

## Responsibility of Social Cohesion for the Shelters Planning in Urban Residential Districts

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### Abstract

*There may be higher risk for people during disaster when they are enjoying the varieties of convenient services with urbanization trends. Especially during natural calamities, of which properties are unexpected and rapid, it is more serious for losses of life and property. The shelters in residential districts are the important location which the residents can immediately utilize for safety once natural disaster or emergencies happen. So basing on the common safety interests, there are some responsibilities of all the residents for shelters planning in urban residential districts, which can make shelters be adequately utilized and reduce the losses during disaster. Social cohesion will be needed to realize this objective, which is reflected by the following aspects: firstly making the residents participate in improvement of the shelters planning according to their actual needs; secondly ensuring the facilities in shelters can operate well and the rescue can be effectively utilized. In this paper, the role of social cohesion on shelters planning in urban residential districts, which also included the routing maintenances and improvements of the shelters, was studied by basing on disaster psychology and anthroposociology, and the case study was applied by the in-depth interview and questionnaires. It was found that the more effectiveness of the social cohesion in the shelters planning was bad, and the more roles of the shelters would be played during the disaster and simultaneously the losses could be possibly reduced. Therefore, the social cohesion is important one of the considerations in the shelters planning.*

**Key words:** social cohesion, urban residential districts, shelters planning

## 1 Introduction

The second world conference on disaster reduction (2005), held in Kobe, Hyogo, Japan, suggested that disaster prevention and mitigation in the cities should be paid our attentions, and especially the urban residential districts should be as the elementary unit for disaster mitigation( Li and Lu, 2009).Actually the larger potential risks have arose in modern urban residential districts during the natural calamities (such as earthquake and conflagration) because the high density of population resulted from the increasing density and height of the buildings in urban residential districts. As the vital components of the cities, urban residential districts daily accommodate the majority of population in the cities during some specific time (such as sack time), and there intensively contain amount of the public infrastructures (such as facilities used for electricity and natgas supplies). During the paroxysmal disasters this is prone to result in more casualties and the serious loss of properties compared with other areas, and even it causes serious secondary disasters. So the shelters planning in urban residential districts have become more important for the modern city, especially in China, compared with that in the last century.

However, less residents participated the shelters planning in their urban residential districts, and the most of the existing shelters were not periodically maintained after the construction or used for disaster prevention trainings. This may resulted in that the residents were not familiar with the shelters. After the analysis of the casualties during several earthquakes, it was found that the casualties during escaping to the shelters (such as green lands) were more serious than that caused directly by the disaster. During 5.12 earthquake (Wenchuan) in China, the victims directly put up the tents in street for the refuge, which delayed the arrival of the supplies and relief teams. In a survey for the unban planning (Liu, 2001), a resident said that it was not reasonable for the planning related to his surroundings solely made by whom did not live here. With the analysis (You, 2004) of 10 stricken areas in 9.12 earthquake (Taiwan), it was found that the residents tended to choose the shelters with the following characteristics: being near to their residences; familiar surroundings and neighbors, which made victims feel more belongingness and also contributed to mutual aid. Therefore, the daily life and familiar needs of the residents is the basis of shelters planning in urban residential districts.

Actually the shelters planning is a pattern of the resource allocation, and it is involved with the security interest of the residents. Marx (1956) said that people are fighting for everything to do with their interests. So it is necessary for the residents to participate in the planning, routine maintenances and use training of the shelters, which the social cohesion among the residents plays an important role in. Therefore, the social cohesion should be one of the main considerations for the shelters planning. The case study done by Li (2014) indicated that the level of the social cohesion could be influenced by the public space. However, until now few studies have been conducted to reveal the direct relationship between the social cohesion and the shelters planning in urban residential districts. In this study, the relationship of the social cohesion in the shelters planning was mainly analyzed, and a theoretical model of the shelters planning was proposed, which may further increase the utilization of the shelters during the outburst calamities in future.

## **2 Definition of concepts**

### **2.1 Social cohesion**

The term Social cohesion was first coined by Emile Durkheim in 1983 (Regina, 2000) that it was a characteristic of the social order, which was expressed by the interdependence, mutual loyalty and solidarity among members of society. Subsequently, it has various definition narrated by many scholars, and some governments and organizations have made many efforts for improving its level among their citizens or members. The Social cohesion is a tie among the members of society, and its level can be assessed by the following factors: social relationship, task relation, perceived unity and emotion (Forsyth, 2010). Actually except the expression of social cohesion mentioned above, there also include belongingness, inclusiveness, the participatory, recognition, legality, shared values, shared challenges, equal opportunities and so on.

### **2.2 Urban residential districts**

The residential districts are the areas with certain scale, which is divided by the roads or natural boundaries (such as rivers) in city and no main road is throughout, and there are the public greenbelts and the completed infrastructures which can meet the residents daily life. A residential district comprised of several housing clusters is a unit of the resident area. According to <Code of urban residential areas planning & design> (GB50180-93, 2002) in China, the scale of a resident district should range from 2,000 to 4,000 households (approximately 7,000-15,000 residents), and land-use area range from 10,000 to 36,000 square meters.

### **2.3 Calamities of residential districts**

The disasters mentioned in this study, which belongs to the urban disasters, likely occur in the residential districts and threaten the security of the residents life and properties. These are of natural and man-made disaster and mainly include earthquakes, floods, severe colds, typhoons, tsunamis, fires, epidemics and the secondary disasters potentially resulted in by them (Liu, 2006).

### **2.4 Shelter**

The shelters mentioned in this study, which solely referred to the emergency and temporary refuges rather than the municipal or provincial refuges, are the transitional places before the victims can be transferred to the larger public shelters together. (Design code for urban disasters emergency shelter-exposure draft, 2012, GB xxxxx-2012)

### **3 Research Objectives**

The objectives of this study were to (i) explore the roles of the social cohesion in the shelters planning. (ii) Highlight the participation of the residents in shelters planning in order to increase its utilization during the outburst calamities in future. (iii) Establish a theoretical model of the shelters planning oriented by the social cohesion.

### **4 Research methods**

A mixed method was design and applied in this study. Firstly, we identified the related literatures by searching the electronic databases of SCI, EI and CNKI, and the following keywords were used in various combinations: social cohesion , residential districts , or shelters planning. To obtain the real needs of the residents, we respectively made the in-depth interviews with 20 persons from the different resident districts, who are the residents, members of the neighborhood committees, or staffs from the property management companies. Every interview was randomly carried out for approximately half an hour, and the contents of the conversation were not limited before. Finally, the factors selected form the related studies were combined with the topics frequently mentioned in the interviews to design a questionnaire and a total of 200 questionnaires were online distributed.

### **5 Results and discussion**

The serious losses of life and property were always caused because the calamities unpredictably and rapidly happened. The comprehensive measures for the disaster protection is one of effective methods to minimize the losses. A shelter in the residential districts is one of the important locations used for the disaster protection, so it is necessary for the immediate and efficient utilization of the shelters during the unexpected disasters, which is directly related to its planning. In this study, whether the social cohesion as one of the considerations is necessary for the shelters planning was investigated, and a theoretical model of the shelters planning oriented by the social cohesion was tried to established, which may be helpful to the related researches and planning.

#### **5.1 Baseline of case study**

A total of 200 questionnaires were online distributed, and 158 valid questionnaires were identified for the subsequent analysis. The baseline characteristics of case study were provided in Table 1. Briefly, all the respondents were from Chinese mainland and randomly selected without age, gender or education background limits.

Table1. The Baseline Characteristics of Case Study

Type	Data
Gender	Male to female ratio 3:5
Age	Under18:1.90%; 19-30:58.23%; 31-50:37.97%; 50-70:1.90%; Above70: 0%
City	About 39 different cities dotted about the country
Residence type	12-30F:20.89%; 7-11F:9.49%; 4-6F:55.70%; the rest:13.92%
Housing ownership	Rent:29.11%; Own:70.89%

### 5.2 Importance of the shelters in resident districts

The various disasters can happen anywhere at any time. More than 70% of the respondents in this survey indicated that they or their friends suffered the disasters (Fig.1). The residential districts are the important one of the functional units in city and are the areas with the dense population. The population mobility in the residential districts always focuses on the special time in daily life. In our surveys, it was found that 74% of the respondents stayed in their home at night and only 7% for all day (Fig.2: a). Simultaneously, the plot ratio are gradually increasing with the increase of population density, which resulted in the reduction of their safe distances. The secondary disasters (such as Stampede) are more easily resulted from the above factors when many panic residents with simultaneously escape for the refuge in the crowded spaces during the disaster. The shelters in resident districts are generally planned as the preferred emergency refuge for the residents during the disasters, and its reasonable planning can partly mitigate the losses and above risks, which is also conducive to the rescues and reconstruction after the disasters.

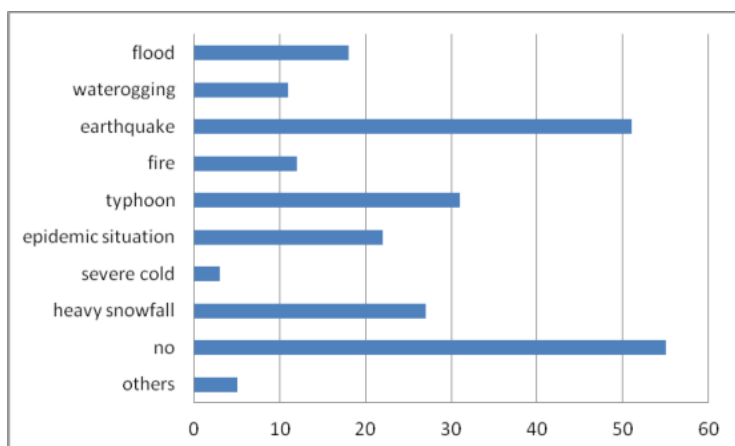


Figure1. Whether Personally Experienced, or Relatives and Friends Have Experienced the Following Disasters? (multiple choice)

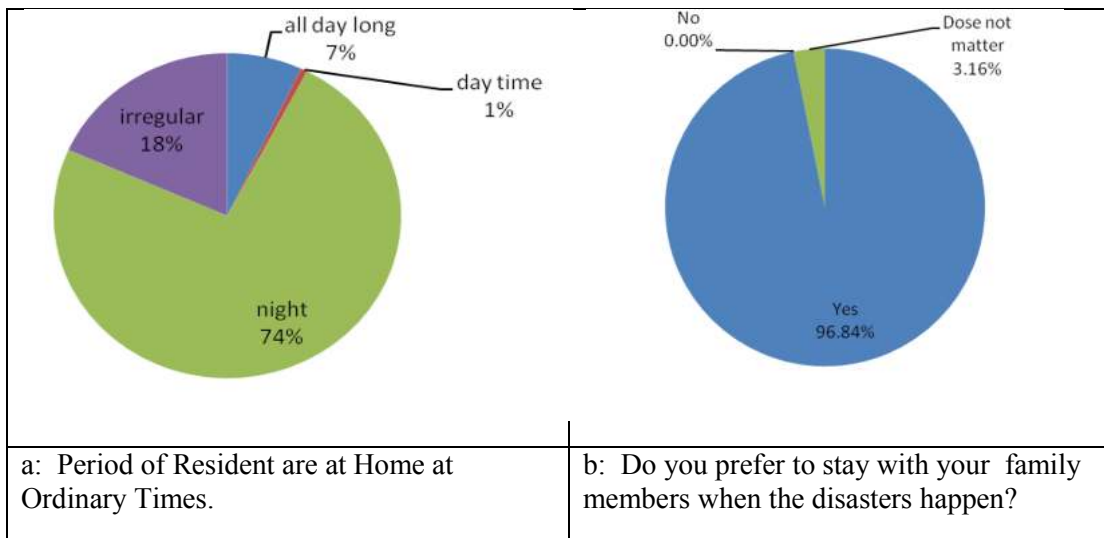


Figure 2. The Relationship between Residents with Family and Family members.

### 5.3 Existing shelters and awareness of disaster prevention in urban residential districts

The public spaces (such as shelters) in the resident areas, which are the important parts of the urban public spaces, are closely related to residents daily life. However, actually the other urban public spaces were always paid more attention than them, and the resident areas especially resident districts were mistaken for the relatively safe locations. So far, the follow-up of many existing shelters, including the construction, rationality of their utilities, maintenances, improvements of their functions and so on, was infrequently concerned by their planners after accomplishments of their planning.

In this survey, many residents had been trained on the disaster prevention, but nearly a half of the respondents did not know where the shelters were in their resident districts, suggesting that the residents were not familiar with the shelters. 29.41% of the respondents indicated that they were not satisfied with the shelters planning and 21.52% were satisfied(Fig.3); simultaneously, during disaster 68.35% of the respondents intended to refuge in the opened areas outside the resident districts, and 25.95% chose the square in the resident districts for the refuge(Fig.4). In addition, the streets were also chosen by a few respondents for the refuge, which may hamper the recues and evacuations during the disaster. This suggested that the shelters were not regarded as the reliable refuges. If the resident districts were dissatisfied, 44.3%, 17.72% and 8.23% respectively chose to suggest property management companies, neighborhood committees or governments for it, and 7.59% chose to move and 22.15% did not know who should be in charge of it (Fig.5). This indicated that there was not a very definite way for the residents participation in the affairs (such as the affaires related to the sa of the resident districts).

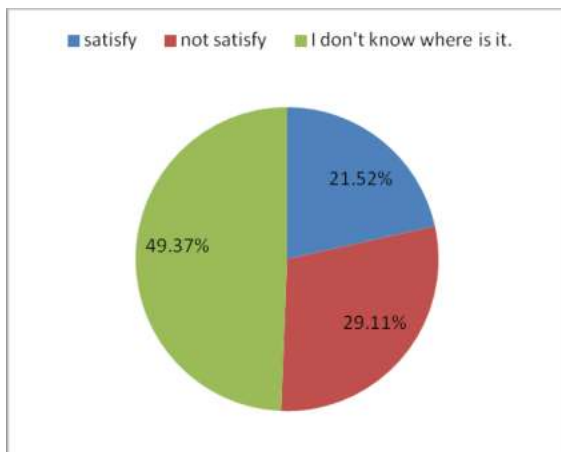


Figure3. Do you satisfied with the present residential area shelter?

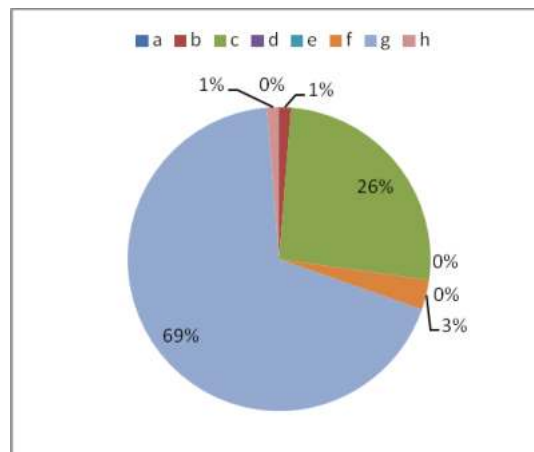


Figure4. Which one do you select as a shelter when a disaster occurs?

Figure legends: a: at home; b: Residential roads ; c: Residential square ; d: Community nursery ; e: Cell door ; f: Road outside the residential ; g: Opened areas outside the resident districts ; h: Else.

#### 5.4 Social cohesion should be as one of the considerations in the shelters planning

The formation of the social cohesion is affected by the complex and diverse factors, which include kinship, traditional or national concepts, class status, social mentality based on the consistency of the realistic interests and so on. For instance, it was founded from this survey that 98.84% of the respondents indicated that they prefer to stay with their family members when the disasters happen (Fig.2:b). In this study, for the concretely reflecting the levels of the social cohesion in the resident districts, it was artificially and simplistically defined and assessed with the following factors in the resident district: the degree of familiarity among the residents, the frequencies and effects of the collective activities, the degree of residents satisfaction for the public spaces, the utilization rate of the public spaces and so on.

In this survey, more than 60% of the respondents, whose age group was from 50 to 70 or less than 18 years old, were familiar with the other residents in their resident districts, but it was less than 10% of the respondents whose age group was from 19 to 50 for it (Fig.6); correspondingly, more than half the respondents indicated that there was never any collective activity held in their resident districts (Fig.7 ). Simultaneously, 46.84% of the respondents had been trained on the disaster prevention and most of the training place were their school or work units rather than resident districts, and the proportions of the respondents trained decreased with age (Fig.8). This may be used to explain that nearly a half of the respondents did not know where the shelters were in their resident districts (Fig.3), and it could result in that the utility rate of the shelters would be low during the disasters. Similarly, the respondents who were the homeowners were more familiar with the other residents and more satisfied with the shelters than the tenants in their resident districts (Fig.9 & Fig.10). The potential utility rate of the shelters is closely related to residents familiarity with them, so the social cohesion will also affect it and should be considered in the shelters planning.

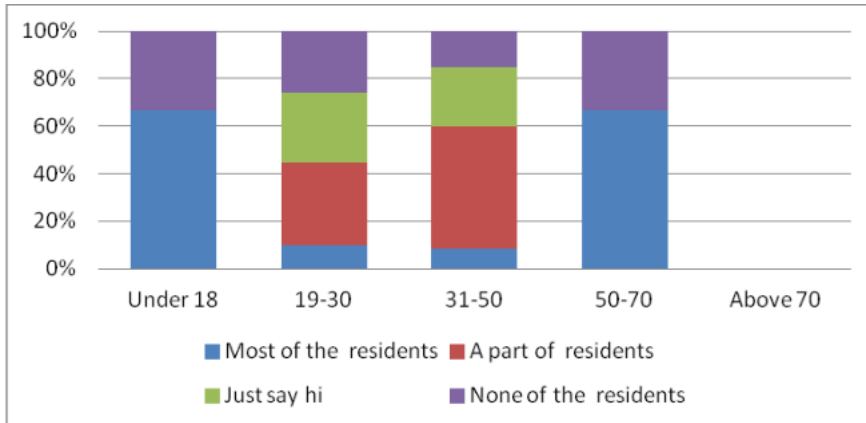


Figure 6. Are you familiar with the other residents in the resident districts?

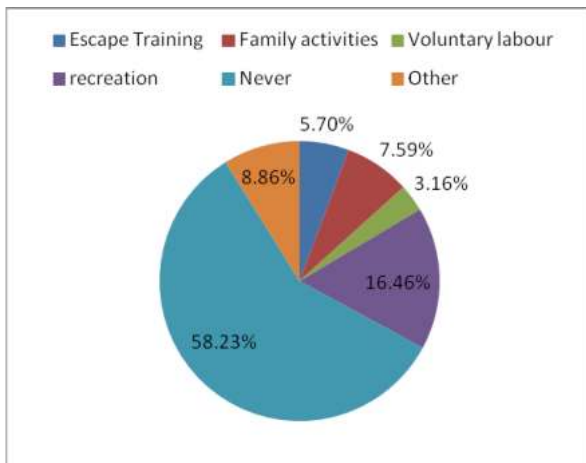


Figure7. Is there any collective activity held in your resident districts

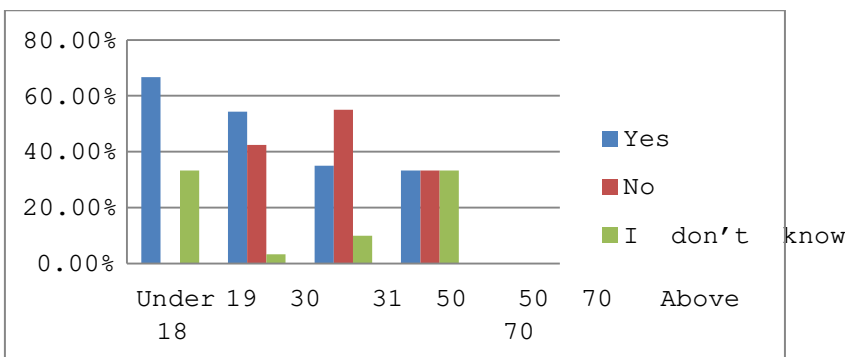


Figure8. Have you attend the survival training course?

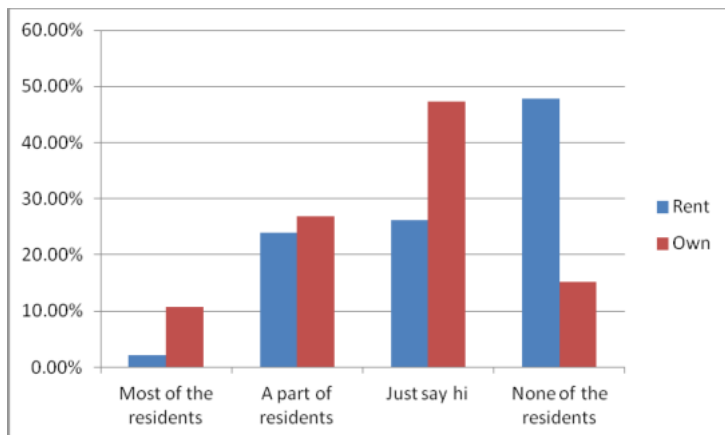


Figure9. Do you familiar with the other residents?

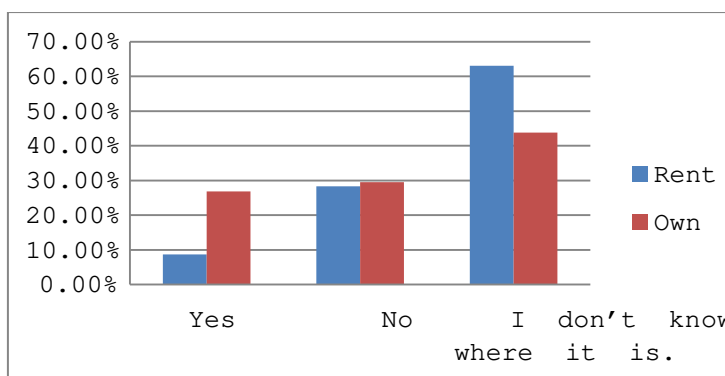
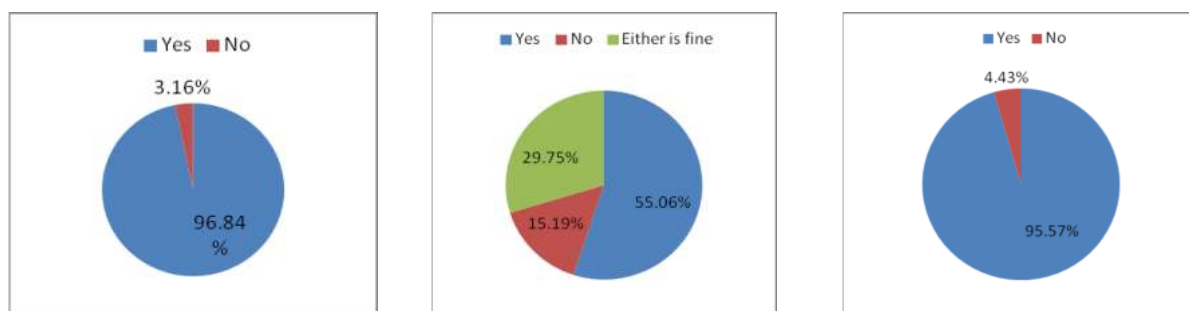


Figure10. Are you satisfied with the shelters?

The shelters in the resident districts are planned for and will be mainly utilized by the residents, so it is rational to consider their needs in the shelters planning. The function conservation of the shelters can successfully be realized in daily life and disasters when the planning meets the needs of the residents, which is impossible without the residents opinions. 95.76% of the respondents would participate in the shelters planning if possible (Fig.11: a). However, it was learned from the in-depth interviews that it was always one-way for the communication between the residents and the managers in the resident districts. The manager generally told the residents what or how they should do rather than comprehended their thoughts or real needs, and the resident seemed to be used to that rather than actively gave their advices. This is consistent with the survey results obtained by Ma (2011). So the enthusiasm of the residents participation weakened by the management mechanism of the resident districts, which could also affect their participation in the following-up maintenances and improvements of the shelters after the constructions. In fact, the effective utilization of the shelters during the disasters is dependent on its following-up maintenances, and the functions of the shelters will be improved with constantly considering and comprehending the needs or habits of the residents in its maintenances. The effective utility of the shelters is related to residents participation in its following-up maintenances, so the social cohesion be certainly considered in the shelters planning.

In addition, if the stir-and mutual-rescue can be firstly done among the residents before the rescue teams arrival as soon as the disasters occur, the losses will be generally reduced at a great degree. The shelters in resident districts are generally planned as the preferred emergency refuge for this, so the degree of the stir-and mutual-rescue, which the social cohesion plays an important role in, was closely related to the utility rate of the shelters during the disasters. In this survey, more than half of the respondents indicated they would need the helps from others during the disasters (Fig.11: b), and more than 90% of the respondents would like to help others if possible (Fig. 11: c). This suggested that the social cohesion is important one of the considerations in the shelters planning.



a. Would you like to participate in the shelters planning if possible?

b. Do you need the helps from others during the disasters ?

c. Would you like to help others during the disasters if possible?

Figure 11: The social cohesion of residents in the disaster.

The density and height of the buildings are gradually increasing with the increase of population density. Although a certain scale of the land are used as the shelters in the resident districts, but with basing on the considerations for the economics and utilization rate of the land, it is impossible to increase their areas without the limitation. So it is necessary to effectively utilize the shelters with the limited spaces during the disasters, which is partly dependent on the participation of its non-planner contributed by the social cohesion. Simultaneously, the various functions of the shelters need to be accepted and embodied by their utilizations among the residents in daily life or disasters, and these are gradually improved with constantly meeting the residents needs. Therefore, the social cohesion should be considered as an important factor related to the utilization, maintenances and improvements of the shelters in the planning.

### 5.5 How to realize the shelters planning oriented by social cohesion

In this survey, the proportions of the respondents trained in the disaster prevention decreased with age (Fig.8), suggesting that the training had been increasingly paid more attentions. Simultaneously, none of the respondents trained would choose the elevators to escape during the disasters. This suggested that the effect of the training was yielded and the psychological fore-warning system on residents trained had been gradually constructed. The shelters in resident districts are generally planned as the

preferred emergency refuge for the stir-and mutual-rescue of the residents, and the participations of its non-planner (such as disaster prevention trainings), which is contributed by the social cohesion, certainly affect its utilization rate. So it is necessary to consider the residents needs in planning, and these needs are related to the following aspects: age and physical condition of the residents (such as the aged or disable), the locations of the shelters (which is necessary to whether the residents can arrive as soon as the disaster occur and whether it is convenient for the residents in daily life), appropriate functions (such as the differences of the infrastructures between south and north) and so on.

The potential real needs should be collected and summarized with basing on the interests of the majority, and these needs will be combined with other factors and realized in a rational degree by the shelter planner. Subsequently, after the shelters construction the planners should always learn their utilization rate and maintenances from the residents, and the various functions of the shelters will be further optimized according to the reasonable and necessary needs. In other words, the shelters planning in the resident districts should be based on the life experiences of the residents, and it is combined with the professional acknowledges of the planners to be realized. During the above process, the enthusiasm of the non-planners participation is important for the comprehension of their real needs, which is contributed by the social cohesion. In addition, the previous studies done by Guo (2013), Bowers (1996) and Olden-burg(1989) showed that the effective utilizations of the public spaces including the shelters in the resident districts or communities played an important role in and were contributed to the formation of the social cohesion. This means that there are the interactions between the social cohesion and shelters planning in the resident districts. So the shelters should be planned as the public spaces which can allow and attract most of the residents usually participate the group activities in daily life. This can not only promote the residents familiarity with the shelters, but be contributed to the familiarity among the residents, which are important to the utilization, maintenances and improvements of the shelters.

With basing on the results of the above survey and study, a theoretical model of the shelters planning in resident districts oriented by the social cohesion was proposed as the following: the residents participations in the shelter planning embody their needs to enhance their sense of belonging; The high degree of familiarity with the shelters for the residents can increase their utilization rate, and the frequent collective activities in the resident districts can promote the formation of the social cohesion; the social cohesion including the residents sense of belonging is contributed improvements of the shelters; the effective utilization of the shelters is important to the immediate stir-and mutual-rescue as soon as the disasters occur, which can generally reduce the losses at a great degree. Therefore, the more effectiveness of the social cohesion in the shelters planning was had, and the more roles of the shelters would be played during the disaster and simultaneously the losses could be reduced.

## 5.6 Limitation

There were certainly several limitations in this study. Firstly, there the biases of the amount of the different classified respondents, which was resulted from the limited total number of the respondents, and this may resulted in the deviations in the analysis results; Secondly, the current roles of the social cohesion in the shelters planning were only investigated, but the roles were not compared with that in the past for the further confirmation; Thirdly, the relationship between the social cohesion and the

shelters planning was only studied by univariate analysis and the multivariate analysis was not applied. Therefore, a detailed and well-designed study should be performed to further confirm our results.

## 6 Conclusion

In conclusion, our study does support that the social cohesion plays important roles in the planning, maintenances and improvements of the shelters in resident districts, and it should be as important one of the considerations in the shelters planning. The conclusions and recommendations are summarized as follows: the social cohesion is contributed to arouse the enthusiasm of the residents participat the planning, maintenances and improvements of the shelters in daily life, and the group activities in the resident districts (such as disaster prevention trainings) should be frequently held; During the disasters the stir-and mutual-rescue to reduce the losses relays on the effective utilization of the shelters, which the social cohesion also promote; The more effectiveness of the social cohesion in the shelters planning was had, and the more roles of the shelters would be played during the disaster and simultaneously smaller losses may be.

## 7 Acknowledgement

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