



# Problems and Countermeasures of Evacuation in University Canteen in Emergencies

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**Abstract.** University canteens have the characteristics of large flow of people and crowded people. Once an emergency happens, there may be some problems such as untimely evacuation and chaotic evacuation, resulting in casualties and equipment losses. This paper deeply analyzes the problems faced by the evacuation of university canteens under emergencies, and puts forward some solutions from the aspects of architectural design, daily safety management of university canteens and safety management system in colleges and universities.

**Keywords:** Unexpected events · Evacuation of personnel · University canteen · Countermeasure research

## 1 Introduction

In the face of emergencies, efficient and orderly evacuation can reduce the damage of accidents to people's lives and property. How to improve evacuation efficiency has always been a research hotspot in related fields. Generally, canteens in colleges and universities have high floors, closed spaces, crowded people during meals, and it is very difficult to evacuate people. In order to reduce the harm to teachers and students caused by emergencies in university canteens and create good evacuation conditions for teachers and students to the maximum extent, this study discusses the common problems that may exist in the safe evacuation of personnel in university canteens, and puts forward relevant countermeasures, aiming at improving the evacuation efficiency of personnel in university canteens and reducing casualties.

## 2 Emergency and Evacuation

Emergency is an accident or event that may cause serious damage or significant loss to the life and property of the residents, as well as to the environment and urban functions of the city, in the course of the production and life of the city residents. Emergencies include both natural and man-made disasters. For example: floods, earthquakes, toxic gas leaks, explosions, terrorist attacks and major traffic accidents, etc.

Evacuation means guiding people to evacuate to a safe area in an organized and planned manner in case of emergencies. College cafeterias have a high degree of gathering of people during a specific time period, few exits from the building, and the average

age of the dining staff is young, so it is difficult to evacuate efficiently and orderly in the event of an emergency. Evacuation under such conditions is likely to lead to serious consequences such as crowding and even trampling [1].

### **3 Influencing Factors of Personnel Evacuation in Colleges Canteen Under Emergencies**

In the event of an emergency, the efficiency of personnel evacuation in university canteens is affected by many factors, including personal factors, environmental factors and social factors.

#### **3.1 Personal Factors**

Personal factors include the evacuees' gender, personality, age and their own experience. During the evacuation process, the evacuees' psychological condition and behavioral performance directly affect the evacuation process. Each evacuee behaves differently in the evacuation process due to the difference in gender, age, personality and degree of calmness. At the same time, the behavior of a single individual in the evacuation process can affect the whole group, and the influence of psychological factors such as herd mentality and panic mentality in the evacuation cannot be ignored [2].

#### **3.2 Environmental Factors**

The more complex the environment, the more difficult it is to evacuate, and the longer the evacuation time. If an emergency occurs during peak meal times, when people gather in the cafeteria and the density of the flow of people is high, the difficulty of evacuation will increase. At the same time, the frequency of emergencies, the type of emergencies, and whether the emergencies will obstruct the escape route will affect people's panic level, which in turn affects the efficiency of evacuation. When evacuating people, the layout of the building is related to the distribution of the evacuated population, and the distribution of evacuation sites also has an important impact on the evacuation work.

#### **3.3 Social Factors**

Social factors mainly consider the rescue and support activities of the government and related departments in case of emergencies. Once an emergency occurs, the staff of the college cafeteria will actively organize the evacuation work, firefighters will help organize the scene and help people escape, medical staff will arrive in time and be fully on standby to treat the injured, etc. All the above social factors will send positive signals to the people at the scene of the accident and can effectively reduce the level of people's panic.

## **4 Problems in the Evacuation of College Canteens**

Through consulting relevant literature and visiting many places, this study summarized the problems existing in the evacuation of college canteens in China into three aspects: the architectural design of college canteens, the daily safety management of college canteens and the safety management system of colleges and universities.

### **4.1 Hidden Dangers in the Architectural Design of University Canteens**

#### **4.1.1 Safety Evacuation Design Is not Taken Seriously**

In the past, many college cafeteria buildings had a single function and the overall requirements for safety design were not high, and the relevant personnel did not pay enough attention to this. A considerable part of colleges and universities are located in the city center or prosperous areas, so the construction cost of schools is high. Considering the overall economic benefits, the construction units tend to ignore the local fire safety, and the design in evacuation only meets the minimum standard.

#### **4.1.2 The Evacuation Passageway Is not Smooth**

Although there are evacuation passages on each floor of college cafeterias, the management of these passages is not standardized, which often results in poor passages. When there is a fire, earthquake and other emergencies, poor evacuation channels will seriously affect the evacuation efficiency.

#### **4.1.3 Unscientific Design of Evacuation Exits**

In the design and construction process of high-rise buildings, some enterprises will increase the revenue area of the building in order to enhance economic efficiency, and the number of staircase exits is usually as small as possible, or the area of the staircase is reduced. This practice leads to a very narrow exit, which does not allow people to evacuate effectively in case of fire and danger [3].

### **4.2 Hidden Problems in Daily Safety Management of University Canteens**

#### **4.2.1 The Daily Safety Supervision and Management Mechanism Is not Perfect**

College cafeterias pay more attention to food safety and health safety, and the composition of college cafeteria staff is extremely complex, most of them are family surplus labor. They lack basic safety qualities and do not have a clear understanding and supervision of safety in case of emergencies. The daily safety management and inspection work of the cafeteria may not be effectively implemented.

#### **4.2.2 Meal Time is Too Concentrated**

Unlike other catering enterprises, college cafeteria has its own special characteristics. Its supply time is very concentrated, and during the peak period of dining, thousands of

people will rush into the cafeteria instantly, which will overload the normal personnel flow channel. When there is an emergency situation (fire, earthquake, etc.), the evacuation of people will face great challenges.

### **4.3 Deficiencies in the Security Management System of Colleges**

#### **4.3.1 The University Emergency Response System Is not Perfect**

Firstly, the usability of the emergency evacuation plan is not strong. Most colleges and universities have emergency evacuation plans that have been compiled in writing, but the plans are relatively solidified and cannot respond to emergencies flexibly, and there is no clear definition of the criteria for emergencies, ignoring the difficulties that actually exist. Secondly, the information coordination mechanism is not perfect. At present, most colleges and universities have not established timely and effective information interaction mechanisms, but simply rely on the relatively traditional college student affairs management mode, which still adopts the four-level information acquisition mode of school-faculty-counselor-student, and the interruption of any link will affect the communication of information.

#### **4.3.2 Lack of Emergency Evacuation Education in Colleges and Universities**

First, colleges and universities do not pay much attention to safety evacuation. Most decision-makers in colleges and universities lack crisis awareness and tend to neglect safety education, skills training and practice drills for emergencies, which leads to the disposal of emergencies in schools cannot form a normalized virtuous cycle. Secondly, the emergency skills training of college students is not in place. At present, the emergency knowledge popularized in colleges and universities is only limited to fire, earthquake escape and prevention of major infectious diseases, and college students do not have enough knowledge about other emergencies, so they cannot save themselves and each other correctly in the emergencies.

## **5 Conclusion**

In order to improve the evacuation efficiency of university canteen personnel and ensure personal safety, relevant subjects must face up to the problems mentioned above, and can start from the following aspects.

### **5.1 Optimize the Architectural Design of University Canteens**

#### **5.1.1 Reasonable Setting of Evacuation Channels and Entrances**

Walking stairs and stairwells should be set up according to the requirements of safe evacuation distance [4]. And the number and width of cafeteria exits are directly related to whether evacuees can quickly evacuate the building [5]. Panic psychology may trigger herd mentality, and exits with a high flow of people and a large degree of people gathering may attract more people with the herd mentality and thus assume a larger number of

evacuees. Therefore, when designing buildings, the number and width of safety exits should be set in accordance with the relevant national industry standards. In addition, designers should also take human psychological factors into consideration by moderately increasing the width of exits that are prone to crowd situations and setting larger widths in the direction of movement that people are used to in their daily lives to improve evacuation efficiency in emergency situations [6]. So as to better absorb the pressure during emergency evacuation.

### **5.1.2 The Design of Evacuation Routes Must Avoid Time Wastage and Maximize Evacuation Efficiency**

The design of the passage should reduce curvature and design that may affect evacuation efficiency within the evacuation passage, such as doors and steps [7]. The specific value of the channel design must be based on the relevant national technical standards for fire protection. Evacuation channels in the building should have evacuation direction hints, and safety exits should be clearly marked, so as to avoid people losing their way in the evacuation process.

## **5.2 Strengthen the Daily Safety Management of University Canteens**

### **5.2.1 Avoid Part of the Emergencies from the Root**

College cafeterias should pay attention to the daily fire inspection of the cafeteria building, regularly check the safety hazards and record the inspection results in detail. If the staff finds a potential danger, the staff should promptly report it and refer the problem to the relevant department for proper handling.

### **5.2.2 Reduce the Flow of People During Peak Meal Times**

First, schools should set different meal times according to grade levels, majors, and regions, and establish a staggered meal system to avoid heavy crowds. Second, the cafeteria can provide take-out service, accelerate network operation, set up pick-up points at designated locations in the dining hall or under the dormitory building, and set staggered pick-up times for batches of staggered meals. After students order meals online, they will pick up meals at the pick-up points according to the scheduled pick-up times, thus avoiding large crowds gathering in the cafeteria.

## **5.3 Improve the Safety Management System in Colleges and Universities**

### **5.3.1 Establish a Complete Emergency Evacuation Plan and Improve the Information Sharing Mechanism**

On the one hand, colleges and universities should prepare for the rainy days and establish practical emergency evacuation plans according to the characteristics of different emergencies. On the other hand, establish a unified information platform and provide effective information support for all aspects of colleges and universities in dealing with emergencies through an interconnected emergency response information system.

### 5.3.2 Colleges and Universities Should Pay Attention to Safety Education

On the one hand, strengthen the publicity of safety knowledge. Colleges and universities can hold regular lectures on safety knowledge and invite experts on safe evacuation to give lectures on campus. At the same time, colleges and universities should also strengthen the safety knowledge education of canteen staff to avoid accidents caused by improper operation of staff, and train canteen staff on evacuation work [8]. On the other hand, pay attention to simulation exercises. Combining with the architectural characteristics of college cafeterias, we should set up reasonable emergency evacuation plans and conduct simulated evacuation drills every year, find out the shortcomings of existing countermeasures through the drills in time and make adjustments accordingly.

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