



# Research and Practice on Standardization of Community Integrated Disaster Reduction in Shenzhen

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**Abstract.** Shenzhen Local standard DB4403/T 253-2022 “Guidelines for Community Creation of Comprehensive Disaster Reduction” were officially implemented on September 1, 2022. The standard makes clear requirements for the community to carry out comprehensive disaster reduction work within the scope of Shenzhen, standardizes the creation content of 33 sub-categories in 7 categories, including organization and management, team construction, risk management, preparation and drill of plan, emergency support, publicity and education, and construction of highlights, and 13 basic work requirements. 80 assessment indicators were detailed and 100 points were set, which effectively promoted the standardization and construction of the system and mechanism of comprehensive disaster reduction at the grassroots level in Shenzhen.

**Keywords:** comprehensive disaster reduction · community risk assessment · hidden danger management

## 1 Introduction

With the continuous development of human society, the contradictions between resources, environment, population and human beings themselves also emerge in an endless stream, and the global warming continues to intensify, leading to the frequent occurrence of natural disasters, which has a great impact on human production and life [1, 2]. The vertical disaster prevention and reduction work of a single disaster has exposed many deficiencies in the system, law, mechanism, rescue and relief, and information transmission, which cannot meet the requirements of frequent disasters [3].

The international community has long promoted the construction of “safe communities” and the research and practice of community-centered comprehensive disaster reduction capacity building. Since 2004, China has begun to explore ways to improve disaster reduction capacity based on communities, and launched a nationwide campaign of “disaster reduction into communities”. In 2007, the 11th five-year National Plan for Comprehensive Disaster Reduction was promulgated, setting the goal of “building 1,000

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demonstration communities for comprehensive disaster reduction”, and the demonstration model for comprehensive disaster reduction began to be formally implemented. After nearly ten years of development, China has more than 10,000 demonstration communities for comprehensive disaster reduction. The construction of comprehensive disaster reduction demonstration communities is a landmark activity and an important feature of the construction of disaster prevention and reduction capacity of Chinese grassroots communities. It greatly promotes the improvement of residents’ awareness of disaster reduction and skills of disaster avoidance and self-rescue, arouses the enthusiasm of grassroots communities for disaster prevention and reduction, expands the participation of all sectors of society, and plays a significant role in the construction of a benign and sustainable community disaster reduction model. At present, China is still in an important period of change, the emergency management system has not been straightened out, the grass-roots emergency management system has not been perfect. In the comprehensive disaster reduction work, the implementation logic and strategy selection of the main body of grass-roots action should be discussed, and the dynamic management of “national comprehensive disaster reduction demonstration community” should be taken as the entry point to effectively promote the reform of grass-roots emergency management system and improve the effect of grass-roots emergency management. In China, comprehensive disaster prevention and reduction is still in its infancy. As a research work integrating theory and practice, only some provinces and cities have established a relatively complete comprehensive disaster prevention and reduction system at present, and most provinces and cities are still in the exploration and improvement stage of comprehensive disaster prevention and reduction system [4–6].

As the basic unit of society, community is the direct bearing unit of disaster and the “first responder” of disaster management [7]. In the current disaster management model of single disaster species, departments are divided, local areas are divided, and the natural relationship among disaster species is not taken into account. As a result, resources are wasted and offset exists, which cannot meet the needs of disaster reduction in the new situation [8]. Integrated disaster prevention and reduction is an all-dimensional, whole-process, systematic and integrated project, which is oriented towards multiple disasters and disaster chains. As one of the hot research issues in the current disaster management circle, various engineering and non-engineering disaster reduction measures and ways can be adopted to give full play to the comprehensive benefits and joint role of social disaster reduction ability, which can reduce the loss and impact of disaster to the greatest extent. Therefore, based on the advanced theory and practice of comprehensive disaster prevention and reduction in the world as well as the current situation and national needs of China’s disaster prevention and reduction, it will be of great use and urgent to carry out research on comprehensive disaster prevention and reduction [9–11].

## **2 Background and Significance of Standard Formulation**

In June 2020, the National Commission for Disaster Reduction issued and implemented the Measures for the Management of the Establishment of National Demonstration Communities for Comprehensive Disaster Reduction, in order to coordinate the establishment of national demonstration communities for comprehensive disaster reduction, do a good

job in the work of urban and rural communities for comprehensive disaster reduction, and strengthen the people's defense line for disaster prevention and relief. In July 2020, in order to further promote the standardized construction of disaster prevention, mitigation and relief capacity of administrative villages (communities) and further improve the emergency response capacity at the grass-roots level, Guangdong Province carried out the construction of "ten capabilities" of disaster prevention, mitigation and relief capacity of administrative villages (communities), aiming at the weak links and existing weaknesses of administrative villages (communities). In March 2021, Shenzhen issued and implemented the Implementation Plan for Shenzhen's Comprehensive Disaster Reduction Community (2021–2023) based on the prominent problems and weak links in the reform of the current system and mechanism of disaster prevention and relief at the grassroots level.

As a coastal city in southern China, Shenzhen has special natural conditions and geographical environment. It not only faces the disaster risks of rainstorm, earthquake and other inland cities, but also faces the disaster risks of typhoon, tsunami and other coastal cities. Therefore, strengthening urban disaster prevention and mitigation is an urgent need to reduce disaster risk and reduce disaster losses, and is an important measure to improve the level of government public services. As the basic unit of urban management, community is not only the foothold of each work, but also the focus of each work. Therefore, in order to comprehensively promote the work of community comprehensive disaster reduction and improve the comprehensive capacity of community disaster prevention and reduction, Shenzhen issued the local standard DB4403/T 253-2022 "Guidelines for the Establishment of Community Comprehensive disaster Reduction" on September 1, 2022, in order to standardize the establishment of community comprehensive disaster reduction at grassroots level.

### **3 The Main Technical Content of the Standard**

#### **3.1 Scope**

The standards are formulated in accordance with the principles of scientific, local, normative and operable, and stipulate the basic conditions, organization and management, team construction, risk management, preparation and drill of plans, emergency support, publicity and education for the establishment of comprehensive disaster reduction communities. They are applicable to guiding all communities in Shenzhen to carry out the establishment of comprehensive disaster reduction communities. It also provides reference for cities across the country to promote the establishment of comprehensive disaster reduction communities.

#### **3.2 Terms and Definitions**

The standard clearly defines disaster prevention, mitigation, disaster relief, integrated mitigation, disaster information officer, etc. Disaster prevention refers to taking a series of measures to prevent the occurrence of disasters or prevent casualties, property losses and social and environmental impacts caused by disasters before they occur. Disaster

reduction means that at all stages of disaster management, a series of measures are taken to reduce the loss of life, property damage and social and environmental impacts caused by disasters. Disaster relief refers to a series of disaster relief work carried out after the disaster, such as disaster investigation and assessment, the material allocation, transfer and resettlement, living and medical assistance, psychological comfort and disaster relief donation. Comprehensive disaster reduction refers to the whole research, comprehensive planning and the formulation and implementation of disaster reduction measures. The disaster information officer is responsible for disaster statistics and reporting, ledger management, verification and evaluation, consultation and approval, and also takes into account the tasks of disaster hidden danger investigation, disaster monitoring and early warning, danger information reporting and other tasks, and assists in the emergency transfer and resettlement of the disaster-stricken people and emergency living assistance.

### **3.3 Basic Conditions**

The standard puts forward 13 basic conditions for the establishment of comprehensive disaster reduction community in Shenzhen, that is, there is an organizational leadership, rules and regulations, and the composition and responsibilities of the organization is clearly defined. Have an emergency response team with at least 1 trained disaster information officer; have disaster risk regular screening system, disaster risk map, hidden danger list; regular community visits, disaster prevention and reduction cards, disaster prevention and reduction responsibility contact cards, lists of vulnerable groups; have emergency plans for disaster prevention, mitigation and relief, and organize at least one emergency drill every six months; there are emergency command places, emergency duty terminals and emergency communication equipment; There are warning information release channels, with loudspeakers, sirens, etc.; Emergency shelters that meet the needs of the community; there are points for storing emergency supplies, including protective supplies, communication equipment, rescue equipment, living supplies and emergency equipment; There are community medical ambulance stations that provide medical ambulance services; There are community miniature fire stations that meet the construction requirements; Schools, hospitals, lifeline systems and other key fortification targets to strengthen anti-earthquake measures as required; There are propaganda and education positions, and at least one comprehensive disaster reduction science publicity and education campaign will be conducted every quarter.

### **3.4 Organization Management**

The standards set forth the organizational and management requirements in the establishment of Shenzhen comprehensive disaster reduction community, such as organizational leadership, rules and regulations, grid management, fund input, disaster insurance and so on. The organization leader clearly requires that the community comprehensive disaster reduction capacity building should be combined with community governance, grid management and public services, and that the community comprehensive disaster reduction leading group should be established. Rules and regulations include, but are not limited to, a comprehensive disaster reduction work system, a disaster monitoring and early warning system, a support system for vulnerable groups, a disaster prevention

and relief publicity and training system, a disaster prevention and relief materials management system, and an emergency duty system; establish a coordination and linkage mechanism with street emergency management departments, social affairs management departments, public security agencies, medical and health departments and other relevant functional departments, as well as relevant social organizations, neighboring communities and property management units. Community management should be implemented on a grid, and community residents, enterprises and public institutions should be encouraged to participate in gas insurance, fire insurance, accident insurance, vehicle insurance and other insurance.

### **3.5 Team Building**

The standards set forth requirements for the construction of emergency teams, disaster information officers, volunteer teams, enterprises and public institutions in the establishment of comprehensive disaster reduction communities in Shenzhen. Communities should set up a combination of full-time and part-time emergency teams, equipped with rescue equipment suitable for local disaster relief characteristics, to undertake daily emergency tasks; effectively integrate the emergency forces of property management units under the jurisdiction, and set up a regular emergency guard team; establish linkage mechanisms with integrated fire rescue teams, units that produce, manage and store dangerous goods under their jurisdiction, and emergency rescue organizations of urban rail transit operation, construction, property management, the flood control and drainage, etc. The community should be equipped with at least one disaster information officer and at least 10 community volunteers to assist the community to carry out hidden danger investigation and management, early emergency treatment, disaster prevention and reduction and relief science publicity and education, public security patrol, help vulnerable groups and other work. Communities should guide schools, hospitals (medical institutions), industrial and trade enterprises, shopping malls and other relevant units as well as charitable organizations, volunteer organizations and volunteers within their jurisdiction to take the initiative in carrying out comprehensive disaster reduction work.

### **3.6 Risk Management**

The standards put forward the requirements of risk management such as risk assessment, the situation analysis, hidden danger inspection and public management in the establishment of comprehensive disaster reduction communities in Shenzhen. The community should organize a disaster risk survey every six months according to the characteristics of different types of communities prone to frequent disasters, carry out disaster risk assessment, and make disaster risk maps; and based on the risk assessment results, establish a list of community hidden dangers, strengthen the risk management of key places and key positions, and clarify the accident hazard sources, dangerous facilities, facility damage, equipment missing and other related information. The community should establish the accident and injury record mechanism of the jurisdiction, carry out natural disaster hidden danger investigation, municipal pipeline inspection, high-risk places and crowded places facility inspection, flammable and explosive dangerous goods inspection, electrical fire hidden danger regulation, electric bicycle management, illegal resident hidden

danger regulation, restaurant management. And designate special personnel to collect, collate and analyze the data of various accidents and injuries in production safety, fire safety, traffic safety, social security, gas safety and so on once a quarter. We will make disaster prevention and mitigation cards, disaster prevention and mitigation responsibility contact cards, and lists of vulnerable groups, and strengthen community public management.

### **3.7 Preparation and Exercise of Plan**

The standards put forward the requirements for the preparation and exercise of disaster prevention, reduction and relief emergency plans, emergency plans of production and business units, emergency drills, public participation, revision of plans, etc. In the establishment of comprehensive disaster reduction communities in Shenzhen. According to the types of disasters and accidents existing in their jurisdiction, communities should formulate simplified and operational community emergency plans for disaster prevention, reduction and relief, and clarify emergency organizations, disaster emergency disposal procedures, lists of disaster risks and hidden dangers, emergency contact information, lists of emergency materials or distribution maps of emergency facilities, emergency rescue teams, emergency evacuation routes, lists of vulnerable people and transfer plans. At the same time, we will carry out at least one single disaster or comprehensive emergency drill every six months, mainly focusing on communication support, equipment use, personnel evacuation, the contact mechanism for key groups, early handling, information reporting and warning under emergency or extreme weather conditions such as flood prevention, typhoon prevention, geological disaster prevention, earthquake prevention and fire prevention. Fully test the community's organization and command, hidden danger investigation, monitoring and early warning, disaster reporting, personnel evacuation, transfer and resettlement, self-rescue and mutual rescue, and after-treatment capabilities.

### **3.8 Emergency Support**

The standards put forward the requirements of emergency duty, disaster and accident warning information release, the emergency shelter, emergency materials reserve, community medical aid station, fire facilities and equipment, earthquake fortification and other emergency support in the establishment of comprehensive disaster reduction communities in Shenzhen. The community should set up an emergency command center, configure emergency duty terminal, implement 24 h on duty, undertake information reporting, emergency team convening, emergency materials scheduling and other work. Based on the risk assessment results, new technologies such as the internet of things, cloud computing, artificial intelligence, 5G, big data and intelligent voice analysis should be adopted, as well as online monitoring systems such as smart loudspeakers, automatic weather stations, smart poles, smart smoke detectors, smart switches, AI cameras, LiDAR, InSAR, etc. Monitoring and early warning equipment and facilities should be allocated in key risk areas. It is interconnected with various disaster and accident monitoring, warning and emergency command systems, such as the meteorological early Warning Information System and the early warning Information Release Center, to monitor natural disasters, production safety, fire, falling objects and other risks within

its jurisdiction in real time, and quickly release early warning information of local meteorological, flood, geological, fire and other disasters and accidents. Issuing daily notices and publicizing knowledge of disaster prevention, mitigation and relief in peacetime; when disaster occurs, report the disaster information to higher level units; forward early warning information, disaster information and relief measures to the masses; release rescue and reconstruction information after the disaster.

### **3.9 Publicity and Education**

The standards set forth the requirements of publicity and education sites, special areas for publicity and education, regular publicity and education, public training and education, community staff training, public Open Day and other publicity and education in the establishment of comprehensive disaster reduction communities in Shenzhen. Communities should have relatively fixed science popularization and education bases or emergency experience centers, which is regularly open to the society to provide experiential and participatory science popularization and education services for primary and middle school students, the elderly, the disabled and other different social groups, especially the training and publicity of hedging skills. Streets and community comprehensive service facilities as well as multifunctional activity rooms, conference rooms and libraries will be used to set up special areas for science popularization and education on disaster prevention and relief, and display wall charts of laws and regulations on disaster prevention and relief and relevant common sense, leading organizations for comprehensive disaster reduction, rules and regulations for comprehensive disaster reduction, disaster risk maps, lists of hidden dangers and emergency response flow charts. We should give full play to the role of radio, television, Internet, mobile phones, electronic displays and other carriers to carry out regular and comprehensive publicity and education on the disaster reduction and popularization of science. For community residents and property management personnel, the manuals for community and family disaster prevention and reduction and relief were made and distributed in conjunction with the International Day for Natural Disaster Reduction, World Meteorological Day, World Earth Day, National Disaster Prevention and Reduction Day, National Science Popularization Day, National Fire Safety Publicity and Education Day, Work Safety Month, Forest Fire Prevention Publicity Month and various holidays. Comprehensive disaster reduction training or publicity and education activities in line with local characteristics shall be carried out.

### **3.10 Highlight Construction**

The standards put forward the requirements for the construction of highlights in the establishment of comprehensive disaster reduction communities in Shenzhen. Communities should strengthen the communication with universities, scientific research institutes and scientific and technological enterprises in the field of disaster reduction and relief, and take the initiative to undertake the pilot tasks of scientific research projects, so as to promote the overall professional level of community disaster reduction and relief work.

### 3.11 Evaluation

The standards put forward the evaluation procedure of Shenzhen comprehensive disaster reduction community establishment and the evaluation criteria of self-examination and self-evaluation, application, review and examination. If the community is required to self-check and self-evaluate more than 80 points, it can apply for Shenzhen comprehensive disaster reduction community, street for on-site verification, district-level department review and acceptance, and municipal department organization the expert group to carry out review and evaluation and publish the results.

In addition, according to the above content, the criteria for the creation of content and requirements of indicators, the establishment of a comprehensive disaster reduction community in Shenzhen Table of indicators, and gives the value of each index (See Table 1).

**Table 1.** Shenzhen integrated disaster reduction community to establish a scoring index system

Level 1 index	Level 2 index	Full score
Organization management (12 points)	Organization leadership	2
	Regulation	5
	Grid management	1
	Fund input	1
	Disaster Insurance	2
	Work File	1
Team building (12 points)	Emergency team	6
	Disaster Information Officer	2
	Volunteer Team	2
	Enterprises and public institutions	2
Risk Management (25 points)	Risk assessment	4
	Situation Analysis	2
	Hidden Danger Check	16
	Management of the masses	3
Plan preparation and drill (7 points)	Disaster prevention, reduction and relief emergency plan	2
	Emergency plan for production and operation units	1
	Emergency drill	2
	Public engagement	1

(continued)

**Table 1.** (continued)

Level 1 index	Level 2 index	Full score
	Plan revision	1
Emergency support (25 points)	Emergency Duty	3
	Emergency warning information release	1
	Emergency shelter	4
	Reserve of emergency supplies	5
	Community medical aid station	3
	File protection facilities	7
	Seismic fortification	2
	Publicity and education venues	2
	Publicity and Education Zone	4
	Regular publicity and education	4
	Public Training and publicity Education	3
	Training of Community Workers	2
	Public Open House	2
Highlight construction (2 points)	Communication with universities, research institutes, science and technology enterprises, etc.	2

#### 4 Thinking and Suggestions

The standards unify the national and provincial assessment standards and requirements, and truly reduce the burden of comprehensive disaster reduction work at the grassroots level. At the same time, it covers the construction of disaster prevention equipment and facilities as well as emergency response capacity, which can effectively guide the systematic improvement of the comprehensive disaster reduction level of communities and effectively solve the problem of poor connectivity of work caused by large staff mobility at the grassroots level. In addition, the standard fully emphasizes the participation of enterprises and public institutions, social organizations and volunteers, strengthens the Concept of social co-governance, encourages the full use of scientific and technological means, and enhances the scientific, refined and intelligent level of community governance. After the release of this standard, it is suggest to promote the implementation and application from the following three aspects.

- (1) Establish a community standard system for comprehensive disaster reduction in Shenzhen. To summarize the work experience of Shenzhen in establishing a comprehensive disaster reduction community, and effectively draw up various requirements for the establishment of a comprehensive disaster reduction community, including

but not limited to organizational management, the team building, risk assessment, hidden danger management, preparation and drill of plans, emergency support, publicity and education, etc. From the top level of design, according to the internal connection of standards, to construct a standard architecture framework with clear hierarchy and reasonable classification, form a standardization planning blueprint including existing, due and expected standards in related fields, and provide guidance for standardization work.

- (2) Building a comprehensive disaster reduction community standard database. By means of information technology, based on the results of pilot standardization and according to the current situation of standardization in the field of integrated disaster reduction community, the standard database is designed and built, the collection and sharing of relevant standard resources is provided according to the standard architecture, and the standardized management application environment of standard management, project work management, resource maintenance and application, knowledge dissemination and training and other functions are integrated. To provide government departments and communities at all levels with timely, accurate and complete standardized information application and services, and to promote the establishment of integrated disaster reduction communities in a standardized, refined and scientific way.
- (3) To carry out supervision and inspection of the implementation of standards. After the release and implementation of the relevant standard system and standard documents, supervise and inspect the implementation and application of the relevant standardization results according to the whole-process, all-directional and all-weather standards. On the one hand, promote and guide the further implementation of the standards; on the other hand, collect the feedback and suggestions of the standard implementation personnel to improve the dynamic adjustment and the revision mechanism of the standard system. Ensure the effectiveness of standardization work and ensure the scientific and applicable results of standardization. Timely conduct effectiveness survey, effectively grasp the satisfaction of the establishment of comprehensive disaster reduction communities, show the achievements of the construction, and explore the areas that still needs to be improved.

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