

2

UNIT

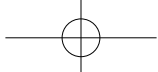
Electrical Safety Management

WARMING UP

PRACTICAL READING

INTENSIVE READING





Learning Objectives

After studying this unit, you'll be able to:

- understand and use words and phrases related to electrical safety management
- apply a specific reading strategy to get keywords and specific information
- learn electrical safety methods to avoid risks of electric injuries

EXTENSIVE READING

EXTRA KNOWLEDGE

READING INTO CHINA

Warming Up

Decide whether the following household electrical safety precautions are correct or not.

Find the mistakes and correct them.

1 Avoid overloading outlets.

2 Replace or repair damaged power cords in time.

3 Do not unplug appliances when they are not in use.

4 Run cords under carpets, doors or windows.

5 Keep electrical appliances and tools near water.

6 Give your appliances proper space for air circulation to avoid overheating.

7 Place dangerous appliances within the reach of small children.

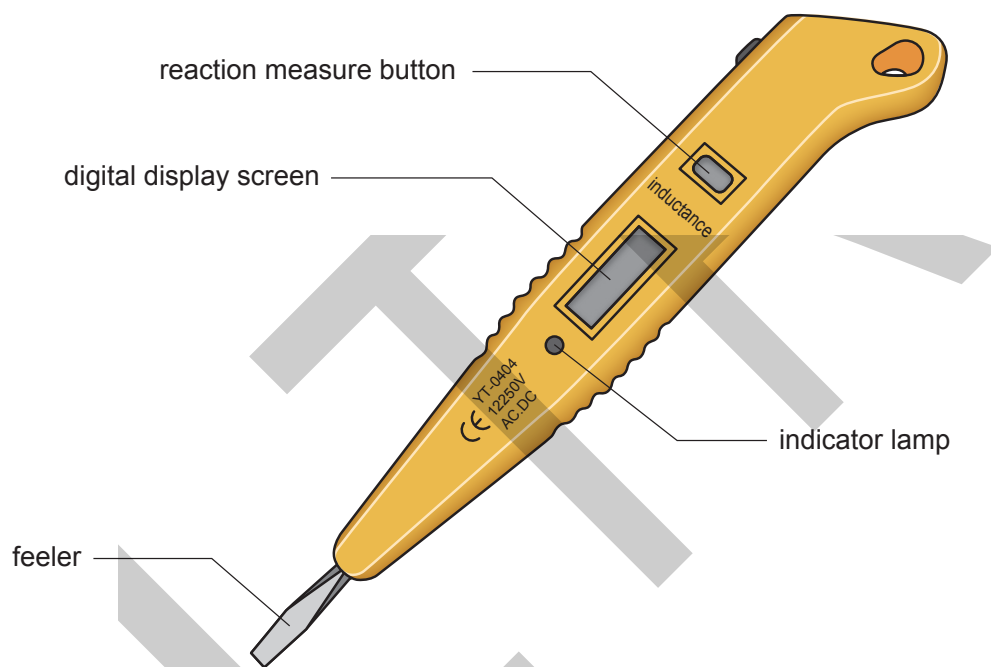
8 Attempt electrical repairs without professional guidance.

How to use a test pencil

—From the operating manual of a test pencil

Test pencil

测电笔，简称电笔，是一种常用的电工工具，用来测试电线中是否带电。笔体中有一氖泡，测试时如果氖泡发光，说明导线有电或为通路的火线。



1. Technical specifications

- Test range: 12–250V
- Operation temperature: 0–40°C

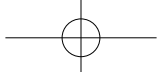
2. Operating instructions

- Hold the test pencil on its insulated handle and place its feeler into an electronic device or the electric circuit.
- Observe the indicator lamp. If the lamp is lit, it means that there is voltage in the circuit. If the lamp is not lit, it means that there is no voltage in the circuit.

- Next, touch the reaction measure button at the end of the handle and observe the numerical value shown on the digital display screen.

3. Warnings

- The test pencil should only be used within the specified voltage.
- The insulating part of the test pencil is made of artificial resin and it must not be used for any other purposes than voltage tests.



Task 1 Reading comprehension Read the text and complete the conversation based on your understanding of it.

(A student, Mike, makes a phone call to an electrician Tom and consults him about how to use a test pencil.)

Mike: Hello, this is Mike from Room 301 in Residence Hall 1. Our power strip seems to be broken. Can we test whether the power strip still works with a(n) **1** _____?

Tom: Yes, that can be a good tool for us to avoid risks brought about by electric power.

Mike: I just borrowed a test pencil from my friend. But I don't know how to use it. Could you please tell me how to use it?

Tom: Sure. Before testing, you should make sure that the voltage of the power strip is within the **2** _____. Now, you can hold the insulated handle of the test pencil and place the **3** _____ into the plug hole.

Mike: OK. What's the next step?

Tom: Well, there should be a(n) **4** _____ on the test pencil. Pay attention to the lamp. If it is lit, it means that **5** _____ has been detected; if not, then there is no voltage in the power strip.

Mike: Well, let me see.

Tom: Is the lamp lit?

Mike: No, it isn't. What can I do then?

Tom: No worries, I will come in 20 minutes and check your power strip.

Mike: Thanks. See you later.

Tom: See you.

Words & Phrases

Words

- indicator /'ɪndəkeɪtər/ n. 指示灯
- feeler /'fi:lər/ n. 探头; 触角
- insulate /'ɪnsəleɪt/ v. 使绝缘; 使隔热
- circuit /'sɜ:kɪt/ n. 电路; 线路
- resin /'rezɪn/ n. 合成树脂

Phrases

- test range 测试范围
- numerical value 数值
- specified voltage 额定电压

Task 2 Playing a game Circle the five words in the word search.

insulate circuit indicator

voltage numerical

N	C	E	D	Q	Z	S	U	V	P
V	I	I	J	C	X	U	V	J	R
Z	O	N	R	B	K	K	D	B	O
J	V	L	S	C	G	Y	C	B	T
T	K	G	T	U	U	A	Z	S	A
E	F	S	U	A	L	I	P	N	C
M	U	V	O	G	G	A	T	P	I
N	J	K	Z	J	I	E	T	M	D
G	H	Z	Q	Z	W	G	T	E	N
N	U	M	E	R	I	C	A	L	I

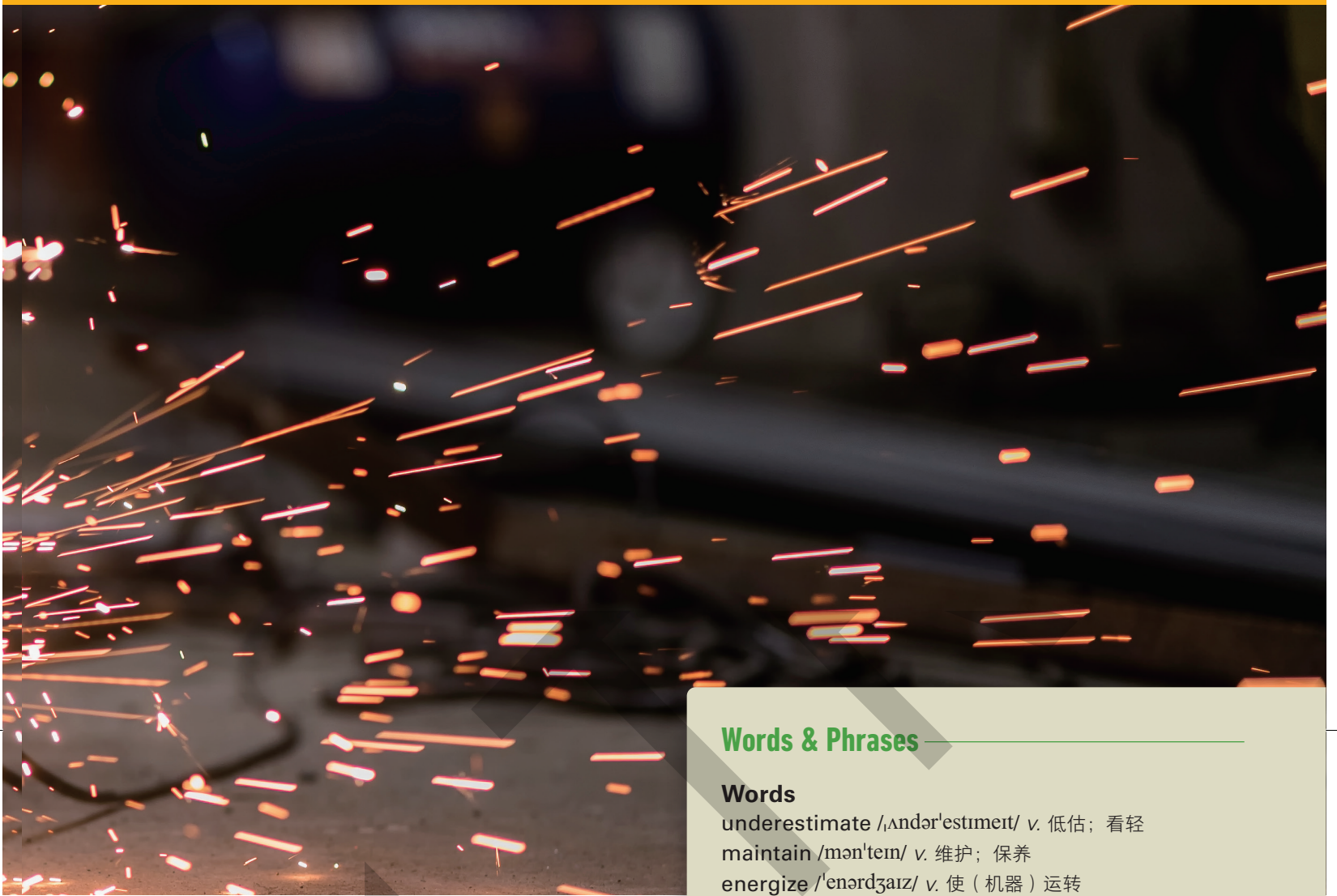
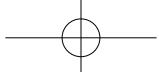


Intensive Reading



Electrical safety—What you don't know CAN harm you!

- 1 Electricity is one of the greatest blessings that science has given to mankind. People rely on electricity, but sometimes **underestimate** its capability to cause injuries. Ignorance of electric injuries may cause harm to people, especially workers who routinely handle and **maintain energized** equipment.
- 2 There are basically two ways in which workers can be injured by electricity. One is through an electric shock and the other is through an arc flash. An electric shock happens when an electric **current** passes through the body, causing burns, abnormal heart rhythms and unconsciousness. The shock can take many forms, but it is always serious. For example, a worker accidentally comes into contact with an energized bus bar and suffers a severe shock when he is **servicing** a piece of machinery in a factory. Or an **electrician** is **electrocuted** while repairing a heating and air conditioning unit located on a commercial building's roof. The **severity** of the injuries depends on the voltage of electricity, the person's state of health, how the current travels through the body and how quickly medical help is received. An arc flash is a release of energy caused by an electric arc. **Potential** causes of an arc flash may include workers mistakenly dropping tools on **live** parts, improper use of test equipment, and dust or moisture **accumulating** to weaken air-insulated bus bars. An arc flash can cause injuries ranging from **minor** to third-degree



burns, and even death. Other possible injuries include blindness, hearing loss, nerve damage, and cardiac arrest.

- ³ Several measures can be taken to reduce the risk of injuries caused by electricity. One of the most important things people can do to keep themselves and others safe when working on electrical systems is to use the proper personal protective equipment (PPE). Many types of PPE are designed specifically to keep people safe from electric injuries. Choosing the gear based on the specific type of electrical system people will be working on can help to minimize the risk of electric injuries caused by an electric shock and an arc flash.

Words & Phrases

Words

underestimate /ˌʌndə'restɪmeɪt/ v. 低估; 看轻

maintain /mə'nteɪn/ v. 维护; 保养

energize /'enədʒaɪz/ v. 使 (机器) 运转

current /'kʌrənt/ n. 电流

service /'sɜːrvɪs/ v. 检修; 维修

electrician /ɪ'lek'trɪʃən/ n. 电工; 电力技师

electrocute /ɪ'lektroʊkjʊt/ v. 使触电受伤 (身亡)

severity /sə'verəti/ n. 严重

potential /pə'tenʃəl/ adj. 潜在的; 可能的

live /laɪv/ adj. (电线或设备) 通电的, 带电的

accumulate /ə'kjʊ:mjəleɪt/ v. 堆积; 聚集

minor /'maɪnər/ adj. 小的; 不很严重的

gear /gɪr/ n. 一套设备 (工具)

Phrases

rely on 依赖; 依靠

electric shock 触电

arc flash 电弧闪光

bus bar 母线; 汇流条

cardiac arrest 心搏停止

personal protective equipment (PPE) 个人防护装备

Intensive Reading

Task 1 Words Fill in the blanks with the correct form of the words given in the boxes.

maintain

current

service

electrocute

live

- 1 Switch off the electric _____ before changing the bulb.
- 2 A(n) _____ wire or piece of electrical equipment is directly connected to a source of electricity.
- 3 The road lamps in the town have been very poorly _____.
- 4 He was _____ when he touched the bare wires.
- 5 I'm going to have the car _____ next week.

Word Formation

形容词转换为副词的规则:

1. 一般直接加 -ly;
2. -le 结尾将 e 变成 y;
3. 辅音字母加 -y 结尾, 变 y 为 i, 再加 -ly;
4. 其他特殊变化。

Task 2 Grammar Change the following adjectives into adverbs. Then find some adjectives from the passage and change them into adverbs.

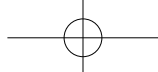
Adjectives

- 1 accidental
- 2 quick
- 3 mistaken
- 4 specific
- 5 considerable
- 6 heavy
- 7 dull
- 8 polite

Adverbs

Adjectives from the passage

Adverbs



Task 3 Reading strategy Read the text and tick the potential negative effects caused by an electric shock and an arc flash.

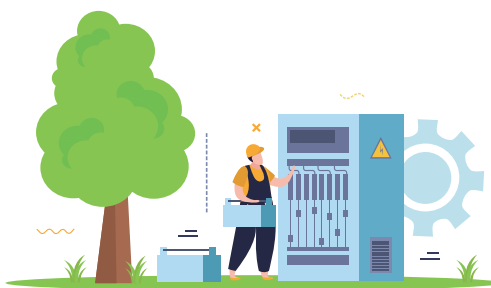
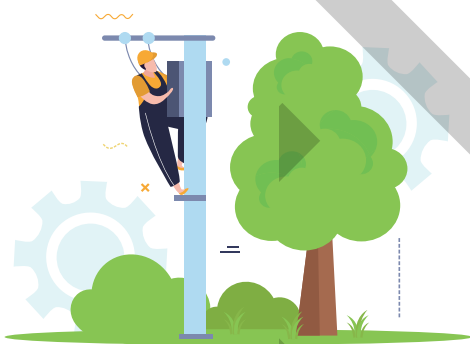
Electric shock	Arc flash
<input type="checkbox"/> burns	<input type="checkbox"/> minor to third-degree burns
<input type="checkbox"/> abnormal heart rhythms	<input type="checkbox"/> death
<input type="checkbox"/> unconsciousness	<input type="checkbox"/> blindness
<input type="checkbox"/> scalds	<input type="checkbox"/> hearing loss
<input type="checkbox"/> a severe shock	<input type="checkbox"/> nerve damage
<input type="checkbox"/> fever	<input type="checkbox"/> dizziness
<input type="checkbox"/> electrocution	<input type="checkbox"/> cardiac arrest
<input type="checkbox"/> fracture	<input type="checkbox"/> vomit

Reading Strategy

扫读 (scanning) 又称为扫描式阅读, 是一种快速阅读方法, 目的是为了获得特定信息, 包括时间、名称、地点、数据等。扫读前, 首先要确定需要寻找的信息, 并思考它们会以什么形式出现, 再决定到文章的哪一部分去找。最后快速移动目光, 直到找到所需信息, 仔细阅读这一部分即可。学会扫读, 有助于在短时间内迅速捕捉有效信息与关键词, 提高阅读效率。

Task 4 Reading comprehension Read the text again and decide whether the following statements are true (T) or false (F).

- 1 Underestimating and ignoring electricity's capability to cause injuries may lead to a severe consequence.
- 2 The worker who services a piece of machinery in a factory may suffer an electric shock.
- 3 The severity of the injuries only depends on the voltage of electricity.
- 4 Improper use of test equipment will cause an arc flash.
- 5 Using the proper PPE can minimize the risk of electric injuries caused by an electric shock and an arc flash.





Extensive Reading

Electrical safety methods in the workplace

¹ Employees may be confronted with different kinds of risks when working on or around electric power. Thus, it is of great importance for them to practice safe behavior in the workplace. The following is a five-step safety strategy on how to avoid risks in the working environment.

1 _____

² Many accidents could have been prevented if the injured victim had concentrated on the safety aspects of the job. Thinking about personal or non-work related problems while working on or near energized conductors is a one-way ticket to an accident. Therefore, workers should always stay alert to the electrical hazards around the work area.

2 _____

³ Every company has defined safety procedures that are to be followed. Each worker should be

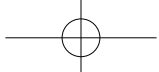
thoroughly familiar with all the safety procedures that affect his or her job. Knowledge of the required steps and the reasons for those steps can save a life. All employees should go through extensive safety training.

3 _____

⁴ Some facilities may allow the violation of safety procedures in the name of production. Such actions have **invariably** proven to be costly in terms of human injury or death. Violation of safety procedures without good cause should be a **discharge offense**. What **constitutes** “good cause” must be decided on a local basis. However, **excuses** of lesser significance than immediate danger to life should not be acceptable.

4 _____

⁵ No matter how **meticulous** workers are, accidents do occasionally happen. Equipment



Words & Phrases

Words

workplace /'wɜ:kpleɪs/ *n.* 工作场所

invariably /ɪn'veəriəbli/ *adv.* 始终不变地; 总是

discharge /'dɪstʃɑ:rdʒ/ *n.* (职责的) 履行

offense /ə'fens/ *n.* 违法行为

constitute /'kɒnstɪtʊ:t/ *v.* 被视为; 被算作

excuse /ɪk'skju:s/ *n.* (辩解的) 理由

meticulous /mə'tɪkjələs/ *adj.* 对细节十分注意的; 一丝不苟的

blast /blæst/ *n.* 爆炸

qualified /'kwɑ:lɪfaɪd/ *adj.* 具备……的学历(资历)的

self-proclaimed /,self prəu'kleɪmd/ *adj.* 自称的; 自封的

Phrases

concentrate on 集中精力于; 全神贯注于

stay alert to 对……警觉

safety procedure 安全规程

immediate danger 紧迫危险; 即刻危险

failures, lightning strikes, switching, surges, and other such events can cause electric shocks, arc flashes, or blasts. Therefore, appropriate safety equipment should be used any time workers are exposed to the possibility of one of the three electrical hazards. Remember that nothing is more regrettable than an accident report which explains that the dead or injured worker was not wearing safety equipment.

5

- 6 No one should ever get fired for asking a question—especially if it is a safety-related one. Anyone who is uncertain about a particular situation should be encouraged to ask questions which should then be answered by a **qualified** person immediately and to the fullest extent possible. No one should answer a question if they are not certain of the answer. **Self-proclaimed** experts should keep their opinions to themselves.

Task 1 Reading comprehension Read the passage and choose the best subheading for Paragraphs 2–6. You can write the letters on the lines.

- A Ask if unsure, and do not assume
- B Understand the safety procedures
- C Follow the safety procedures
- D Use appropriate safety equipment
- E Think—be aware

Task 2 Discussion Nowadays, how can we make the principle of electrical safety deeply rooted in the hearts of people with various new technologies and new media?

Extra Knowledge

Read the following steps of emergency treatment procedure for an electric shock and put them in the correct order.

+ Call for help A

Call the emergency medical services by dialing 120.



+ Check for other injuries D

Someone who has suffered an electric shock might have minimal external evidence of injury. If the victim is bleeding, apply direct pressure with a clean cloth to try to stop or slow blood loss.



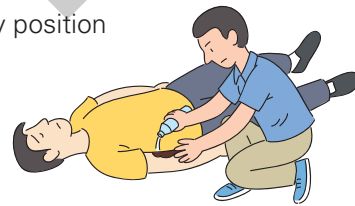
+ Do CPR if necessary B

Do CPR if the victim is not breathing or does not have a pulse.



+ Treat for minor burns E

- 1 If the victim is conscious, immerse the injured area in cool, running water and then cover it with a clean, non-fluffy dressing.
- 2 Place the unconscious victim in the recovery position and cover the burned area with a wet dressing.



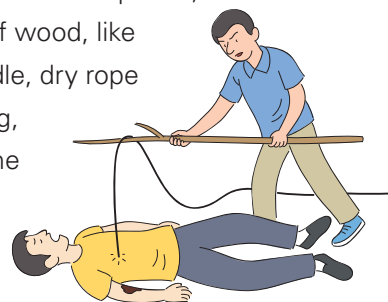
+ Check whether the victim is responsive C

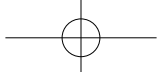
- 1 If the victim responds by answering or moving, leave them in the position you found them providing they are in no further danger.
- 2 If the victim is unresponsive, open their airway and check for breathing.



+ Separate the victim from the current source F

If you can't turn off the power, use a piece of wood, like a broom handle, dry rope or dry clothing, to separate the victim from the power source.

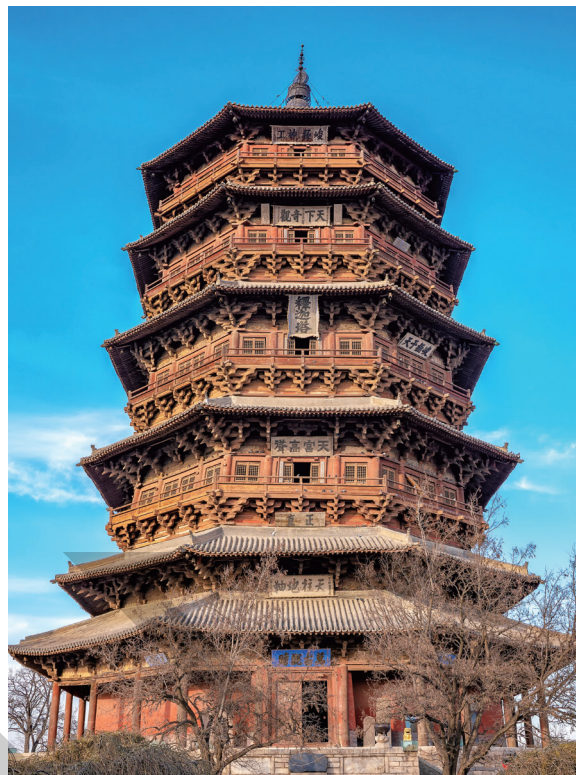




Reading into China

How did the Yingxian Pagoda survive lightning strikes?

Located in Yingxian County, Shanxi Province, the Yingxian Pagoda (应县木塔) is the oldest and tallest full-wooden pagoda still standing in China. According to modern records, it remained unaffected by two lightning strikes in the 1950s that occurred within 100 meters of the tower. On the top of the pagoda, there is an iron brake (铁刹) made entirely of an iron pestle, which functions as a lightning rod (避雷针). In addition, there are eight iron chains around it, which can conduct the thunder down from the tower. It is due to these facilities that the Yingxian Pagoda was spared from lightning strikes in history.



Similarly, the Cishi Pagoda (慈氏塔) (reconstructed in 1100 AD) in Yueyang City, Hunan Province has six iron chains hanging from the top of the tower to the ground along six corners to prevent lightning strikes. Some other ancient pagodas also sunk such iron chains into wells to achieve good grounding (接地) as well as to protect themselves against lightning strikes.

My Learning Log

Words & Phrases The words and phrases I have learned in this unit are:

Grammar The grammar I have learned in this unit is:

Reading Strategy The reading strategy I have learned in this unit is:

Knowledge Another thing I want to find out about electrical safety is: