

ỦY BAN NHÂN DÂN THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG CAO ĐẲNG LÝ TỰ TRỌNG THÀNH PHỐ HỒ CHÍ MINH

GIÁO TRÌNH

MÔN HỌC/MÔ ĐUN: ANH VĂN CHUYÊN NGÀNH
NGÀNH/NGHỀ: CÔNG NGHỆ CHẾ TẠO MÁY
TRÌNH ĐỘ: CAO ĐẲNG

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của Hiệu trưởng Trường Cao đẳng Lý Tự Trọng Thành phố Hồ Chí Minh*

LƯU HÀNH NỘI BỘ

TUYÊN BỐ BẢN QUYỀN:

Tài liệu này thuộc loại sách giáo trình nên các nguồn thông tin có thể được phép dùng nguyên bản hoặc trích dùng cho các mục đích về đào tạo nghề và tham khảo.

Mọi mục đích khác mang tính lệch lạc hoặc sử dụng với mục đích kinh doanh thiếu lành mạnh sẽ bị nghiêm cấm.

LỜI GIỚI THIỆU

Tiếng Anh chuyên ngành cơ khí là kiến thức vô cùng quan trọng mà các kỹ sư cần phải có để học tập và làm việc tốt hơn trong môi trường nước ngoài. Nhiều người nghĩ rằng tiếng Anh có vẻ sẽ không mấy quan trọng vì cứ suy nghĩ rằng làm kỹ thuật thì không cần dùng tiếng Anh, Tuy nhiên, bất cứ một ngành nào đều cũng có thuật ngữ chuyên ngành riêng, tức là có tiếng Anh chuyên ngành riêng.

Các doanh nghiệp cơ khí hiện nay đã và đang đòi hỏi ứng viên của mình phải có trình độ giao tiếp tiếng Anh cơ bản và tiếng Anh chuyên ngành để có thể ứng dụng trong việc đọc bản vẽ, đọc các tài liệu nước ngoài, catalogue ... chưa kể đến việc phải giao tiếp với cấp trên hoặc đồng nghiệp là người nước ngoài.

Nhằm giúp người học có thể đọc hiểu và dịch được một số tài liệu chuyên ngành tiếng Anh cơ khí một cách chuẩn xác nhất, tôi đã chọn và trích xuất từ giáo trình nước ngoài “Oxford English for Electrical and Mechanical Engineering” để đưa vào chương trình giảng dạy.

Giáo trình gồm 5 bài trình bày những chủ đề cơ bản trong lĩnh vực kỹ thuật cơ khí, giúp người học có thể tăng cường vốn từ vựng cũng như các kỹ năng khác, từ đó có thể đọc hiểu tài liệu kỹ thuật và làm việc một cách thuận lợi hơn. Cấu trúc ngữ pháp trong Anh văn kỹ thuật thường đơn giản, dễ hiểu, dễ dàng dịch sang tiếng Việt.

Rất trân trọng cảm ơn.

Thành phố Hồ Chí Minh, ngày.....tháng.... năm 20

Chủ biên

Đỗ Thị Phương Khanh

MỤC LỤC

ĐỀ MỤC	TRANG
Lời giới thiệu	2
Mục lục	3
Unit 1. Engineering – What’s it all about?	4
1.1 Introduction	4
1.2 Reading	5
1.3 Language study	7
1.4 Word study	8
1.5 Writing	8
1.6 Listening	9
Unit 2. Engineering materials	10
2.1 Tuning – in	10
2.2 Reading	11
2.3 Language study	13
2.4 Writing	13
Unit 3. Mechanisms	15
3.1 Tuning-in	15
3.2 Reading	17
3.3 Writing	18
3.4 Language study	19
3.5 Speaking practice	19
Unit 4. Forces in engineering	21
4.1 Tunimng- in	21
4.2 Reading	24
4.3 Language study	26
4.4 Listening	26
Unit 5. Safety at work	28
5.1 Tuning-in	29
5.2 Reading	31
5.3 Language study	32
5.4 Writing	32
Tài liệu tham khảo	34

GIÁO TRÌNH MÔN HỌC

ANH VĂN CHUYÊN NGÀNH

Tên môn học: Anh Văn chuyên ngành

Mã môn học: CK124

I. Vị trí, tính chất, ý nghĩa và vai trò của môn học

- Vị trí: Môn học được giảng dạy vào năm học thứ 2 của ngành học Công nghệ chế tạo máy
- Tính chất: Là môn học hỗ trợ trong chương trình học ngành Công nghệ chế tạo máy
- Ý nghĩa và vai trò của môn học:
 - + Ý nghĩa: giúp người học có một số từ vựng chuyên ngành cơ khí, từ đó có thể đọc hiểu được các tài liệu tiếng Anh chuyên ngành Cơ khí
 - + Vai trò: là môn học chuyên môn nghề thuộc chuyên ngành công nghệ chế tạo máy.

II. Mục tiêu của môn học

- Về kiến thức:

Sinh viên hiểu được ý nghĩa các thuật ngữ tiếng anh chuyên ngành, các tên gọi tiếng anh của các chi tiết máy, máy cắt kim loại, các lực trong lĩnh vực kỹ thuật cơ khí.
- Về kỹ năng:

Sinh viên đọc được, tóm tắt và dịch các tài liệu liên quan đến chuyên ngành cơ khí; khả năng trình bày bằng tiếng Anh các vấn đề cơ khí dựa trên khả năng phân tích, tổng hợp tài liệu liên quan đến chuyên ngành cơ khí.
- Về năng lực tự chủ và trách nhiệm:

Sinh viên phải có thái độ học tập nghiêm túc, chủ động trong học tập, phải có trách nhiệm hoàn thành nội dung học tập của cá nhân và của nhóm do Giảng viên hướng dẫn yêu cầu.

III. Nội dung của mô đun:

Bài 1. Engineering - what's it all about?

Giới thiệu:

Trong bài này giới thiệu về ngành cơ khí, về các lĩnh vực của ngành cơ khí

Mục tiêu:

Sau khi học xong bài này sinh viên phải:

- + An ability to read and write about engineering in general.

Nội dung chính:

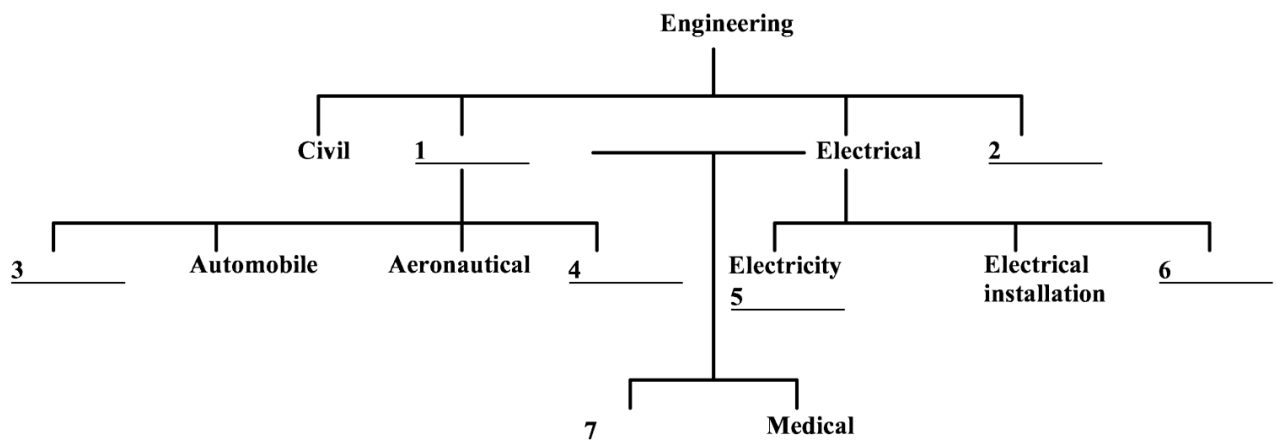
1.1 Introduction

Task 1 List the main branches of engineering. Combine your list with others in your group. Then read this text to find out how many of the branches listed are mentioned.

Engineering is largely a practical activity. It is about putting ideas into action. Civil engineering is concerned with making bridges, roads, airports etc. Mechanical engineering deals with the design and manufacture of tools and machines. Electrical engineering is about the generation and distribution of electricity and its many applications. Electronic engineering is concerned with developing components and equipment for communications, computing, and so on.

Mechanical engineering includes marine, automobile, aeronautical, heating and ventilating, and others. Electrical engineering includes electricity generating, electrical installation, lighting, etc. Mining and medical engineering belong partly to mechanical and partly to electrical.

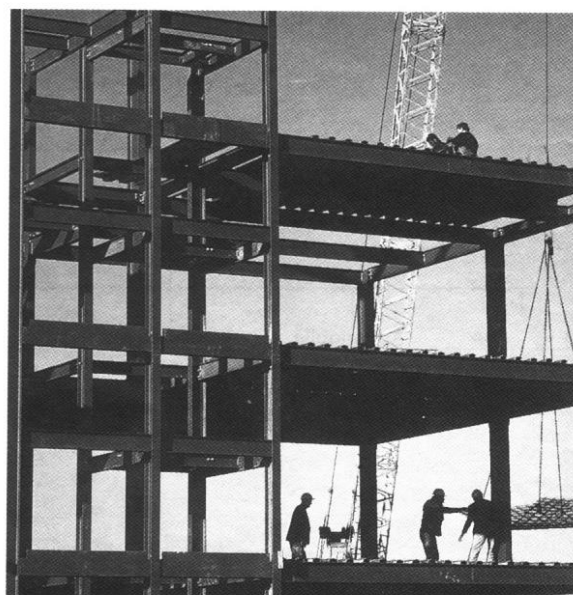
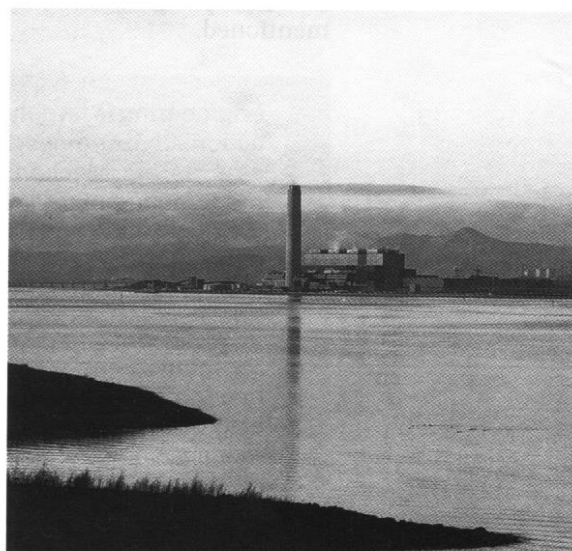
Task 2 Complete the blanks in this diagram using information from the text.



1.2 Reading *Introduction*

In your study and work, it is important to think about what you are going to read before you read. This helps you to link old and new knowledge and to make guesses about the meaning of the text. It is also important to have a clear purpose so that you choose the best way to read. In this book, you will find tasks to make you think before you read and tasks to help you to have a clear purpose when you read.

Task 3 Study these illustrations. They show some of the areas in which engineers work. Can you identify them? What kinds of engineers are concerned with these areas – electrical, mechanical, or both?



Task 4 Now read the following texts to check your answers to Task 3. Match each text to one of the illustrations above.

Transport: Cars, trains, ships, and planes are all products of mechanical engineering. Mechanical engineers are also involved in support services such as roads, rail track, harbours, and bridges.

Food processing: Mechanical engineers design, develop, and make the machines and the processing equipment for harvesting, preparing and preserving the foods and drinks that fill the supermarkets.

Medical engineering: Body scanners, X-ray machines, life-support systems, and other high-tech equipment result from mechanical and electrical engineers combining with medical experts to convert ideas into life-saving and preserving products.

Building services: Electrical engineers provide all the services we need in our homes and places of work, including lighting, heating, ventilation, air-conditioning, refrigeration, and lifts.

Energy and power: Electrical engineers are concerned with the production and distribution of electricity to homes, offices, industry, hospitals, colleges and schools, and the installation and maintenance of the equipment involved in these processes.

(Source: Adapted from *Turning ideas into action*, Institution of Mechanical Engineers, and *Engineering a career*, Institution of Electronics and Electrical Incorporated Engineers.)

1.3 Language study

deals with/ is concerned with

What is the link between column **A** and column **B**

A

Mechanical

Electrical

B

machines

electricity

Column **A** lists a branch of engineering or a type of engineer. Column **B** lists things they are concerned with. We can show the link between them in a number of ways:

1. *Mechanical engineering **deals with** machines.*
2. *Mechanical engineers **deal with** machines.*
3. *Mechanical engineering **is concerned with** machines.*
4. *Mechanical engineers **are concerned with** machines.*
5. *Machines **are the concern of** mechanical engineers.*

Task 5 Match each item in column **A** with an appropriate item from column **B** and link the two in a sentence.

A

1 marine

2 aeronautical

3 heating and ventilating

4 electricity generating

5 automobile

6 civil

7 electronic

8 electrical installation

9 medical

B

a air-conditioning

b roads and bridges

c body scanners

d cables and switchgear

e communications and equipment

f ships

g planes

h cars and trucks

i power stations

1.4 Word study Word stress

Words are divided into syllables. For example:

Engine	en.gine
Engineer	en.gin.eer
Engineering	en.gin.eer.ing

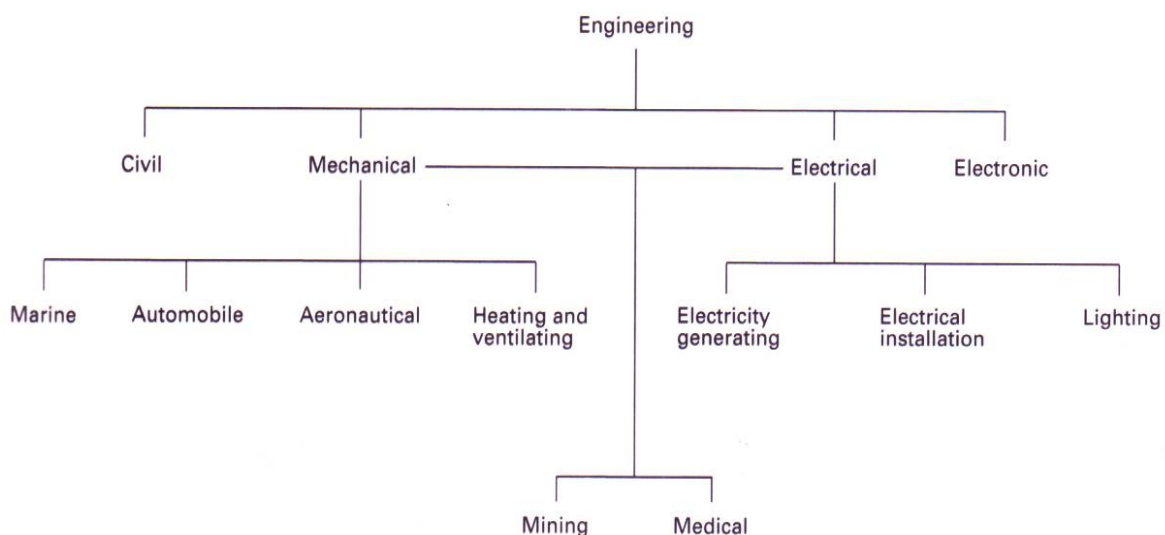
Each syllable is pronounced separately, but normally only one syllable is stressed. That means it is said more slowly and clearly than the other syllables. We say 'engine but *engin*'eer. A good dictionary will show the stressed syllables.

Task 6 🎧 Listen to these words. Try to mark the stressed syllables.

- 1 machinery
- 2 mechanical
- 3 Machine
- 4 Install
- 5 Installation
- 6 electricity
- 7 Electrical
- 8 electronics
- 9 aeronautical
- 10 ventilation

1.5 Writing

Task 7 Fill in the gaps in the following description of the different branches of engineering using information from this diagram and language you have studied in this unit.



The main branches of engineering are civil, ¹, ², and electronic. Mechanical engineering is ³, ⁴ machinery of all kinds. This branch of engineering includes ⁵, automobile, ⁶, and heating and ventilating. The first three are concerned with transport: ⁷, cars and planes. The last ⁸ with air-conditioning, refrigeration, etc.

Electrical engineering deals with ⁹ from generation to use. Electricity generating is concerned with ¹⁰ stations. Electrical installation deals ¹¹ cables, switchgear, and connecting up electrical equipment.

Two branches of engineering include both ¹² and ¹³ engineers. These are mining and ¹⁴ engineering. The former deals with mines and mining equipment, the latter with hospital ¹⁵ of all kinds.

1.6 Listening

Task 8 🎧 Listen to these short extracts. To which branch of engineering do these engineers belong?

Task 9 🎧 Listen again. This time note the words which helped you decide on your answers.

Review question

- 1/ Study new words
- 2/ Translate the text into Vietnamese
- 3/ Complete task 5

Bài 2. Engineering materials

Giới thiệu:

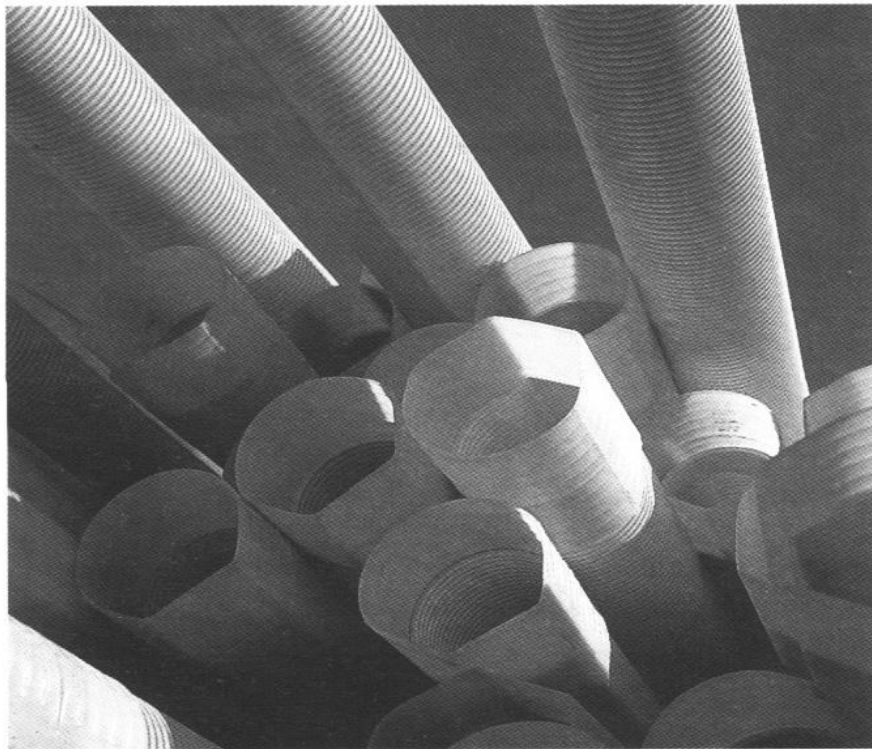
Trong bài này chúng ta sẽ tìm hiểu về các loại vật liệu thường dùng trong ngành cơ khí, về đặc tính và công dụng của các loại vật liệu đó

Mục tiêu:

Sau khi học xong bài này sinh viên phải:

- + Scanning tables.
- + Reading and writing about engineering materials.

Nội dung chính:



Ribbed plastic pipes stacked near a road construction site where they will be laid for drainage along the sites of a new section of motorway

2.1 Tuning-in

Task 1 List the materials you know which are used in engineering. Combine your list with the others in your group and classify the materials as metals, thermoplastics, etc.

2.2 Reading *Scanning tables*

In engineering it is important to practise reading tables, charts, diagrams, and graphs because so much information is presented in these ways. We will start in this unit with a table.

Scanning is the best strategy for finding information in a table. With scanning, you know before you read what sort of information you are searching for. To scan a table, you move your eyes up and down the columns until you find the word or words you want. To scan quickly, you must learn to ignore any information which will not help you with your task.

Task 2 Scan the table which follows to find a material which is:

1. soft
2. ductile
3. malleable
4. tough
5. scratch-resistant
6. conductive and malleable
7. durable and hard
8. stiff and brittle
9. ductile and corrosion-resistant
10. heat-resistant and chemical-resistant

Materials	Properties	Uses
Metals		
Aluminium	Light, soft, ductile, highly conductive, corrosion-resistant.	Aircraft, engine components, foil, cooking utensils.
Copper	Very malleable, tough and ductile, highly conductive, corrosion-resistant.	Electric wiring, PCBs, tubing
Brass(65% copper, 35% zinc)	Very corrosion-resistant. Casts well, easily machined. Can be work hardened. Good conductor.	Valves, taps, castings, ship fittings, electrical contacts
Mild steel(iron with 0.15% to 0.3% carbon)	High strength, ductile, tough, fairly malleable. Cannot be hardened and tempered. Low cost. Poor corrosion resistance.	General purpose

High carbon steel (iron with 0.7% to 1.4% carbon)	Hardest of the carbon steels but less ductile and malleable. Can be hardened and tempered.	Cutting tools such as drills, files, saws.
Thermoplastics		
ABS	High impact strength and toughness, scratch-resistant, light and durable.	Safety helmets, car components, telephones, kitchenware.
ACRYLIC	Stiff, hard, very durable, clear, can be polished easily. Can be formed easily.	Aircraft canopies, baths, double glazing.
NYLON	Hard, tough, wear-resistant, self-lubricating.	Bearings, gears, casings for power tools.
Thermosetting plastics		
Epoxy resin	High strength when reinforced, good chemical and wear resistance.	Adhesives, encapsulation of electronic components
Polyester resin	Stiff, hard, brittle. Good chemical and heat resistance.	Moulding, boat and car bodies.
Urea formaldehyde	Stiff, hard, strong, brittle, heat-resistant, and a good electrical insulator.	Electrical fittings, adhesives.

Task 3 Scan the table to find:

1. A metal used to make aircraft
2. Plastics used for adhesives
3. Steel which can be hardened
4. An alloy suitable for castings
5. A plastic with very low friction
6. A material suitable for safety helmets
7. A metal suitable for a salt-water environment
8. A metal for general construction use but which should be protected from corrosion
9. A plastic for car bodies
10. The metal used for conductors in printed circuit boards.

2.3 Language study *Making definitions*

Study these facts from the table about aluminium:

1. Aluminium is a light metal.
2. Aluminium is used to make aircraft.

We can link these facts to make a definition of aluminium:

1+2 *Aluminium is a light metal **which** is used to make aircraft.*

Task 4 Use the table on the previous page to make definitions of each of the materials in column **A**. Choose the correct information in columns **B** and **C** to describe the materials in column **A**.

A	B	C
1. An alloy		allows heat or current to flow easily
2. A thermoplastic		remains rigid at high temperatures
3. Mild steel		does not allow heat or current to flow easily
4. A conductor	a metal	contains iron and 0.7% to 1.4% carbon
5. An insulator	a material	becomes plastic when heated
6. High carbon steel	an alloy	contains iron and 0.15% to 0.3% carbon
7. Brass		formed by mixing metals or elements
8. A thermosetting plastic		consists of copper and zinc

2.4 Writing *Adding information to a text*

Study this text about aluminium.

Aluminium is used to make aircraft, engine components, and many items for the kitchen.

We can add extra information to the text like this:

Aluminium, **which is light, soft and ductile**, is used to make aircraft, engine components – **for example, cylinder heads** – and many items for the kitchen, **such as pots**.

Note that the extra information is marked with commas or dashes:

, *which* ... ,
– *for examples*, ... –
, *such as*

Task 5 Add this extra information to the following text about plastics.

1. Plastics can be moulded into plates, car components, and medical aids.
2. Thermoplastics soften when heated again and again.

3. Thermosetting plastics set hard and do not alter if heated again.
4. ABS is used for safety helmets.
5. Nylon is self-lubricating.
6. Nylon is used for motorized drives in cameras.
7. Acrylic is a clear thermoplastic.
8. Acrylic is used for aircraft canopies and double glazing.
9. Polyester resin is used for boat and car bodies.
10. Polyester resin is hard and has good chemical and heat resistance.

Plastics are synthetic materials. They can be softened and moulded into useful articles. They have many applications in engineering. There are two types of plastics: thermoplastics and thermosetting plastics.

ABS is a thermoplastic which is tough and durable. Because it has high impact strength, it has applications where sudden loads may occur.

Nylon is a hard, tough thermoplastic. It is used where silent, low-friction operation is required.

Acrylic can be formed in several ways. It is hard, durable, and has many uses.

Polyester resin is a thermosetting plastic used for castings. It has a number of useful properties.

Review question

- 1/ Study new words
- 2/ Translate the text into Vietnamese
- 3/ Complete task 4 and task 5

Bài 3: Mechanisms

Giới thiệu:

Trong bài này sẽ giới thiệu các cơ cấu đặc biệt thường dùng trong cơ khí và trong cuộc sống

Mục tiêu:

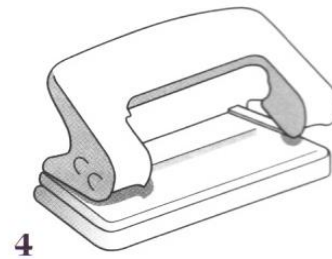
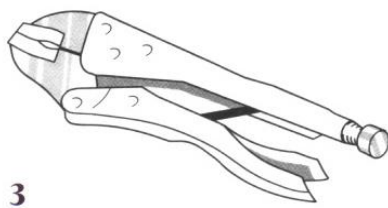
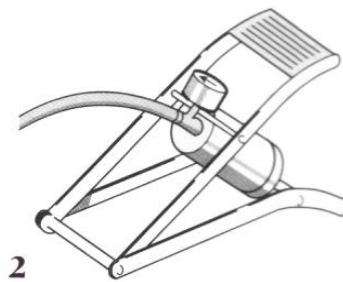
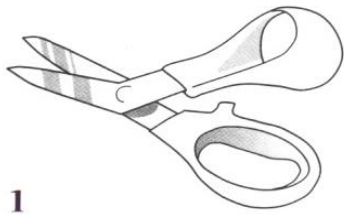
Sau khi học xong bài này sinh viên phải:

- Scanning a text
- Reading and writing about mechanisms

Nội dung chính:

3.1 Tuning-in

Task 1 Identify these simple mechanisms. Try to explain the principles on which they operate.



3.2 Reading *Scanning a text*

Scanning is the best strategy for searching for specific information in a text. Move your eyes up and down the text until you find the word or words you

want. Again, try to ignore any information which will not help you with your task.

Task 2 Scan the text opposite quickly to find out which of these mechanisms are mentioned.

- | | |
|-------------|--------------|
| 1. cam | 4. foot pump |
| 2. tap | 5. escalator |
| 3. pendulum | |

Mechanisms

Mechanisms are an important part of everyday life. They allow us to do simple things like switch on lights, turn taps, and open doors. They also make it possible to use escalators and lifts, travel in cars, and fly from continent to continent.

Mechanisms play a vital role in industry. While many industrial processes have electronic control systems, it is still mechanisms that deliver the power to do the work. They provide the forces to press steel sheets into car body panels, to lift large components from place to place, to force plastic through dies to make pipes.

All mechanisms involve some kind of motion. The four basic kinds of motion are:

Rotary: Wheels, gears, and rollers involve rotary movement.

Oscillating: The pendulum of a clock oscillates – it swings backwards and forwards.

Linear: The linear movement of a paper trimmer is used to cut the edge of the paper.

Reciprocating: The piston in a combustion engine reciprocates.

Many mechanisms involve changing one kind of motion into another type. For example, the reciprocating motion of a piston is changed into a rotary motion by the crankshaft, while a cam converts the rotary motion of the engine into the reciprocating motion required to operate the valves.

Task 3 Now read the text to find the answers to these questions.

1. What does a cam do?
2. What does oscillating mean?
3. How are plastic pipes formed?
4. What simple mechanisms in the home are mentioned directly or Indirectly?
5. What is the function of a crankshaft?
6. Give an example of a device which can produce a linear movement.
7. How are car body panels formed?
8. What do mechanisms provide in industry?

3.3 Writing *Ways of linking ideas*

When we write, we may have to describe, explain, argue, persuade, complain, etc. In all these forms of writing, we use ideas. To make our writing effective, we have to make sure our readers can follow our ideas. One way of helping our readers is to make the links between the ideas in our writing.

What are the links between these pairs of ideas? What words can we use to mark the links?

1. Mechanisms are important to us.
2. They allow us to travel.
3. Mechanisms deliver the power to do work.
4. They play a vital role in industry.
5. Friction is sometimes a help.
6. It is often a hindrance.

Sentence 2 is a *reason* for sentence 1. We can link 1 and 2 like this:

*Mechanisms are important to us **because/since/as** they allow us to travel.*

Sentence 4 is the *result* of sentence 3. We can link 3 and 4 like this:

*Mechanisms deliver the power to do work **so** they play a vital role in industry.*

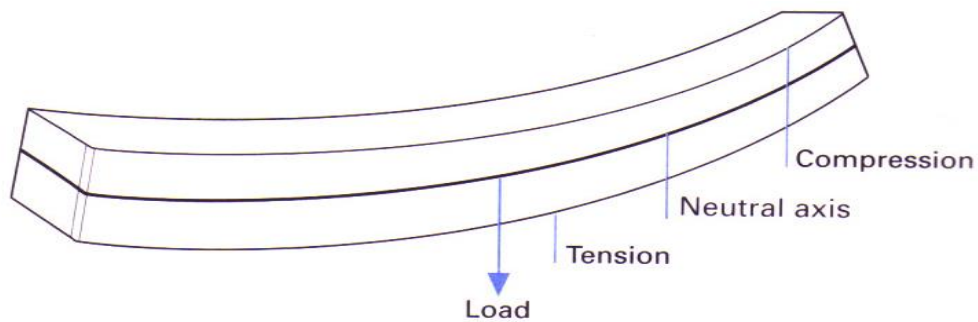
*Mechanisms deliver the power to do work; **therefore** they play a vital role in industry.*

Sentence 6 *contrasts* with sentence 5. We can link 5 and 6 like this.

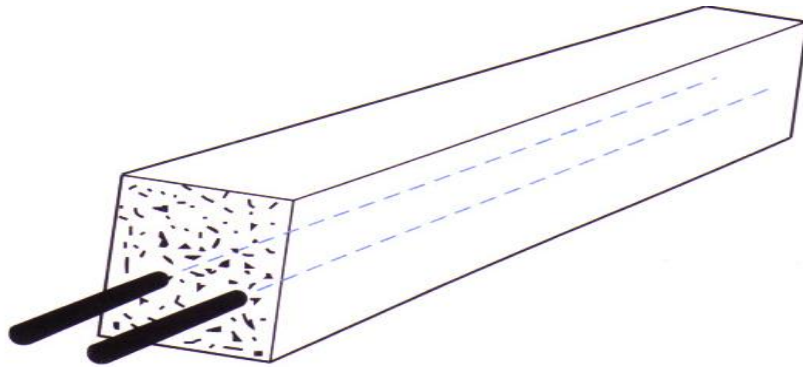
*Friction is sometimes a help **but** it is often a hindrance.*

Task 4 Show the links between these sets of ideas using appropriate linking words.

1. Copper is highly conductive.
It is used for electric wiring.
2. Weight is measured in newtons.
Mass is measured in kilograms.
3. Nylon is used for bearings.
It is self-lubricating.
4. ABS has high impact strength.
It is used for safety helmets.
5. The foot pump is a class 2 lever.
The load is between the effort and the fulcrum.
6. Friction is essential in brakes.
Friction is a nuisance in an engine.



7. The upper surface of a beam is in compression.
The lower surface is in tension.



8. Concrete beams have steel rods near the lower surface.
Concrete is weak in tension.

3.4 Language study *Dealing with technical terms*

One of the difficult things about the English of engineering is that there are many technical terms to learn. Newer terms may be the same, or almost the same, in your own language. But many terms will be quite different and you may not always remember them.

When this happens, you will have to use whatever English you know to make your meaning clear.

The same thing may happen in reverse when you know a technical term but the person you are communicating with does not recognize it. This may happen in the *Speaking practice* tasks in this book. Again, when this happens, you will have to make your meaning clear using other words.

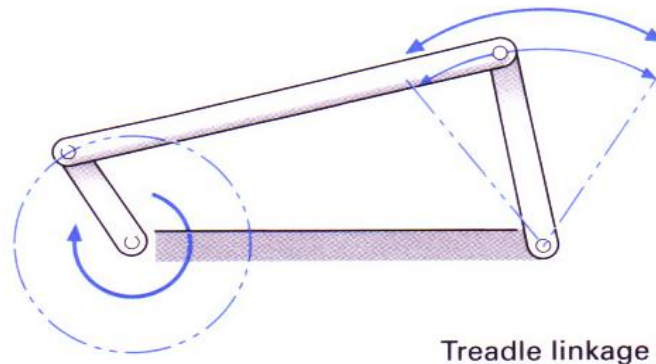
Task 5 The technical words in column **A** are similar in meaning to the more general English in column **B**. Match them.

- A**
1 oscillates
2 rotates

- B**
a changes
b large, thin, flat pieces

- | | |
|-----------------------|---------------------------------|
| 3 reciprocates | c moving stairs |
| 4 has a linear motion | d goes round and round |
| 5 converts | e movement |
| 6 motion | f goes in a line |
| 7 escalator | g swings backwards and forwards |
| 8 sheets | h goes up and down |

Task 6 Try to explain how this simple mechanism operates using whatever English you know. Write your explanation down. Compare your explanation with the technical explanation given on page 4 of the Answer Book. Learn any technical terms which are unfamiliar to you.



Treadle linkage

3.5 Speaking practice

Task 7 Work in pairs, **A** and **B**. Each of you has a diagram of a cam. Describe your diagram to your partner. Your partner should try to reproduce your diagram from the spoken description you provide.

Student A: Your diagram is on page 177.

Student B: Your diagram is on page 181.

The text on the next page will help you with the vocabulary you need.

Cams are shaped pieces of metal or plastic fixed to, or part of, a rotating shaft. A “follower” is held against the cam, either by its own weight or by a spring. As the cam rotates, the follower moves. The way in which it moves and the distance it moves depends on the shape of the cam. Rotary cams are the most common type. They are used to change rotary motion into either reciprocating or oscillating motion.

If you do not understand what your partner says, these questions and phrases may be helpful.

1. Could you say that again/repeat that, please?
2. What do you mean by the cam?
3. Where exactly is the cam?
4. What shape is the cam?
5. How does the cam move?

If your partner does not understand you, try to rephrase what you say.

Review question

- 1/ Study new words
- 2/ Translate the text into Vietnamese
- 3/ Complete task 4 and task 5

Bài 4: Forces in engineering

Giới thiệu:

Trong chương này giới thiệu các lực trong kỹ thuật như trọng lực, lực ma sát và các ứng dụng của các lực....

Mục tiêu:

Sau khi học xong bài này sinh viên phải:

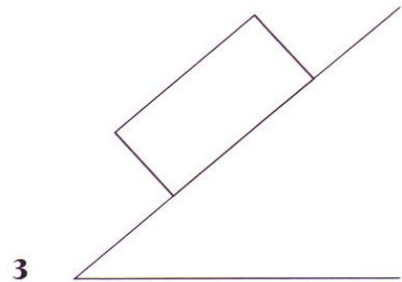
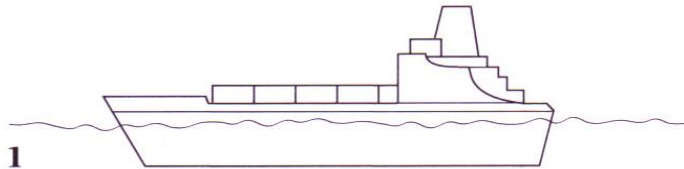
- Reading and writing about forces in engineering.

Nội dung chính:

4.1 Tuning-in

Task 1 Working in your group, try to explain these problems.

1. Why doesn't the ship sink?
2. What makes the spring stretch and what keeps the weight up?
3. Why doesn't the box slide down the slope?



4.2 Reading

Reading 1 *Predicting*

As you learnt in Unit 1, it is important to think about what you are going to read before you read. Do not start to read a text immediately. One way to help your reading is to think about the words which might appear in the text. The title might help to focus your thoughts. Which words might appear in a text with the title *Forces in engineering*?

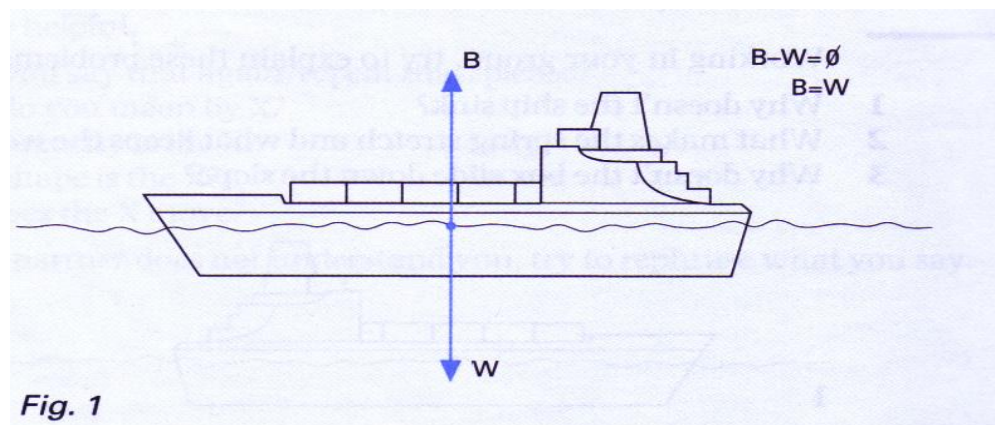
Task 2 The text you are going to read is called *Forces in engineering*. Here are some of the words it contains. Can you explain the link between each word and the title of the text?

weight	buoyancy	equilibrium
elasticity	magnitude	resultant
newton	gravity	

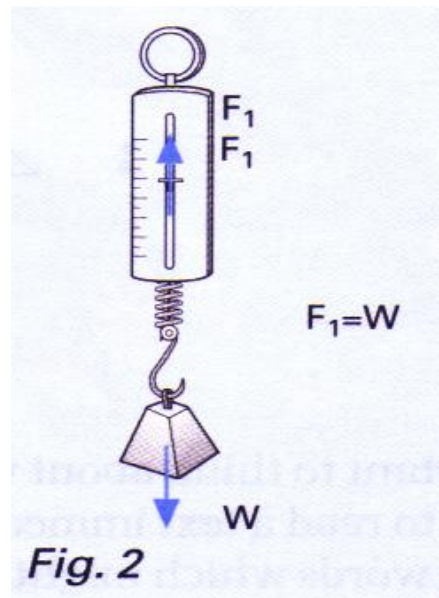
Task 3 Now read the text. Use the information in the text to check the explanations you made in Task 1

Forces in engineering

To solve the ship problem, we must look at the forces on the ship (Fig.1). The weight, W , acts downwards. That is the gravity force. The buoyancy force, B , acts upwards. Since the ship is in equilibrium, the resultant force is zero, so the magnitudes of B and W must be the same.

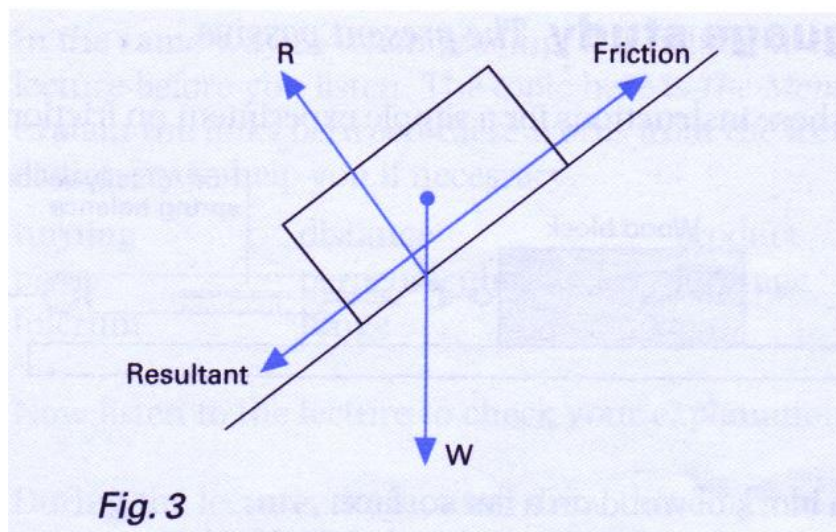


Another very important force in engineering is the one caused by elasticity. A good example of this is a spring. Springs exert more force the more they are stretched. This property provides a way of measuring force. A spring balance can be calibrated in newtons, the unit of force. The block in Fig. 2 has a weight of 10 newtons. The weight on the balance pulls the spring down. To give equilibrium, the spring pulls up to oppose that weight. This upward force, F_1 , equals the weight of the block, W . ($F_1 = W$)



It is important to get the distinction between mass and weight absolutely clear. Mass is the quantity of matter in an object. Weight is the force on that object due to gravity. Mass is measured in kilograms, whereas weight, being a force, is measured in newtons.

We have looked at buoyancy, elasticity, and gravity. There is a fourth force important in engineering, and that is friction. Friction is a help in some circumstances but a hindrance in others. Let us examine the forces on the box (Fig.3). Firstly, there is its weight, W , the gravity force, then there is the reaction, R , normal to the plane. R and W have a resultant force trying to pull the box down the slope. It is the friction force, F , acting up the slope, that stops it sliding down.



Reading 2 Grammar links in texts

One of the ways in which sentences in a text are held together is by grammar links. In this extract, note how each expression in italics links with an earlier expression.

Another very important force in engineering is *the one* caused by elasticity. A good example of *this* is a spring. Springs exert more force the more *they* are stretched. *This* property provides a way of measuring force.

Sometimes these links cause problems for readers because they cannot make the right connection between words in different parts of a text.

Study these common grammar links:

1. A repeated noun becomes a pronoun.
Springs becomes *they*.
2. A word replaces an earlier expression.
Force in engineering becomes *one*.
3. A word replaces a whole sentence or clause.
Springs exert more force the more they are stretched
becomes *This property*.

Task 4 With which earlier expressions do the words in italics link? Join them as in the example above.

Friction in machines is destructive and wasteful. *It* causes the moving parts to wear and *it* produces heat where *it* is not wanted. Engineers reduce friction by using very highly polished materials and by lubricating *their* surfaces with oil and grease. *They* also use ball bearings and roller bearings because rolling objects cause less friction than sliding *ones*.

Source: S. Larkin and L. Bernbaum (eds.), *The Penguin Book of the Physical World*

4.3 Language study *The present passive*

Study these instructions for a simple experiment on friction.

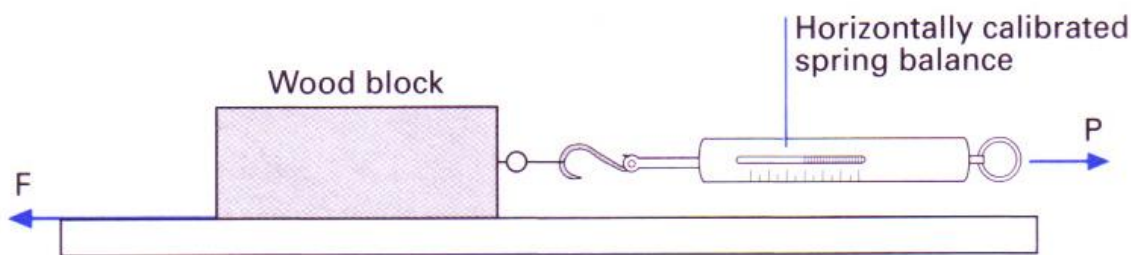


Fig. 4

1. Place a block of wood on a flat surface.
2. Attach a spring balance to one end of the block.
3. Apply a gradually increasing force to the balance.
4. Note the force at which the block just begins to move.
5. Pull the block along so that it moves at a steady speed.
6. Note the force required to maintain movement.
7. Compare the two forces.

When we describe this experiment, we write:

A block of wood *is placed* on a flat surface. A spring balance *is attached* to one end of the block.

This description uses the present passive. We form the present passive using *is/are + past participle*.

Task 5 Complete this description of the experiment using the present passive.

A block of wood (1) _____ on a flat surface. A spring balance (2) _____ to one end of the block. A gradually increasing force (3) _____ to the balance. The force at which the block just begins to move (4) _____.

The block (5) _____ along at a steady speed. The force required to maintain movement (6) _____. The two forces (7) _____. It is found that the first force is greater than the second.

What does this experiment show?

4.4 Listening *Listening to lectures*

The listening passage you are going to hear is an extract from a typical engineering lecture. Here are some of the features of lectures

1. Incomplete sentences: Spoken language is not divided neatly into sentences and paragraphs. For example:
Now what I thought I might do today.... What we are going to talk of...
2. Repetition and rephrasing: Lectures often say the same thing more than once and in more than one way. For example:
It will turn, revolve
3. Signpost expressions: Lectures often use expressions to help the students know what we are going to do next, what is important. etc. For example:
What we are going to talk of is the extension of a force

Task 6

In the same way as when reading. It is helpful to think about the topic of a lecture before you listen. The topic here is The Moment of a Force. Can you explain the links between these words from the lecturer and the topic? Use a dictionary to help you if necessary

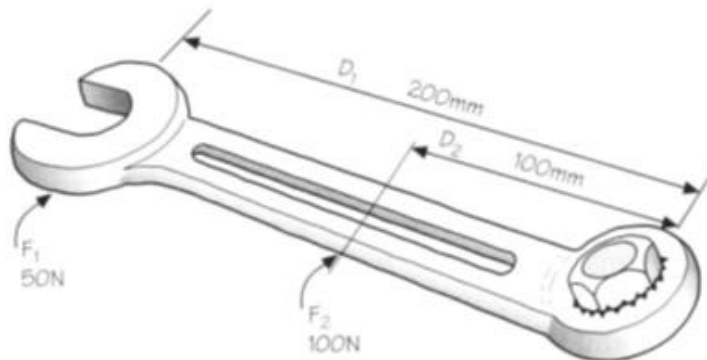
turning	distance	product
Pivot	perpendicular	leverage
fulcrum	hinge	

Task 7

Now listen to the lecture to check your explanations

Task 8

During the lecture, the lecturer drew this diagram on the board. Which of the words in Task 6 can be used to talk about the diagram?



Task 9

Here are some signpost expressions from the lecture. What do you think the lecturer is indicating each time? Select from the labels below, a to e

1. We're going to talk about the moment of a force
2. If you can think of a spanner
3. But what you have to remember is...
4. Something simple to illustrate.
5. I'm thinking of a practical job.
6. Why do we put a handle there on the door
7. Is that understood? All right?
8. Well that is then a little explanation of how you calculate moments
 - a. Emphasizing an important point
 - b. Showing that the lecture is over
 - c. Checking that the students can follow him
 - d. Introducing the topic of the lecture
 - e. Giving examples to illustrate the points

Task 10

Listen to the tape again and answer these questions according to the information given by the lecturer

1. What advantage does a longer spanner offer in loosening in tight nut?
2. What is the formula for calculating the moment of a force
3. Why is it sometimes difficult to apply a force at right angles in a motor car engine?
4. Why is the handle of a door at the edge?
5. Write down the formulae for calculating force and distance.

Review question

- 1/ Study new words
- 2/ Translate the text into Vietnamese
- 3/ Complete task 5 and task 9

Bài 5: Safety at work

Giới thiệu:

Trong chương này sẽ nghiên cứu về an toàn lao động khi làm việc trong các công ty cơ khí, các xưởng sản xuất cơ khí

Mục tiêu:

Sau khi học xong bài này sinh viên phải:

- Making safety rules and linking ideas.

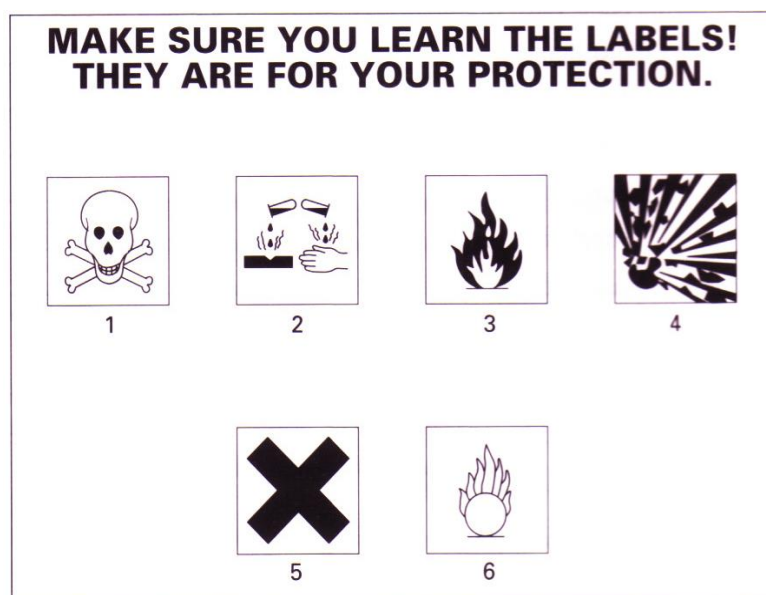
Nội dung chính:



5.1 Tuning-in

Task 1 What do these warning labels on chemicals mean? Match each label to the correct warning.

- a** Highly flammable
- b** Harmful
- c** Explosive
- d** Corrosive
- e** Oxidizing
- f** Toxic



Task 2 List some of the potential dangers in your laboratory, workshop, or place of work. How is the risk of these hazards reduced?

Task 3 Study the safety instructions from a workshop below, and then answer these questions.

- a Who are these instructions for?
- b Who wrote them?
- c What was the writer's purpose?

- 1 Wear protective clothing at all times.
- 2 Always wear eye protection when operating lathes, cutters, and grinders and ensure the guard is in place.
- 3 Keep your workplace tidy.
- 4 The areas between benches and around machines must be kept clear.
- 5 Tools should be put away when not in use and any breakages and losses reported.
- 6 Machine should be cleaned after use.

5.2 Reading *Understanding the writer's purpose*

Knowing what the writer's purpose is, who the writer is, and who the intended readers are can help us to understand a text. The safety instructions in Task 3 are clearly intended to encourage employees to be safety conscious and reduce the risk of accidents. The writer is perhaps a supervisor or the company safety officer, and the intended readers are machine operatives. Knowing these things can help us to work out the meaning of any part of the text we may not understand.

Task 4 Study the company document on safety on the next page, and then answer these questions.

- 1 Who is this document for?
 - a machine operatives

- b** managers
 - c** all employees
 - d** injured employees
- 2** Who wrote this document?
 - a** trade union representative
 - b** technician
 - c** manager
 - d** medical staff
- 3** What is the writer's intention?
 - a** to prevent accidents
 - b** to ensure speedy help for injured employees
 - c** to protect the company
 - d** to warn about danger

Accident investigation

Whenever an accident occurs that results in any injury (medical case), damage of equipment and material, or both, prompt accident investigation by the immediate manager is required. A written preliminary investigation will be completed by the end of the particular shift or business day on which the accident occurred.

In no event should there be a delay of more than 24 hours. Failure to comply with this requirement may subject the immediate manager to disciplinary action up to and including discharge.

Without adequate accident investigation data the Company may be subjected to costs, claims, and legal action for which it has no defence.

As a minimum, the preliminary accident investigation report will include the following:

- 1 Name, occupation, and sex of injured worker.
- 2 Place and date / time of accident.
- 3 Description of how the accident happened.
- 4 Immediate causes of the accident – unsafe acts and unsafe conditions.
- 5 Contributing causes – manager safety performance, level of worker training, inadequate job procedure, poor protective maintenance, etc.
- 6 Witness(es) – name and department.
- 7 Corrective action taken – when.

The employee who was injured and any employee(s) who witnessed the incident should be separately interviewed as soon as possible. A copy of the report must be submitted to the Manager – Human Resources for review. Another copy of the report is to be retained for a period of not less than the injured employee's length of employment plus five (5) years.

Task 5 Study this brief report of an accident. In which points does it not meet company policy on reporting accidents?

To:	Name Manager	Department & Location Human Resources	Date 17 May
From:	Name D. Taylor	Department & Location Mech. Eng. Workshop	Tel. 6200
Subject	Preliminary Report, Accident, 12 May		

While turning a brass component on Tuesday, last week, Kenneth Oliver, machinist, received an injury to his eye. He was taken to the Eye Hospital where I understand he was operated on. I believe the accident was due to carelessness.

5.3 Language study *Making safety rules*

What are the differences in meaning, if any, between these statements?

- 1 Wear protective clothing.
- 2 Always wear protective clothing.
- 3 Protective clothing must be worn.

We can make safety rules in these ways:

- 1 Use an imperative.
***Wear** protective clothing.*
***Do not wear** loose-fitting clothing.*
- 2 *Always/ Never* are used to emphasize that the rule holds in all cases.
***Always** wear protective clothing.*
***Never** wear loose-fitting clothing.*
- 3 We can use a modal verb passive for emphasis.
*Protective clothing **must** be worn.*
*Protective clothing **should** be worn.*

Task 6 Study this list of unsafe environmental conditions (hazards). Write safety rules to limit these hazards using the methods given above. For example:

inadequate lighting
Lighting must be adequate, or
Lighting should be adequate.

- 1 uneven floors
- 2 unguarded machinery
- 3 untidy workbenches
- 4 untidy workplaces
- 5 badly maintained machinery
- 6 carelessly stored dangerous materials
- 7 inadequate ventilation

- 8 damaged tools and equipment
- 9 machinery in poor condition
- 10 equipment used improperly
- 11 equipment operated by untrained personnel
- 12 apprentices working without supervision

5.4 Writing *Ways of linking ideas, 2*

In Unit 2 we learnt that to make our writing effective, we have to make sure our readers can follow our ideas. We learnt how to mark reasons, results, and contrast in our writing.

What are the links between these ideas? What words can we use to mark the links?

- 1. The accident happened.
- 2. The operator's carelessness.
- 3. The supervisor was not present.

Sentence 2 is a reason for sentence 1. Sentence 3 is an additional reason. We can mark the links between them like this:

*The accident happened **because of** the operator's carelessness. **In addition/ moreover**, the supervisor was not present.*

We use **because of** to introduce a reason which is a noun or noun phrase. We use **in addition** and **moreover** to introduce an additional reason.

What are the links between these ideas? What words can we use to mark the links?

- 4 Suitable protection should be worn.
- 5 Safety helmets should be used where there is a danger of falling objects.

Sentence 5 is an example to illustrate sentence 4. we can mark this in this way:

*Suitable protection should be worn. **For example/ For instance**, safety helmets should be used where there is a danger of falling objects.*

Task 7 Show the links between these sets of ideas using appropriate linking words from this unit and from unit 2.

- 1 Many accidents happen.
Workers' carelessness.
- 2 Education can reduce accidents.
It is important that all workers receive training in basic safety.
- 3 Eye injuries can be serious.
Goggles must be worn for grinding and cutting.
- 4 Safety gloves provide protection for the hands.
They prevent burns.

- They reduce the danger of cuts.
- 5 Safety shoes protect the feet against falling objects.
They prevent the feet getting caught in machinery.
 - 6 Respirators should be worn in dusty conditions.
Dust can damage the lungs.
 - 7 Safety gear exists for every danger.
Each year people are injured.
They refuse or forget to wear the right gear.

Review question

- 1/ Study new words
- 2/ Translate the text into Vietnamese
- 3/ Complete task 5, task 6 and task 7

TÀI LIỆU THAM KHẢO

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