11.1	0	1.9
Big earthquake	38.3	44.4	12.8	13	0	0	21.3	24.1	19.1	7.4	2.1	1.9
Building fire	34	29.6	38.3	33.3	2.1	9.3	2.1	9.3	12.8	11.1	2.1	1.9
Jumbo jet crash	27.7	31.5	14.9	24.1	2.1	7.4	14.9	14.8	21.3	7.4	4.3	7.4
Falling off scaffold	19.1	9.3	40.4	40.7	17	29.6	2.1	3.7	2.1	3.7	10.6	7.4
combinat accident	31.9	29.6	23.4	40.7	12.8	9.3	2.1	1.9	14.9	9.3	6.4	1.9

Table 1 The relationship between the prevention of damage by disaster and safety or security sense

The total of “very,” “quite” and “a little” about each of “safety” and “security” is shown in Fig.1 and 2. In the students’ “safety,” disasters like “traffic accident” and “falling off scaffold,” which might happen near themselves instead of causing serious damage, were chosen more. In the fire fighting personnel’s “safety”, disasters like “nuclear power plant accident,” “Shinkansen derailment” and “combinat accident,” which cause large scales of damages and high trust was needed to prevent were chosen more.

In “security”, disease and crime which happened by human action, and disasters which we experience in low probability showed high percentages.

Every percentages of “building fire,” “residential fire,” “traffic accident” and “flood” that fire fighting personnel dealt with in fact topped the students’ percentages. It was found that the fire fighting personnel thought much of “security” about disasters that happened around themselves in comparison with the students.

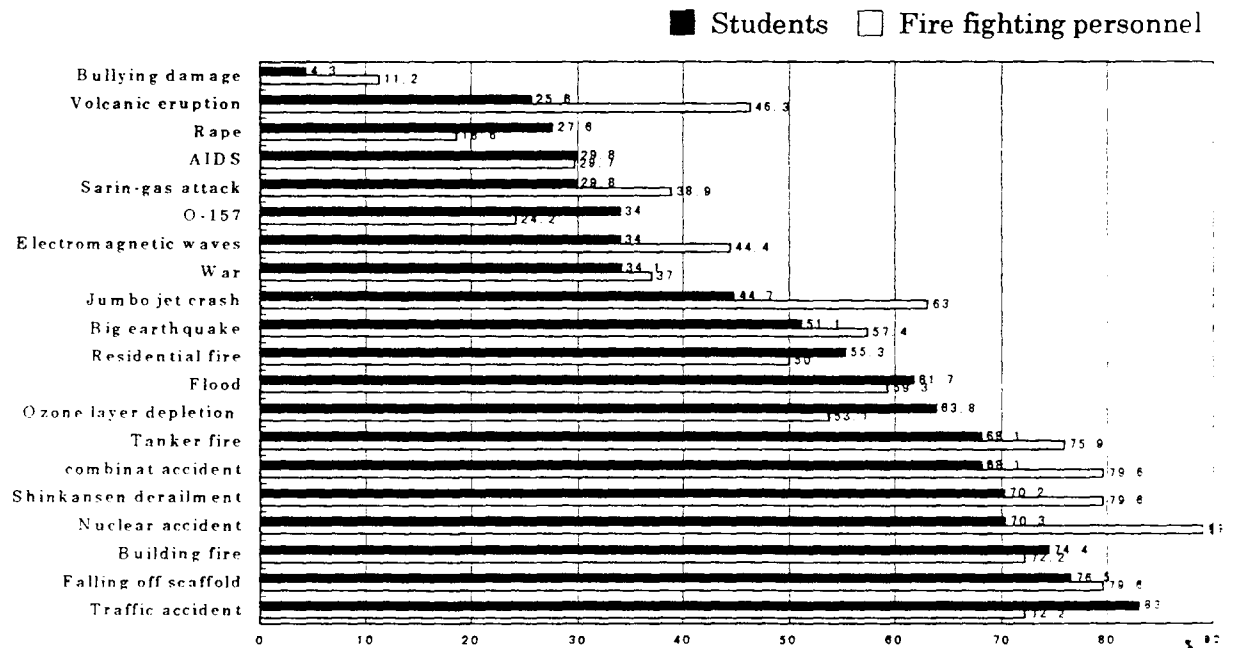


Fig.1 The comparison of the results on choice “safety” between Students and Fire fighting personnel

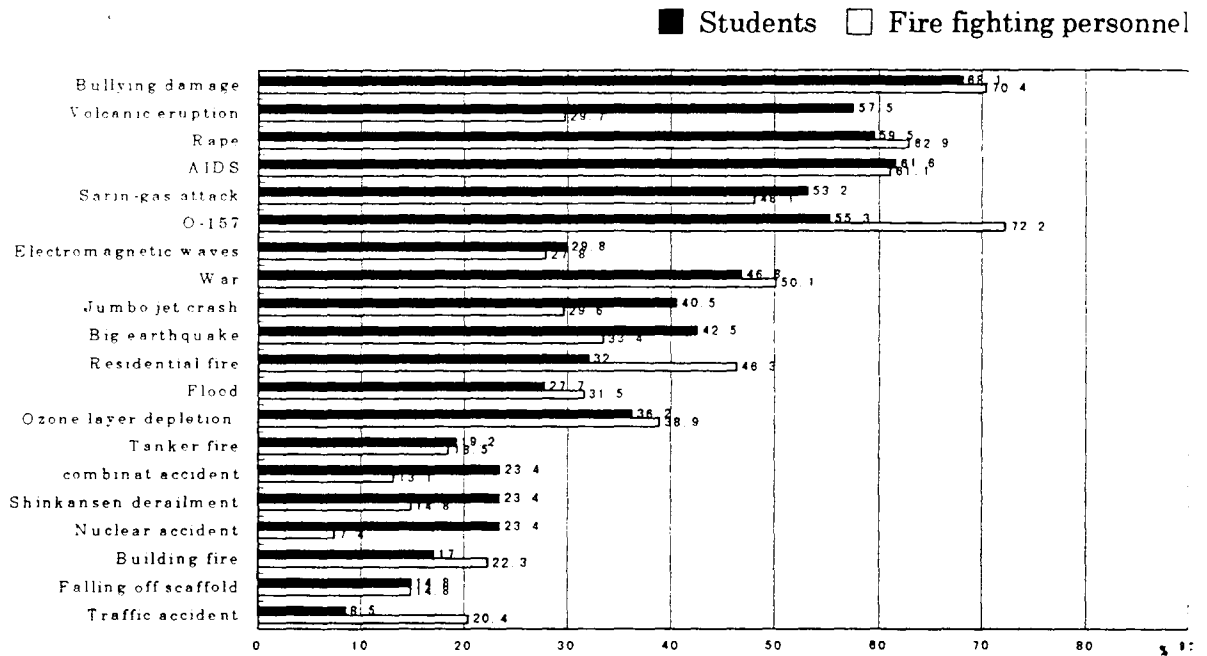


Fig.2 The comparison of the results on choice "security" between Students and Fire fighting personnel

The possibility of death by being involved in disasters

The results of Question 2 are shown in Fig.3 , 4 and 5. As the total tendency, the percentages of students that chose "there is no probability of death" were lower than that of the fire fighting personnel. And the students chose "there is some probability of death" more than the fire fighting personnel. It shows that the students feel high possibility that they are involved in some disasters. The tendency seems to originate in the situation that the students have less knowledge on disaster prevention than the fire fighting personnel. In Fig.4, it shows that more than half of both choose "perhaps, there is some possibility of death" in almost all disasters despite the wide range of possibility. It seems to be manifestation that they always feel uneasy to something potentially in their life.

Fig.6 shows the relationship between "security" in Question 1 and "there is no possibility of death" in Question 2 to examine how their risk of dead by disasters, which is one of human sense to judge safety and security, is related to their security sense.

From the result, the evident relation between the judgments of safety sense and security sense and the possibility of death in disasters couldn't be seen. There seems to be other relation factors.

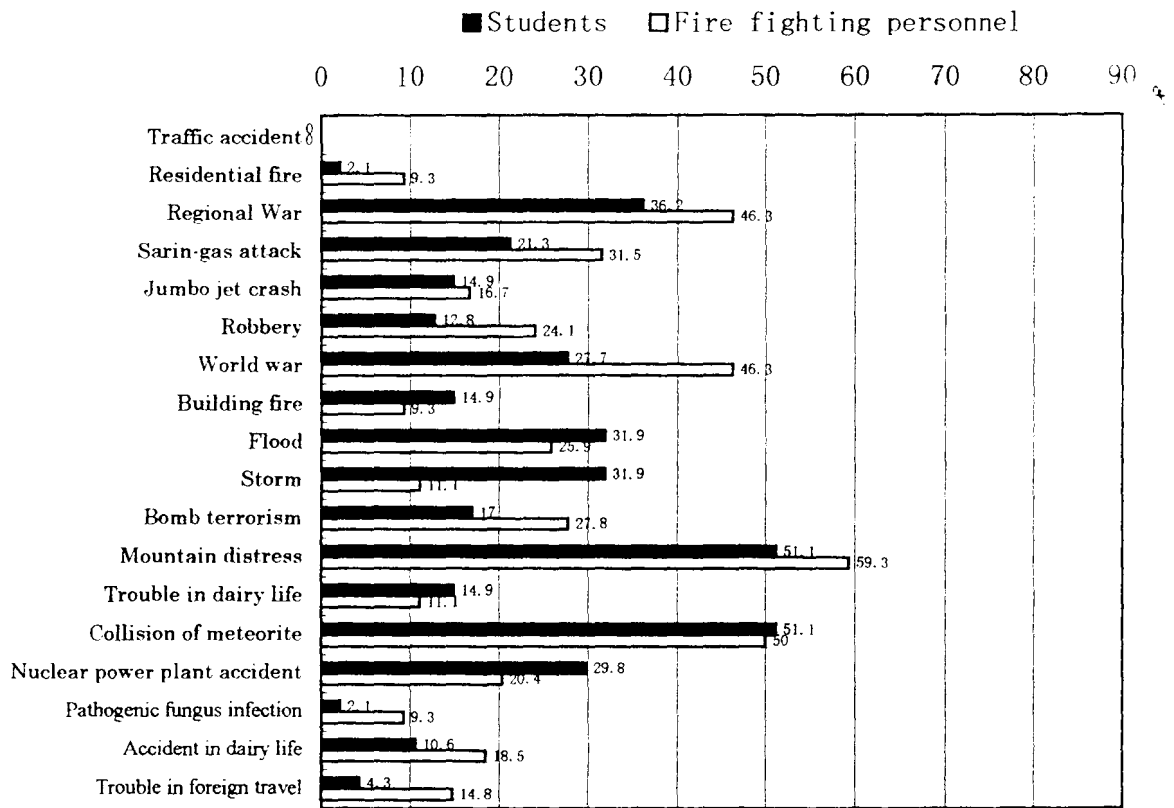


Fig.3 The possibility of death in disasters "There is no possibility."

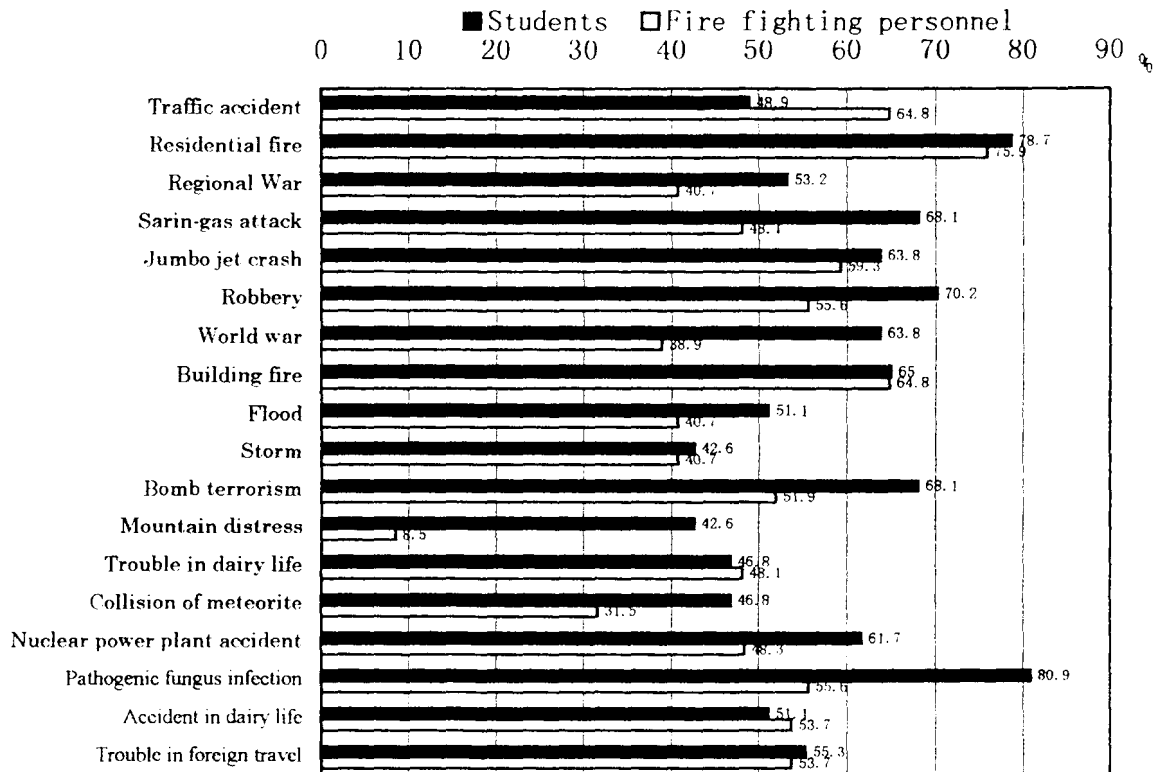


Fig.4 The possibility of death in disasters "Perhaps, there is some possibility."

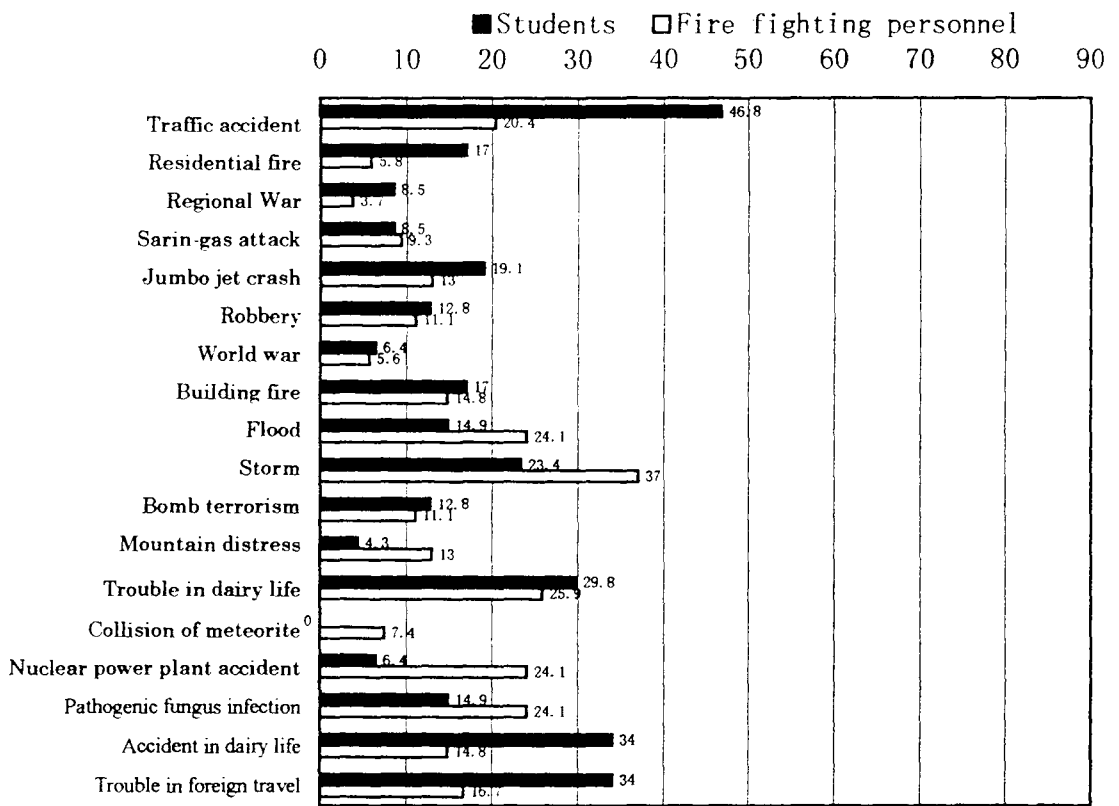


Fig.5 The possibility of death in disasters "There is some possibility."

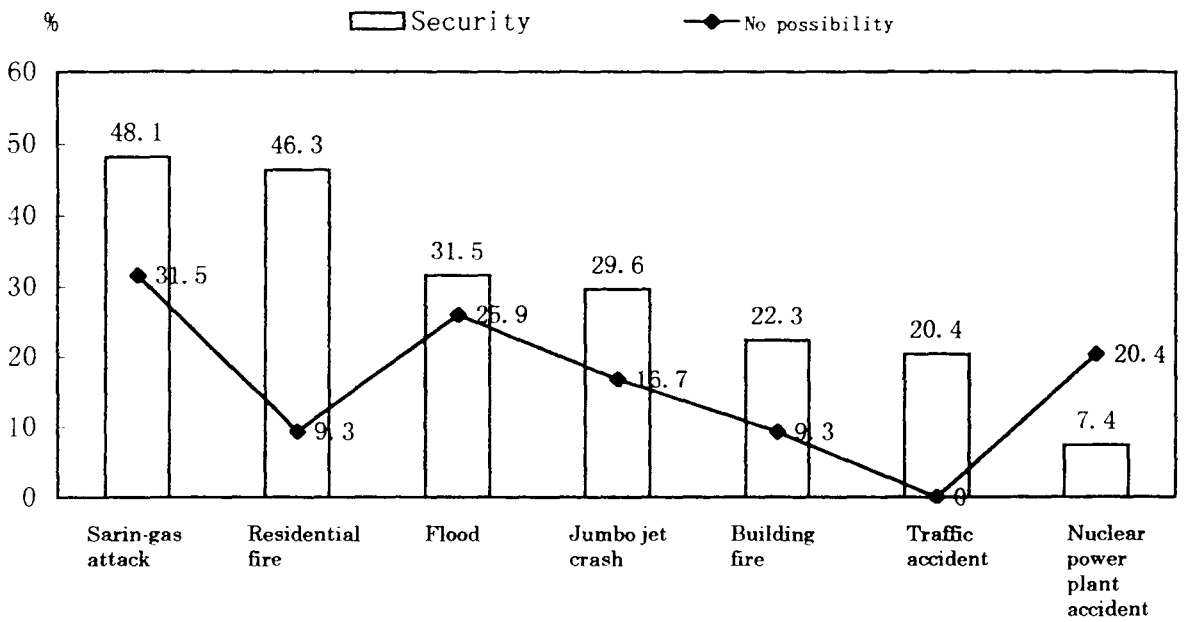


Fig.6 The relationship between security and the possibility of death in disasters on fire fighting personnel



## The earthquake disaster measures

Fig.7 shows measures from physical side against earthquakes they chose. Measures they chose were same till the third highest rank. They both thought much of “ the improvement of the crowding area of decrepit wooden houses,” “the widening of district roads” and “the extension of vacant lands and parks.” In the meantime, the students didn’t think much of “the establishment of earthquake-proof fire cisterns” in comparison with the fire fighting personnel.

Fig.8 shows measures from human side. “the early collection of information in disaster area” the students chose most was seventh in the fire fighting personnel. On the contrary, “the improvement of disaster prevention function in self-government association” the fire fighting personnel chose most was fifth in the students. From the fact, it was proved that there was quite different recognition about the measures from human side against earthquake between them.

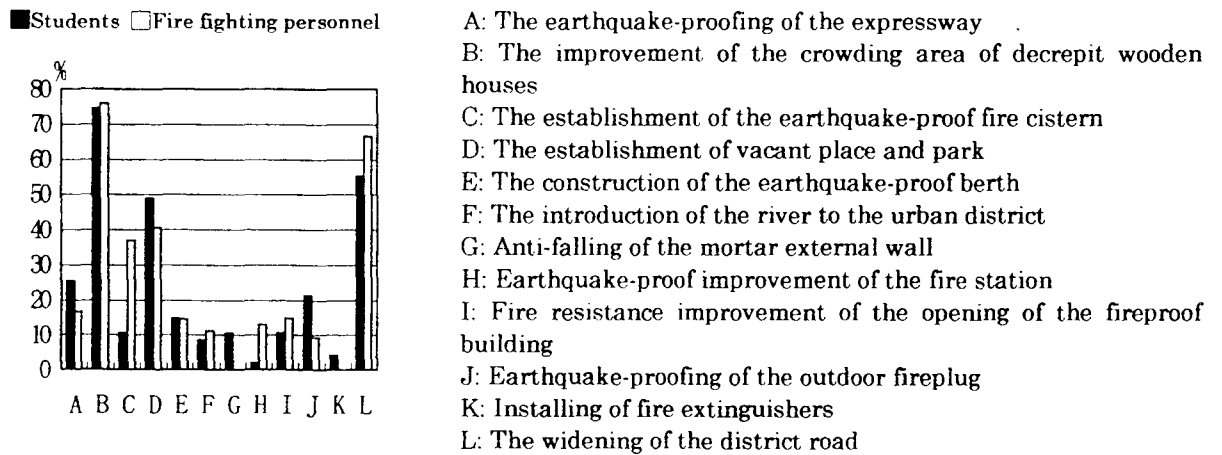
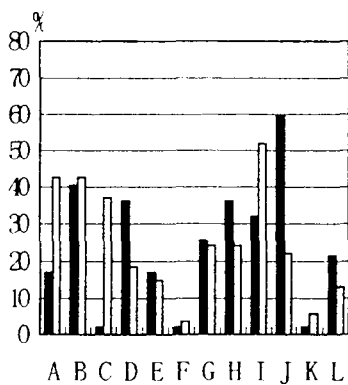


Fig.7 The earthquake disaster measures from physical side

■ Students □ Fire fighting personnel



- A: The education of the disaster prevention volunteer
- B: The education of the region community
- C: The increase of fire fighters
- D: The education of familiar people who have a knowledge of fire fighting or training
- E: The collection and utilization of neighborhood inhabitant information
- F: The establishment of the wide monitoring camera
- G: The fire fighting by helicopter
- H: The early response of Self-Defense Forces
- I: The improvement of disaster prevention function in self-government association
- J: The early collection of information in disaster area
- K: The utilization of monitor to process information
- L: The improvement of the rescue measure for elderly people

Fig.8 The earthquake disaster measures from human side

## CONCLUSION

Safety sense tended to relate to disasters which caused physical or wide-area damage. Security sense tended to relate to matters which caused personal damage such as crime and disease. The students had vague judgment and felt uneasy to various disasters in comparison with the fire fighting personnel. It is evident that how to grasp "safety" and "security" is influenced by their knowledges or experiences on disaster prevention. As a result, it was found that persons with less knowledges on disasters prevention felt uneasy about various disasters, which induces a cause of panic, and security was psychologically allocated among individual safety senses including healthy features. After that, we'll reconsider more proper examination items and the number, and examine the image of safety sense and security sense in buildings according to effective statistics treatment or psychological method. As a result, we want to suggest the methods to evaluate "the place where each social constituent member can have security sense" and utilize them for future disaster prevention design.

## REFERENCES

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