

# Research and Practice of Fire Safety Education for Electrical Major Students in Higher Vocational Colleges

Yanjie Chen

*Chongqing vocational Institute of Engineering, Jiangjin, Chongqing 402260, China*  
 \* 366158901@qq.com

## ABSTRACT

Fire is one of the most serious disasters that threaten the public security. Especially the electrical fire is more prominent, which is more than 100,000 each year, and it accounts for about 30% of the total number of fires. The casualties and property losses caused by electric fire are also the highest among all kinds of fire causes. As a group of college students, students' fire knowledge level, attitude and behavior towards fire safety directly affect the fire safety of college campus. According to the professional characteristics and technical characteristics of electrical major in higher vocational colleges, this paper carries out systematic research and practice from the aspects of students' fire safety awareness, fire safety technology management, fire fighting and alarm, escape and evacuation drill, etc. Next research, the college will further strengthen the training of professional fire teachers and fire drill in Whole campus.

**Keywords:** *fire safety education, electrical major, electrical fire, practical training room, fire escape drill, fire safety awareness*

## 1. INTRODUCTION

Fire is one of the most serious disasters that threaten the public security. Once a fire breaks out, it will not only destroy the construction and research achievements, cause great loss of life and property, but also affect the social stability and destroy the ecological environment[1].

The common causes of fire include electrical fire, smoking, careless use of fire in daily life, careless production, playing with fire, setting fire and lightning strike. Especially the electrical fire is more prominent, which is more than 100,000 each year, and it accounts for about 30% of the total number of fires. The casualties and property losses caused by electric fire are also the highest among all kinds of fire causes.

The electrical engineering major students in higher vocational colleges are directly serving the production front line of electrical industry. They engage in the design, manufacturing and laying of electrical equipment, as well as the maintenance management of electrical equipment after it is put into use. They are important technical force in the field of electrical engineering and will play an important role in the fire safety awareness, fire knowledge level and fire technology management ability of the industry and society in the future.

Therefore, according to the professional characteristics and technical characteristics of electrical major in higher vocational colleges, this paper carries out systematic research and practice from the aspects of students' fire safety awareness, fire safety technology management, fire fighting and alarm, escape and evacuation drill, etc.

## 2. FIRE SAFETY EDUCATION

### *2.1. Fire safety awareness education integrated into multi-dimensional education of students*

Fire has significant contingency and sudden. However, according to the research statistics, more than 80% of the fires are caused by weak awareness, lack of common sense and illegal operation[2]. In particular, lack of fire escape skills often leads to casualties. At the same time, the hidden danger of fire caused by fire code violations is more prominent, such as the occupation of fire truck passageway, the locking of emergency exit, the blocking of evacuation passageway, the nonstandard use of fire doors and the damage of fire hydrants.

As a group of higher vocational college students, students' awareness of fire safety, fire knowledge level, attitude and behavior towards fire safety directly affect the fire safety of college campus[3]. And with their graduation, they will have a long-term impact on the work and the future society. So, it is very important to carry out fire safety education for higher vocational students and improve their fire safety quality. Especially it is more important to improve the fire safety education level of electrical students who are the main force of the production line in the electric power industry.

Therefore, from the moment when students enter the school, we have integrated the fire safety awareness education into the whole learning process and daily life of students. The places of fire safety education include student dormitories, teaching buildings, training rooms, and enterprise internship posts. Strengthening the fire

safety awareness and improving the fire safety skills of students are the primary task of fire safety education. The basic knowledge of fire safety mainly includes: identification of inflammable and explosive dangerous goods, inspection of fire hazards, fire development and spread mechanism, fire fighting methods, use of fire extinguisher, Initial fire fighting, organization of evacuation, self-help, mutual aid.

## ***2.2. Combination of electrical fire safety management and basic education of electrical specialty***

The electrical fire is the most common hidden danger that electrical students may encounter in campus study and future work.

According to the statistics and analysis of the ignition sources of the major electrical fire accidents, the electrical circuit is the primary fire origin of the electrical fire, which is 51.35% of the total electrical fire and followed by electrical appliances, electrical equipment and lighting appliances.

Therefore, the key to the management of electrical fire protection is to combine the education of electrical fire safety with the education of electrical specialty, and do a good job in technical management of circuit and electrical equipment.

### ***2.2.1. Fire safety of electrical circuit***

In addition to the external fire source, the fire of electrical circuit is mainly caused by the short circuit, overload, leakage during its operation.

To carry out the fire safety education of electrical circuit, we should mainly start from the selection of wires and cables, the laying and connection of lines, and the protection measures taken on the lines. Students should be trained to select appropriate wires and cables according to the temperature, humidity, chemical corrosivity and other environmental factors and rated voltage requirements.

Students should master the correct selection of different wires and cables, the correct construction of line laying and the technology of short circuit protection, overload protection, ground fault protection and other electrical circuit technical protection measures.

### ***2.2.2. Fire safety of electric equipment***

Electrical equipment may generate a lot of heat and high temperature when they are in use or in failure, which will constitute a fire hazard.

Students are required to master the technical fire protection measures of various electrical devices, such as switch fire protection, fuse fire protection, relay fire protection, contactor fire protection, starter fire protection,

residual current protection device fire protection and low-voltage distribution cabinet fire protection.

## ***2.3. Combination of fire safety practice in Practical training room and electrical professional course practice***

Practical training room is not only an important learning platform for students to carry out professional curriculum practice, but also a key fire protection place. In Practical training room, there may have high-pressure vessels, high-power heating equipment, inflammable and explosive dangerous goods. And there may have safety problems such as excessive power load, aging of lines, etc[4].

Practical training room is the most effective place for students to carry out fire safety education practice, whose scene and function is closest to the actual production posts of enterprises.

In order to do a good job in the fire safety practice, it is necessary to combine the fire safety practice with the electrical professional curriculum practice, and take the fire safety practice as the curriculum basis of the professional curriculum practice.

### ***2.3.1. Identification practice of inflammable and explosive dangerous goods***

Fire risk refers to the sum of the causes, factors and conditions of fire and explosion accidents of production or storage goods, as well as the conditions of fire expansion and spread.

In Practical training room, the electrical equipment and production goods are various, and the fire risk is also different. It is of great significance to master the fire risk classification of training equipment and storage articles in Practical training room for protecting the personal safety of students and the property safety.

Students should be familiar with the fire risk classification methods and fire risk characteristics of various equipment and articles, and know Main indicators of fire risk of equipment and goods, the nature of materials, defects of production equipment, production operation behavior, control of process parameters and interaction of many factors such as production environment.

### ***2.3.2. Inspection practice of electrical fire and explosion protection***

Students must be able to correctly select, install, repair, maintenance electrical equipment and power supply lines, also learn to install necessary protection devices. This is the main method to prevent electrical fire and explosion accidents. Combined with the installation and operation of electrical equipment in Practical training room, carry out the fire prevention inspection of the equipment, check

whether the electrical explosion-proof in the inflammable and explosive places meets the requirements of the current national engineering construction fire protection technical standards, such as checking the kind of conductor material, allowable carrying capacity of circuit, and the laying and connection mode of the line, and the grounding conditions and mode of live parts.

Students should carry out fire prevention inspection in Practical training room under the guidance of Teachers. First of all, according to the fire design data of the building and the construction records of the concealed works of the building, the fire prevention problems of the main building of the training room should be checked.

Then, according to the list of electrical equipment and materials in the training room, the debugging and test records of the equipment and other relevant data, check the fire protection problems of electrical equipment in turn. For example, in combination with the fire design documents, check and verify the model, fire rating and explosion-proof characteristics of electrical equipment.

At the same time, check the potential explosive substances in the training room as well as the scope of explosive dangerous area, and carry out on-site inspection of explosion-proof electrical equipment and dust explosion-proof electrical equipment item by item.

### *2.3.3. Practice of fire and smoke prevention facilities inspection in training room*

Reasonable fire and smoke prevention measures can effectively control the spread of fire and smoke, and facilitate the rapid evacuation of people in the fire area. Students should understand the common fire and smoke prevention measures, especially the fire separation measures such as fire walls, fire doors, fire windows, fire rolling curtains, fire dampers, and the basic knowledge and specific contents and methods of functional inspection of smoke blocking facilities such as roof smoke blocking partitions and smoke blocking vertical walls.

Students should learn to check the firewall, such as checking the wall materials, the tightness of the firewall while the pipes passing through. According to the requirements of the current national engineering construction fire protection technical standards, the relevant fire protection facilities should be checked. Inspection contents include: model, appearance, installation quality and function inspection of fire doors, windows, rolling shutters and fire dampers, and whether relevant facilities and passages are blocked or occupied.

### *2.3.4. Practice of initial fire fighting and fire alarm drill*

It is an important task of fire safety work to eliminate the hidden danger of fire, find out the fire in time and put out the fire quickly. It is also an effective measure to avoid casualties and losses. The fire extinguishing methods

include cooling, suffocation, isolation and chemical inhibition. Different types of fire need to have specific fire extinguishing methods. The fire extinguisher has simple structure, convenient operation and wide use, and it is an important fire fighting equipment to put out all kinds of initial fires.

Before carrying out training and learning links in Practical training room, students must learn to use all kinds of fire extinguishers, fully understand the classification and basic parameters of all kinds of fire extinguishers, master the basic structure and fire-fighting mechanism of common fire extinguishers, and be familiar with the scope of use of all kinds of fire extinguishers, the configuration, selection and setting requirements of fire extinguishers.

To carry out fire fighting simulation exercise, students are required to be able to quickly and effectively take appropriate fire-fighting measures at the early stage of the fire, timely select the correct fire-fighting method, select and correctly use the appropriate fire-fighting equipment, and timely alarm.

### *2.3.5. Inspection of fire evacuation device and practice of fire escape drill*

When the fire is out of control, students should be able to escape and rescue ourselves scientifically and decisively. This requires students to fully understand the common evacuation facilities, such as emergency exits, evacuation doors, evacuation exits, evacuation walkways, evacuation walkways, evacuation floors, evacuation stairwells, emergency lighting, evacuation signs and other basic information. These measures are important fire-fighting facilities to effectively guarantee the emergency actions such as evacuation, escape, refuge and fire rescue of personnel. At the same time, they can maximize the protection of personnel safety, reduce casualties and property losses.

To carry out the practice of fire escape drill, the evacuation guidance group and protection and rescue group shall be organized according to the unified organization and command plan of the school. The evacuation guidance group shall scientifically organize the evacuation plan and reasonable standby plan, and set up special personnel in key parts to ensure the smooth passage and exit. Students should be familiar with the location and situation of each safety passage and exit of Practical training room, and quickly evacuate and escape from the nearest safety passage and exit according to the guidance of evacuation instruction signs at the first time of fire, so as to ensure the safety of students' lives.

The fire safety protection and rescue team shall prepare medical equipment and first-aid drugs, and quickly arrive at the site of safe evacuation for emergency rescue. The whole process shall ensure smooth communication, smooth implementation of fire alarm and help, and the fire fighting team shall ensure the first time to carry out the work and do a good job in fire fighting and rescue.

## ***2.4. Combination of fire safety responsibility education and electrical enterprise post practice***

Electrical enterprise post practice is a comprehensive practical teaching link for students to go to work. It is the most systematic summary of students' three-year knowledge and the most comprehensive fire safety responsibility education practice for students. Students should have a deep understanding of the obligations and responsibilities of electrical fire protection, as well as the laws and regulations to be followed.

### ***2.4.1. Deeply understand the policy of putting prevention first and combining prevention with elimination***

In the fire fighting work, everyone must insist on both fire prevention and fire fighting, combine fire prevention and fire fighting organically, protect personal safety and property safety to the greatest extent, and maintain public safety.

Fire fighting facilities and equipment shall be equipped in accordance with national and industrial standards, fire safety signs shall be set, and regular inspection and maintenance shall be organized to ensure that they are in good condition. Ensure that the evacuation passageway, emergency exit and fire lane passageway are unblocked, and ensure that the fire and smoke prevention zones and fire separation distance meet the fire technical standards.

No one is allowed to damage, misappropriate or dismantle or stop using fire-fighting facilities and equipment without authorization, and no one is allowed to bury, occupy or block fire hydrants or occupy fire separation space, occupy, block or close evacuation passageways, emergency exits and fire truck passageways.

### ***2.4.2. Fully implement the principle of overall responsibility of units and active participation of citizens***

To work, students should have a deep understanding of the fire safety responsibility system of the enterprise, follow the fire safety system and fire safety operation regulations of the enterprise, and be familiar with the fire fighting and emergency evacuation plan of the enterprise.

Every employee must receive fire safety training and participate in enterprise fire drill regularly before going to work. Anyone who finds a fire shall call the police immediately. Anyone shall provide convenience for the alarm free of charge, and shall not obstruct the alarm. It is strictly prohibited to make a false report of the fire.

In the event of a fire, the enterprise must immediately organize forces to put out the fire; after the fire is put out, the fire unit and relevant personnel shall protect the scene according to the requirements of the fire protection agency,

receive the accident investigation, and truthfully provide the information related to the fire.

### ***2.4.3. Comprehensively and profoundly study the legal responsibility of post fire management***

Combined with the case of production fire control, the legal liability of fire crime and fire liability accident crime must be studied in detail.

Fire is caused by the fault of the actor, which causes serious consequences. The behavior endangering public safety is called fire crime. Whoever commits the crime of fire shall be sentenced .

Violation of fire management regulations and refusal to take corrective measures after being notified by the fire control supervision agency, resulting in serious consequences and endangering public safety, is called the crime of fire liability accident. Whoever commits the crime of fire control liability accident and causes serious consequences shall be sentenced . Through the case study, the fire safety alarm in students' mind will be sounded.

## **3. CONCLUSION**

The electrical fire is more than 100,000 each year, and it accounts for about 30% of the total number of fires. As a group of higher vocational college students, students' fire knowledge level, attitude and behavior towards fire safety directly affect the fire safety of college campus.

According to the professional characteristics and technical characteristics of electrical major in higher vocational colleges, this paper carries out systematic research and practice from the aspects of students' fire safety awareness, fire safety technology management, fire fighting and alarm, escape and evacuation drill.

Next, the college will further strengthen the training of professional fire teachers and fire drill in Whole campus..

## **REFERENCES**

- [1] H.W. GAO, (2013)Exploration and practice of laboratory fire protection safety education, *Experimental Technology and Management*,30:11-14
- [2]Y.Y.ZHANG,D.M.WANG,(2014)The study of college students' fire safety awareness, behavior and measures, <http://www.paper.edu.cn/releasepaper/content/201404-60>.
- [3] M. Kobes, (2010)Building safety and human behaviour in fire: A literature review, *Fire Safety Journal*, 45:1-11.
- [4] L.T.LIU,H.Z.TIAN,(2013) Research and reform of laboratory safety system in colleges and universities, *Experimental Technology and Management*,30: 212-214