

Urban Safety Planning and Design Based on GIS Technology

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Abstract: The urban public security system is composed of three different levels: management system, operation mechanism and technology platform. The technology platform plays a basic and supporting role in the whole system. Based on the platform of Geographic Information System (GIS) and Integrated Decision Support System (DSS), this paper studies and develops a "GIS-based Urban Public Security Emergency Decision Support System". It analyses the drawbacks of the current urban public security decision-making model, and introduces the structure framework of the system and the functions of each subsystem. A technical solution for constructing the urban basic space database quickly and efficiently is proposed, and the fusion mechanism between the system and the urban public security system is discussed. From the perspective of urban planning profession, it puts forward opinions on the problems existing in the preparation work, and analyzes the reasons for the formation of these problems. Finally, from the perspective of urban planning, this paper puts forward that the urban public safety planning is the process design. At the same time, combined with the current urban planning work, the paper puts forward the strategy of implementing urban public safety planning.

1. Introduction

With the continuous progress of urbanization, the expansion of population and the increasing use of urban land, the existing urban infrastructure can not adapt to the current urban development, which reduces the accessibility and convenience of the city. GIS includes basic information subsystem, disaster information subsystem, hazard source management subsystem, fire analysis subsystem, flood analysis subsystem, earthquake analysis subsystem, wind disaster analysis subsystem, urban safety planning subsystem, emergency decision subsystem and system control module [1]. Urban living environment needs to avoid danger and achieve safety. The safety issues include many aspects such as fire prevention, earthquake prevention, flood prevention, air defense, traffic safety, evacuation passage, safety lighting, safe entrance and exit, dangerous signal and alarm system and emergency rescue facilities. Urban security is the most important social demand of mankind. Since the emergence of human society, various natural and man-made disasters have always been accompanied by human history [2]. Since the emergence of the concept of the state in history, the state has begun to assume the responsibility of organizing the people to prevent and resist various disasters.

The residential area consists of two major parts: residential buildings and outdoor spaces. The residential area is an important part of the city. The safety construction of the residential area is related to the safety of residents' lives and property and the stability of the city. It is of great significance to the safety of the city [3]. With the sustained and rapid development of China's social economy, social contradictions and unbalanced and intensified social problems are not problems that can be solved in a short period of time. Faced with the increasingly serious trend of urban residential safety and security, we cannot evade, but should mobilize the power of the whole society and actively seek solutions to the problem [4]. The urban safety management is relatively backward, and the imperfect legal system, management system, emergency mechanism and safety planning of urban safety pose a direct threat to the urban safety of modern cities [5]. With the progress of urban informatization and the continuous development of Internet technology, the massive urban cloud data based on network will provide strong decision support for urban planning. Geographic Information System (GIS) came into being under the background of large network data [6-7].

2. Methodology

The first few minutes after an emergency is the most critical moment. Whether prompt and effective response action can be taken during this period will determine whether the whole situation can be controlled and whether damage can be mitigated [8]. The realization of the above-mentioned functions of urban safety system needs the support of technical means, and the advancement of technical means is directly related to the effect of disaster, accident and incident prevention and control. Therefore, efforts should be made to build a technical platform for urban safety [9]. In the process of investigation, all the respondents were randomly selected without any tendency. They tried to understand the thoughts and needs of all kinds of residents and chatted with most of the respondents in order to find out their real intention in casual conversation, not just at the level of a questionnaire. At present, China lacks systematic research on the safety and security of residential environment in the field of planning and architectural design, which has attracted the attention of professionals. However, the research on the safety of residential environment is still in the exploration stage. In the field of planning and design, the research on the safety of residential environment will have a wide application value for the planning and design of domestic living environment.

Regarding the formulation of “urban security“ in urban urban security planning, China is more semantically inclined to prevent natural disasters than human factors such as social security, and so is practice. With the rapid development of Internet information technology, network big data is getting more and more attention from all walks of life. Internet-based big data has made great innovations in the fields of business analysis, management science, computer science and statistical science [10]. The main reason for the lack of information in the current emergency decision-making mode is the misunderstanding of disaster space. Disaster space includes not only the physical space such as the spatial distribution of disaster sources, the real environment, the key facilities and emergency rescue forces, but also the non-physical factors in the social and economic fields. In China, the application of GIS develops rapidly, and has been applied in urban planning, environmental monitoring, fire fighting and natural disaster management. However, because the study of urban safety system is still in its infancy in China, the importance and Prospect of GIS application in this field have not been fully recognized.

Scheduling is virtually impossible unless the work breakdown structure is arranged. Figure 1 shows an example of defining four levels. Start with the first deliverable top-level project, then use the outline hierarchy diagram to further divide it into sub-parts. It is one of the most important outputs in the planning process because it explicitly guides the scheduling of the project through the formation and grouping of work tasks.

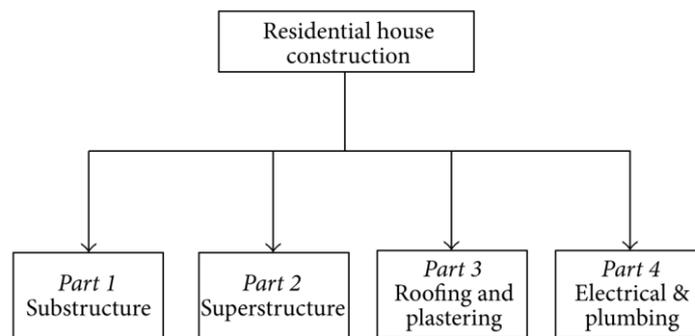


Fig.1. Work breakdown structure of urban residential buildings

In the community environment, when the outdoor environment is shared and shared, the “big pot” management mode will inevitably cause residents to over-occupy public space and privatize public space. The privatization of outdoor space will destroy the fairness of the settlement. Sharing, resulting in inequality of residents. At present, many small high-rise residential buildings in the city, under the premise of reasonable functions, break the dull and lacking determinant layout of residential buildings. By adopting the layout of high and low, point and face, the different wall

colors and Texture to enhance recognizability. Residents live in a specific environment, pursue their own needs, and try to adapt to the surrounding environment, climate, landform, ecology, natural resources and other aspects of the differences, forming a different way of life, but also a different architectural pattern. From a large point of view, the research scope of urban safety includes not only management, law, but also science and engineering. From the point of view of urban safety planning itself, the scholars in the research field are not only safety science and technology disciplines, but also urban planning professionals.

3. Result Analysis and Discussion

GIS is a special and important spatial information system. Supported by computer hardware and software systems, it is a collection, storage, management, operation, analysis, display and technical system for geographic distribution data in the whole or part of the earth's surface (including the atmosphere) space. It is a computer system for effective management and analysis of geographical data. DSS is a computer application system that assists decision makers to make semi-structured or unstructured decisions by means of human-computer interaction through data, models and knowledge. The GIS-based urban public safety technology platform can establish a reliable interconnection between the integrated system of the city layer and the departmental layer subsystem through the integration with the network technology, and improve the efficiency of resource allocation. Residents in the daily neighborhood communication, the higher the familiarity, the higher the privacy requirements for outdoor activities. When the familiarity is reduced, the residents are complex and the population mobility is increased. Therefore, residents hope to enhance the visual surveillance of the outdoor public space. To get a sense of security.

According to the statistics of safety accidents occurring in urban communities, cases of safety accidents in residential areas are classified according to the type of accidents. The types of safety accidents in urban residential areas are shown in Table 1 and Figure 2 below.

Table 1 Statistics on types of safety accidents in urban residential areas

Type of accident	Number of accidents	Proportion(%)
Security incident	347	78.36
Fire	189	28.17

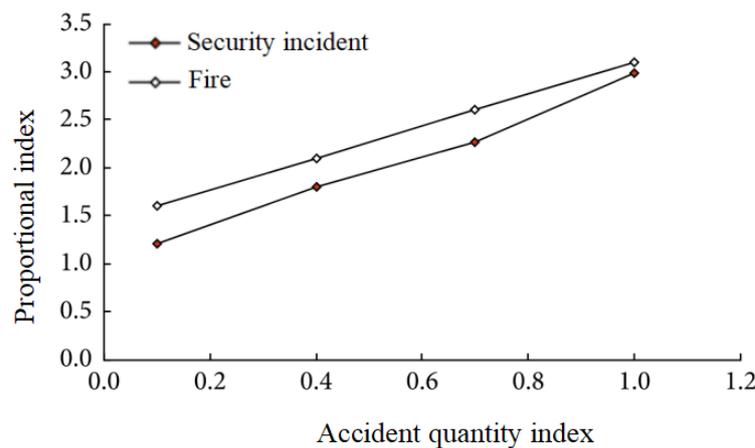


Fig.2. Statistics on types of safety accidents in urban residential areas

Residential building group combinations can take a variety of different forms, but studies have shown that groups of houses are more freely loose or determinantly arranged, which can inspire residents' sense of belonging. Residents are more closed than open spaces. The outward-looking space is more secure and domain-like. The novelty of the shape-oriented building is inconsistent with the current building codes and structural safety regulations. There are certain risks. There are many unknown factors in the design and construction, so the early safety argument is very necessary. Urban planning is the basic basis for the construction and management of cities, the

premise and basis for ensuring the rational construction of cities and the rational development and utilization of urban land and their normal operation activities, and the comprehensive means for realizing the social and economic development goals of cities. At present, the traditional relational database of GIS has been unable to meet the requirements of mass data management, high concurrent reading and writing, and multi-scalability. Applying large network data to GIS system can solve the above bottleneck.

Traditional GIS is still limited to basic functions such as acquisition, storage, query and mapping, and lacks effective support for complex spatial problems. Therefore, the establishment and improvement of multi-functional technology platform based on GIS can greatly improve the level of urban public security and effectively respond to various security challenges facing today's cities. In the survey, parents of children think that natural surveillance of public space is very important. It is precisely because of the lack of visual surveillance of community outdoor space, they dare not let children play freely without parental care, so they can only keep their children at home, which is a helpless move. In many cases, if you want the building to be a sign, the structural safety may be relegated to the second place. Therefore, for architects and engineers, although advocating design innovation, they oppose too much formal fuss, and Security must be added. The layout of urban open spaces and the planning of integrated disaster avoidance facilities are the material conditions for the construction of the entire public safety system. Only urban planners can conduct preliminary research and comprehensive analysis of these information, and finally determine the planning content.

4. Conclusions

At present, the work of urban public safety planning in China has just begun, and there are various problems in theoretical research and practical work. The theoretical research on urban public safety planning is immature, especially in the urban planning field, there are still some misunderstandings about urban public safety planning. Through the integration of GIS and decision support system, the "GIS-based urban public safety emergency decision support system" was developed to realize the computer storage and management of the basic data and disaster data of urban public safety. The construction of technology platform supported by GIS and database management system is the objective requirement of urban public security, and the realization of its functions requires certain conditions. The advanced system composed of certain elements and specific structural forms is the sufficient and necessary condition to realize its functions. With the increasing attention of the international community to urban security issues and the existing research foundation, China's urban security construction will be improved and developed comprehensively and rapidly, and China's construction will usher in a new era of security.

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