

# Research on Tourist Attraction Emergency Preparedness Capability Evaluation

Zhesheng Zhang\* and Xuefeng Wang

School of Economic and Management, Beijing Jiaotong University, China 100044

18120724@bjtu.edu.cn

**Keywords:** Evaluation system, Tourism safety, Analytic hierarchy process, Fuzzy evaluation, Emergency preparedness.

**Abstract.** Based on the systematic analysis of existing research results, analytic hierarchy process is employed to employed the tourist attraction emergency preparedness capability evaluation. The system includes four secondary indicators, including emergency plan construction and drill, emergency organization System, emergency support capability, risk control. There are 14 three-level indicators to provide a reference scale for subsequent related research. In addition, one case is selected from four types of scenic spots, including mountain resorts, cultural ruins, parkland spots, amusement Attraction. Fuzzy evaluation was applied to evaluate the emergency preparedness ability. It was found that the level of these four tourist attractions is above the qualified level. By comparison and analyzing, there are certain problems in the construction of emergency teams, emergency fund support and emergency plan drills.

## Introduction

Tourism is known as happiness industry and can reflect people's life. However, travel safety accidents have frequently occurred in recent years. On the Shanghai Bund, 130 people were killed in 2014. In the spring of 2019, 14 people died due to congestion. The Incident is major hidden danger in tourism safety. We need to assess the emergency capability of the scenic spot, identify the deficiencies from the management aspect, and improve the ability to respond to emergencies.

Emergency management focuses on preventing problems before they occur. There are two main reasons for accidents deaths, including lacking risk management and prevention before the accident and insufficient emergency preparedness[1]. The domestic research on emergency preparedness ability of tourist attractions is still in a blank stage. It is difficult to provide effective support for the actual operation of relevant regulatory departments and scenic spots. This study analyzes the various aspects of the scenic spot in the emergency preparation, building a evaluation system, providing a reference for the scenic spot in theory and measurement for emergency preparedness ability of tourist attractions.

## Literature Review

### Emergency Preparedness

The emergency management is divided into four processes of mitigation, preparation, response and recovery[2]. The Emergency Response Law of the People's Republic of China divides it into four processes, emergency prevention and preparedness, monitoring and warning, emergency response and rescue, and recovery and reconstruction[3]. The US Department of Homeland Security defines emergency preparedness as a series of pre-designed missions and actions to establish, maintain and improve domestic prepare for the prevention, protection, response, and recovery of incidents. Preparation is a continuous process. The national emergency preparedness cycle includes planning, organization, equipment and training, exercises, assessment and improvement (DHS, 2009), and promote whole-process to prevention, protection, response, and recovery of fundamental[4].

Emergency preparedness is to respond to various emergencies including organizational preparations and knowledge, preparing personnel, materiel readiness, plans and preparation[5].

Emergency preparedness should include the following aspects, combing hazard factors in a region, reducing the probability of emergencies, doing various preparations in the usual work, for example, preparations for personnel, materials, infrastructure, plans, emergency knowledge ,command.

### **Emergency Preparedness Ability**

The emergency preparedness ability is the ability to respond to the mitigation and preparation of the emergency management. It is the capability requirement for the responding body at all levels. It requires the coordination and cooperation of all entities. It focuses on risk assessment, plan construction and emergency resource protection. It can identify and prevent disasters and risks, and deal with all kinds of emergencies in a more orderly and effective manner with emergency preparedness ability [6]. The evaluation form (CAR) defines 13 functional items, 209 attributes, and 1014 features for assessing state operational readiness and emergency management capabilities[8]. There are many research results in urban emergency response capabilities, such as Lu Wengang initially constructed the urban power system emergency capability evaluation index system[7]; Jiang Tianhan established an emergency response preparedness assessment mode [8]. This study focuses on discuss the composition of the emergency preparedness ability of the scenic spot.

### **Tourist Attraction Emergency Preparedness Ability**

Tourist attractions refer to independent management areas with functions such as visits, leisure vacations, recreation and fitness, and corresponding tourism service facilities and corresponding tourism services. The emergency and safety management of tourist attractions mainly involves the following contents: comprehensive management, facilities and environment of tourist attractions [9].

Tourism emergency management is a new research content in China. The emergency preparedness in the scenic spot refers to various measures taken in order to effectively and orderly respond to various emergencies that may occur, reducing casualties and property losses. The tourist attraction preparedness ability refers to the comprehensive work, such as organization construction, risk assessment, monitoring and warning, emergency plan, emergency drill, resource guarantee.

### **Constructing Tourist Attraction Preparedness Ability evaluation system**

Through *the Emergency Response Law of the People's Republic of China* and summary of the evaluation system of scenic spots, communities and urban emergency preparedness, this study puts forward four indicators.

#### **Selection of Tourist Attraction Preparedness Ability indicators**

##### ***Emergency Plan Construction and Drill.***

The emergency plan is the plan for dealing with emergencies. The plan specifies the rights and responsibilities of the relevant departments in the various stages of the emergency and the preparation of materials matching the various emergencies [10]. Jiang Tianhan refers to the framework of the one case and three systems of emergency management, and defines the emergency plan as the emergency plan development team, risk analysis, emergency capability assessment, etc[8]. The three-level indicators focus on the integrity, scientific, revision, complementation of emergency plans.

##### ***Emergency Organization System.***

The organization system refers to the emergency management department and system of the scenic spot. A fixed and authoritative organization, unified command and coordination of daily emergency preparedness work, that takes effective emergency decision-making in case of emergencies. Rescue. organizational system construction is the premise of emergency preparedness, which can guarantee the construction of other capabilities and work. In the evaluation of community emergency

preparedness, the emergency organization system is divided into two parts: emergency management department and emergency management work system[5]. The indicators are divided into three parts.

**Emergency Support Capability.**

Emergency support is the resources, materials, infrastructure and various types of equipment that the scenic spots reserve in response to emergencies. In addition to the reserve and coordination, the work content of the emergency protection is also including dynamic management. There are six capability about tourism emergency support capability[11]. The third-level indicators are finally mainly concentrated in the team, materials and infrastructure construction.

**Risk Control.**

Risk control includes risk assessment and identification. Risk assessment is an important task and the basic work of emergency management. The value of risk assessment is to identify hidden dangers, find weak links, and determine risk tolerance and control ability [12]. Conducting a risk assessment of the scenic spot, it can predict the hidden dangers and possible emergencies in the scenic spot.

**Establishment and Analysis of Scenic Spot Emergency Preparedness Evaluation System**

There are four secondary indicators, 14 tertiary indicators and evaluation rules. It is converted into weight coefficient applying AHP by Yaahp software, comparing the indicators in 1~9 through 8 scenic spot managers, government officials and experts. The results are shown in Fig.1~3 and Table 1.

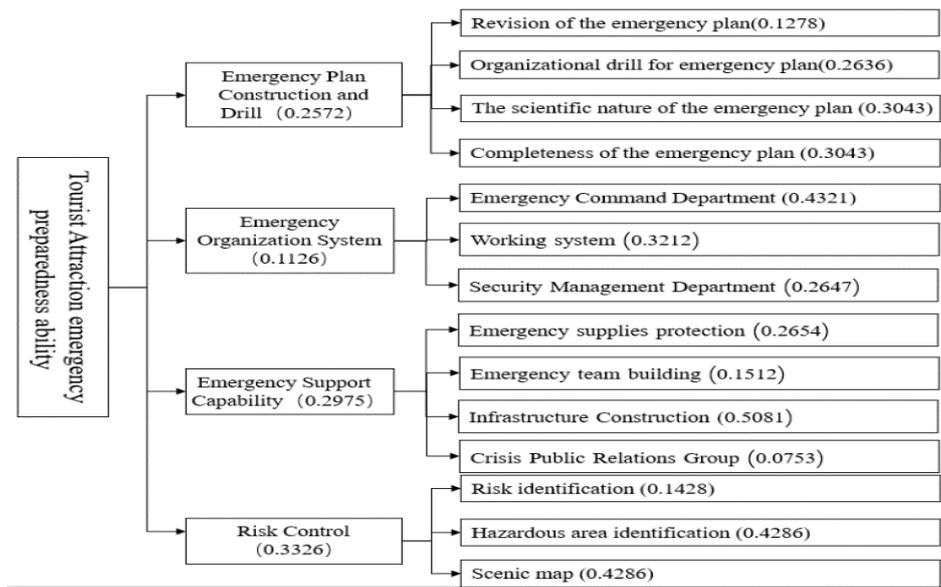


Fig.1 Evaluation System and Weight

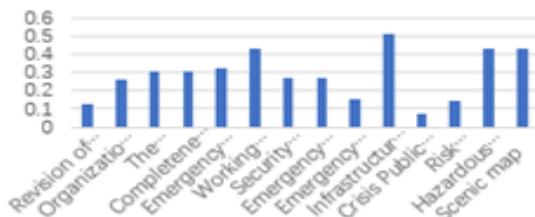


Fig. 2 Distribution of secondary indicators

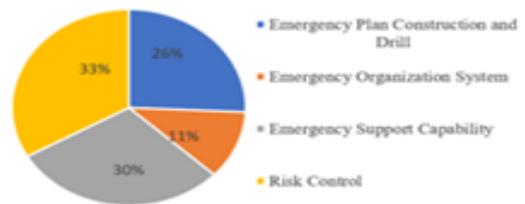


Fig. 3 Distribution of tertiary indicators

Table 1. Evaluation rules

Secondary	Three-level	Evaluation rules
Emergency plan construction and drill	Completeness of emergency plan	1). Specify the composition and responsibilities of the relevant emergency agencies;2). Provision of personnel and materials;3). Preparation for disaster assessment;4) Develop detailed emergency action plans
	Scientific of emergency plan	1).Ask the expert every time you make a revision; 2). Developed for different types of travel safety incidents;3).Based on the actual situation of the scenic spot
	Emergency plan drill	1). The number of linkage units is set to four minimum requirements (public security, fire protection, medical care, transportation); 14 is the most ideal value2). The number of trial drills is ideal for 1 year
	Amendment of emergency plan	1). Regularly revised according to the actual situation of the scenic spot and changes in the social economy; 2). Revised based on feedback from the drill;3).Revised according to actual situation after an emergency
Emergency organization system construction	Command department	1). Establish an emergency leadership team; 2). Clear rights and responsibilities, clear first leader
	Safety department	1). Establish a sound department, responsible for the four stages; 2). The department set up science, responsibility to the post, to people
	Working system	1). Perfect emergency management system; 2). Implementation of emergency management system
Emergency support capability	Material support	1). Establishment of special funds; 2). Emergency transportation capacity;3).Reserve capacity of scenic emergency materials
	Team building	1). Set up a full-time patrol and inspection team;2). Form a professional rescue team;3).Organizing volunteer teams t;4) Establish a tour guide team with professional knowledge and disaster prevention awareness; 5). Establish an emergency expert library to provide support
	Infrastructure construction	1). Certain scale of medical stations according the Rules of Tourism Planning; 2). In places with particularly large traffic, setting safe exits, emergency passages, evacuation passages, etc. 3). There are shelters that match the scenic spots t;4) Establish a complete communication facilities.
	Public relations crisis team	1). Discipline of foreign speech ; 2). Connect with mainstream society media ;3).Conducting statistics and assessments of emergencies, such as social attention, response and evaluation of tourists, etc.
Risk control	Risk Identification	1). Investigation of hazardous sources and areas; 2). Preventive inspection of public facilities and entertainment facilities
	Risk labeling	1). Obvious warning signs; 2). Obvious protective facilities
	Scenic map	1). Mapping and publicity disaster areas, evacuation and escape route

In the composition of the ability, the risk control ability occupies the most important proportion, accounting for 33%.It shows that risk control is the most important for the construction of emergency preparedness. The risk control includes four indicators, of which the Scenic map is the largest, 0.5081;

### Comprehensive Evaluation of the Emergency Preparation Ability of Scenic Spots

There are many factors involved in the emergency preparedness ability of the scenic spot and both quantitative evaluation and qualitative evaluation. So, the fuzzy synthetic evaluation is used. The step [13] is as follows:(1)establishing a set of factors for evaluating objects (2)clarifying the level of evaluation(3)establishing a fuzzy relation matrix R (4)clarifying the weight vector (5)synthesizing evaluation result vector (6) Calculate the score. The evaluation level established is shown in Tab. 2

Table 2. Scenic Emergency Preparedness Ability Evaluation Level

Grade	Level description	Coefficient	Interval
A	Excellent level, good emergency preparedness	9.5	(9,10)
B	Good level, good foundation preparation ability	8.5	(8,9)
C	Qualified level, general emergency preparedness,	7	(6,8)
D	Unqualified level, poor emergency preparedness	4.5	(3,6)
E	Very poor level, no emergency preparedness	1.5	(0,3)

**Evaluation and Analysis of Tourist Attraction Emergency Preparedness Ability in Beijing**

There are rich tourism resources in Beijing. According *Safety Management of Beijing Grade Tourism Attraction*, we should implement the principle of safety first and comprehensive management. Therefore, four types of scenic spots, including mountains, parks, ruins, and play, are selected in Beijing, and each is represented by MS, YH, ZJ, and HL, to analysis the emergency preparedness level of four types of tourist attraction in Beijing.

**Evaluation Process of Tourist Attraction Emergency Preparedness Ability**

According to the evaluation system, through field survey four scenic spots of MS, YH, ZJ, and HL, the expert evaluation was scored. Taking MS as an example, this study invited 6 staff and 2 leaders in tourist attraction.,2 emergency management officials evaluate the indicators at all levels. The final summary results are shown in Tab.3.

Tab.3 Evaluation results of index

Evaluation index	A	B	C	D	E	Evaluation index	A	B	C	D	E
Amendment	1	2	3	3	1	Material support	1	0	3	4	2
Drill	0	2	3	3	2	Emergency team building	0	1	2	4	3
Scientific	1	3	3	2	1	infrastructure	1	1	2	5	1
Completeness	1	3	4	1	1	Crisis public relations team	0	1	2	5	2
Command department	2	1	3	2	2	Risk Identification	1	3	5	1	0
Working system	0	3	3	2	2	Risk labeling	1	2	5	1	1
Safety department	1	1	3	3	2	Scenic map	2	3	4	1	0

The matrix of each factor  $R_i$  ( $i=1,2,3,4$ ) is calculated, and the weight matrix of the sub-criteria evaluation factor is  $W_i$  ( $I=1,2,3,4$ ). According to  $A_i=R_i \cdot W_i$  ( $i=1,2,3,4$ ), the first-level evaluation results  $A$  is obtained, and the second-level evaluation matrix  $B$  is formed

$$B = \begin{pmatrix} 0.0736 & 0.2609 & 0.3304 & 0.2087 & 0.1264 \\ 0.1189 & 0.116 & 0.3054 & 0.23007 & 0.2036 \\ 0.07735 & 0.1188 & 0.24166 & 0.4281 & 0.13407 \\ 0.14286 & 0.2571 & 0.45714 & 0.1 & 0.04286 \end{pmatrix} \tag{1}$$

According to the secondary indicators weight, the fuzzy vector  $C$  is finally obtained.  $C=(0.102845, 0.206673, 0.343306, 0.240203, 0.109577)$ . Vector  $C$  is multiplied by the corresponding coefficient of each level, by  $V=9.5C1+8.5C2+7C3+4.5C4+1.5C5$ , the score is 6.38, which is in the qualified level. Similarly, the emergency preparation ability for other scenic spots is obtained. The score is shown in Table 4.

Table 4. Tourist attraction emergency preparedness ability

tourist attraction	MS	YH	ZJ	HL
score	6.38	6.88	7.85	6.52

According to the score, the ability of emergency preparedness of the four scenic spots is above the qualified level. Due to the different types and geographical locations, ZJ is equipped with abundant human and material resources, which is higher than the other three scenic spots.

### **Results and Analysis**

The comprehensive level score can not fully reflect the emergency preparedness ability. Taking the MS as an example, according to the fuzzy comprehensive evaluation vector of each index in the B,  $M=(6.36, 6.01, 5.56, 7.25)$ , we found that the emergency support capability is at the unqualified level, the risk control is at a better level. Furthermore, the evaluation result of the three-level index based major, the level of organization and drills of the emergency plan, safety management departments, emergency materials support, crisis public relations team belong to D, indicating these indicators have not met the basic requirements. At the same time, the scenic map evaluation results are almost all above the C, indicating that preparation is more complete.

Through the quantitative analysis and the field survey of the four scenic spots, it is found that these four scenic spots have certain capabilities in emergency preparedness, and have superior capabilities in the map of scenic spots, the identification of dangerous areas, etc. However, there are still some problems, such as the lack of infrastructure in the YH. There are some common problems as follows, which need to be improved.

(1) The overall construction of the emergency team is lagging behind. Through interviewing with the leaders of the scenic spot, it was found that the construction of the emergency team was very weak, especially the organization of the volunteer team and the emergency expert database. The type of emergency rescue team is also very single. In the future, the rescue team is diversified and joins the elements of business and volunteerism.

(2) The lack of special funds in the emergency material support. It is indicated that the funds were insufficient, that are rarely reserved special funds and are temporarily allocated. In addition to the increased investment by the scenic spot, the government should also allocate emergency preparedness funds, such as material and financial support for the scenic spot.

(3) Insufficient emergency plan drills. Through making communication with the leaders of the scenic spot and emergency management, it is found there is certain emergency plans of scenic spots, and emergency drills, such as flood control and geological disasters. However, there are fewer linkage units, and lacking of linkage with district and municipal units.

### **Conclusions and Prospects**

The development of tourism in Beijing is in the forefront of the country. As a gathering place for tourists, the ability of emergency preparedness ability directly determines the speed and effect of emergency rescue, and affects the image and reputation of the scenic spot. This study empirically tests the emergency preparedness of the four types of scenic spots in Beijing by constructing evaluation indicators. At the same time, it points out some problems. There is certain guiding significance for promoting the safety of scenic spots in the future. However, there are some shortcomings in the perfection of indicators and the representativeness of scenic spots.

Emergency management includes four phases that are closely linked to each other, and emergency preparedness plays an important and fundamental role. The improvement of emergency preparedness in scenic spots is a continuous action. In the process of promoting emergency preparedness in scenic spots, the relationship between various government departments, units and the masses should be comprehensively coordinated. Administrative, economic, legal and other measures should be taken. It can't rely on scenic spots alone

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