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英汉科普读物

工程英语对话

第一册

——土木、机械工程



ENGINEERING BOOK 1

Civil & Mechanical Engineering

科学普及出版社

内 容 提 要

《工程英语对话》是美国麦克米兰公司出版的专业英语读物，全书分两册。第一册是土木、机械工程，共23课；第二册是电气工程和电子学，共19课。本书主要采用对话形式对土木、机械、电气工程作了通俗的介绍，并提供了大量基础专业词汇和基本句型。内容浅近易懂，文字生动活泼。书末附有课文的参考译文和总词汇表，可供大专院校学生和科技人员学习专业英语用。

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ENGINEERING (1)

CIVIL AND MECHANICAL ENGINEERING

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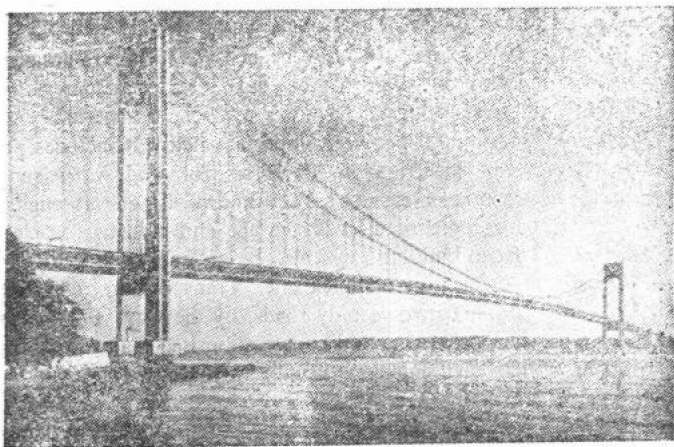
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Triborough Bridge and Tunnel Authority

LESSON 1

CIVIL ENGINEERING

A. Dialogue

Professor: Have a seat. What can I do for you?

Student: I'm going to be an engineer, but I'm having a little trouble deciding which field to go into. The Dean suggested that I have a talk with you about the work of a civil engineer.

Professor: Well, I don't know how helpful I can be, but I'll be glad to give you some general idea of the field.

Student: Good. That's just what I want.

Professor: One of the better known areas is construction engineering. It deals with the construction of all kinds of structures, like bridges, factories, dams, and so on.

Student: Does it include the design?

Professor: Not necessarily. The structural engineer will usually do this. His job, of course, is to follow the general design and make sure that the structures are sound. He will have to figure stresses and strains, size of

beams, etc. It's a very demanding field, because it usually involves a great deal of mathematics.

Student: I see. What about water control, in general?

Professor: Oh, yes. This is an important field. It includes problems in irrigation, flood control, and water supply. Another area, not so well known, is sanitary engineering, which deals with sewage and industrial waste.

Student: Road building must also be an important field.

Professor: And a very complex one. Transportation engineering doesn't involve only roads, by the way. For instance, airport design and construction is a major concern.

Student: Do civil engineers usually work with a company?

Professor: Usually, yes. There are large as well as small civil engineering firms. Their size depends on the scale of the projects they undertake. A smaller number of civil engineers become what are known as consultant engineers. They are experts in particular fields, and they are consulted by larger firms on specific projects.

Student: Well, thank you very much.

Professor: O K. Lots of luck in your career.

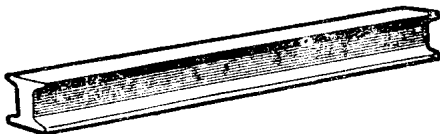
B. Terminology Practice

beam: as used here, the horizontal support of a structure

The structural engineer will have to figure the size of beams.

The load on a beam determines its size and shape.

The stress on a beam is an important structural problem.



civil engineer: an engineer whose specialty is the design and construction of buildings, roads, harbors, irrigation systems, and works of a similar nature

I want to talk with you about the work of a civil engineer.

The term "civil engineer" was set up as a distinction from the military engineer.

The civil engineer has often done work of a pioneering nature.
consultant engineer: an expert in a specific field of engineering whose function is to provide professional advice and services

A small percentage of civil engineers become consultant engineers.

It is important that a consultant engineer be familiar with modern developments.

It is often necessary for a firm to hire a consultant engineer.

dam: a barrier across water controlling its flow

What about dams?

The strength of a dam is an important design consideration.

Dams can greatly affect wide geographical areas.

industrial waste: material left over from industrial production

Sanitary engineering deals with industrial wastes.

Strict laws govern the handling of industrial wastes.

Industrial wastes often make our rivers impure.

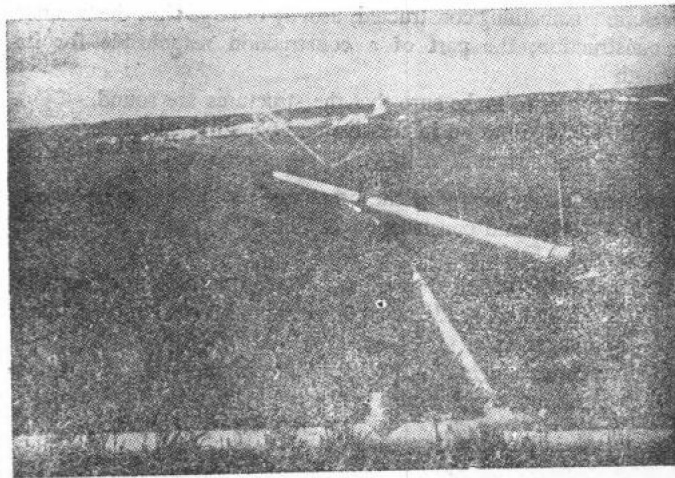
irrigation: the artificial watering of land

It includes problems in irrigation.

Irrigation plays an important role in agriculture.

Floods can sometimes be helpful to irrigation.

United States Department of Agriculture



sanitary engineering: a branch of civil engineering dealing with sewage and waste problems

Another area, not so well known, is sanitary engineering.

The need to control disease was one of the reasons for the development of sanitary engineering.

Sanitary engineering grew out of a combination of physical and biological sciences.

sewage: waste matter usually disposed of by drains

Sanitary engineering deals with sewage.

The handling of sewage is important in civic planning.

Sanitary and storm sewage sometimes form two separate systems.

strain: the change of shape or size of a body through the action of a force

He will have to figure strains.

The strain of a body is sometimes also called the **deformation**.*

How much strain will occur in this case?

stress: force between touching surfaces of bodies, due to external forces

He will have to figure stresses.

The stress developed per unit of area is called unit stress.

The study of stresses is essential to an engineer.

structure: something constructed, usually of large size; the manner of construction; the part of a construction responsible for its strength

His job is to make sure that the structures are sound.

That bridge has an impressive and beautiful structure.

The roof structure of this building is too weak.

transportation engineering: the branch of civil engineering dealing with the design and construction of highways, railroads, airports, etc.

One of the better known areas is transportation engineering.

The design of roads is an important field of transportation engineering.

Economic and human problems are often involved in transportation engineering.

* For words in boldface type, see glossary.

C. Check-Up

Insert the proper terms in the blanks.

irrigation	transportation engineer
sanitary engineering	strain
consultant engineer	industrial wastes
dam	beams

1. This firm needs advice on a new project.
They're hiring a _____.
2. This field deals with the disposal of wastes.
It's called _____.
3. The building didn't have enough horizontal support.
The _____ were not strong enough.
4. That part of the country is quite dry.
_____ would make much of it usable for agriculture.
5. They want to control the flow of water in that river.
They're going to build a _____.
6. The weight has changed the shape of this iron bar.
It has undergone a lot of _____.
7. They're hiring a man to design an airport.
He's a _____.
8. The factories have made the river impure.
It's full of _____.



General Motors Corp.

LESSON 2

MECHANICAL ENGINEERING

A. Dialogue

Professor: My secretary tells me that you'd like to know something about mechanical engineering. What I can do is give you some idea of the variety of specialties within the field.

Student: I'd appreciate that very much.

Professor: One of the oldest mechanical engineering areas is machine design. First, we need to know the purpose of a particular machine, whether it's a crane or a tool or a steam engine. Then, if we know the loads that this machine will carry, we can make the most efficient use of the materials we have.

Student: I see. Is heating included in this field?

Professor: Oh, yes. Heating, refrigerating, and air conditioning rely quite a lot on thermodynamics and theories of heat transfer. The goal is to make the most efficient use of power. This area can be quite involved with mathematics.

Student: I've heard of the Carnot cycle. Does this concern the mechanical engineer?

Professor: Very much so. The whole field of internal combustion engines is based on the principles set out by Carnot. The mechanical engineer deals with two- and four-cycle engines, gasoline and diesel engines, gas turbines, and the like.

Student: Isn't that part of automotive engineering?

Professor: Yes. This is one of our largest industries.

Student: What about the aircraft industry?

Professor: Of course. Aeronautical engineering became a very large field with the widespread use of airplanes. Now, with space travel, it promises to grow even larger.

Student: Well, you've been most helpful, sir.

Professor: Not at all. Come in again.

B. Terminology Practice

aeronautical: having to do with aircraft

Aeronautical engineering became a very large field with the widespread use of airplanes.

The government recognized the importance of aeronautical research.

Thermodynamics is important in aeronautical design.

air conditioning: the process of regulating the temperature, humidity, and purity of air entering an enclosure

Air conditioning relies quite a lot on thermodynamics.

Air conditioning is necessary for the operation of many laboratories.

The hot air outlets are also used for air conditioning in the summer.

automotive: having to do with automobiles

Isn't that part of the automotive industry?

Automotive engineering has a great influence on the national economy.

The automotive engineer is always concerned with stresses and strains.

Carnot cycle: a thermodynamic cycle first described by Carnot I've heard of the Carnot cycle.

The Carnot cycle assumes ideal conditions.

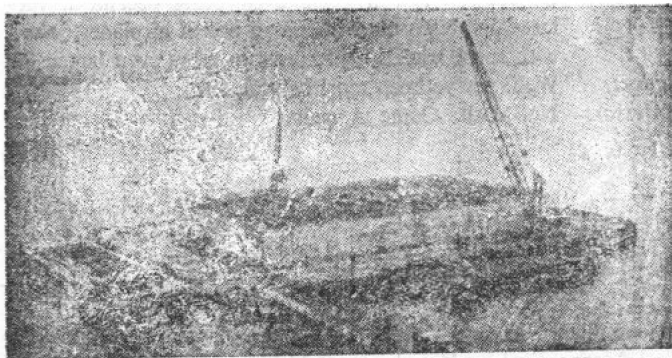
The Carnot cycle provides the greatest efficiency for turning heat into work.

crane: a machine for raising, lowering, and shifting heavy weights

If we know the purpose of a crane, we can make the most efficient use of the materials we have.

Cranes are necessary in the construction of tall buildings.

Electrically powered cranes have found a variety of uses.



Triborough Bridge and Tunnel Authority

cycle: a completed series of actions with a return to the original condition—in speaking of engines, cycle means stroke

The mechanical engineer deals with two- and four-cycle engines.

The two-cycle engine fires once each time the engine turns over.

A four-cycle engine fires once every fourth stroke.

diesel: an internal combustion engine in which the fuel ignites as a result of the high temperature of the air under pressure

The mechanical engineer deals with diesel engines.

The fuel in a diesel engine is not ignited by a spark.

Diesel engines are often used in ships.

heat transfer: the carrying of heat from one place to another

Refrigerating relies quite a lot on theories of heat transfer.

This machine has low heat transfer ability.

There are several heat transfer processes.

internal combustion engine: an engine in which power is produced by the burning of a fuel-and-air mixture

The whole field of internal combustion engines is based on the principles set out by Carnot.

The internal combustion engine is used in almost all automobiles.

The diesel is an internal combustion engine.

load: the amount of pressure on a structure due to weight; the outside resistance that a machine has to overcome; the outside resistance of an electric network; the amount of electric power that must be produced

We know the loads that this machine will be subjected to.

Controlling the loads of electric power systems is a serious problem.

The amount of fuel used varies with the load against which the engine is operating.

refrigerating: the process of lowering the temperature of air

Refrigerating relies quite a lot on thermodynamics.

Refrigerating is necessary for protecting some food.

Heat losses must be avoided in refrigerating processes.

thermodynamics: the science dealing with the relationship of mechanical work and heat

Air conditioning relies quite a lot on thermodynamics.

The laws concerning energy are important in thermodynamics.

The second law of thermodynamics is due to Carnot.

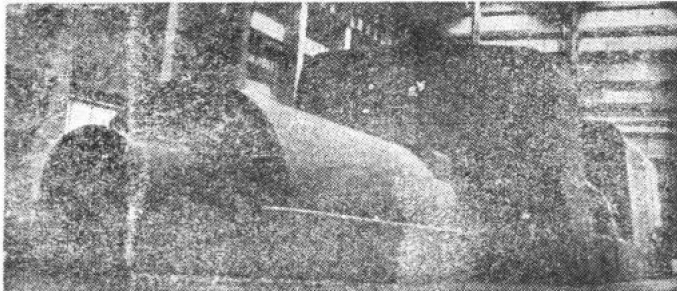
turbine: an engine in which the power is provided by a wheel driven by the flow of steam, water, or air

The mechanical engineer deals with gas turbines.

Turbines have been used in some aircraft.

High temperatures were a problem in the development of gas turbines.

Consolidated Edison



C. Check-Up

Answer true or false.

1. All internal combustion engines are ignited by a spark.
2. Cranes are sometimes powered by electricity.
3. Turbines operate on the same principle as diesels.
4. Refrigerating controls the purity of air.
5. The transportation engineer deals with automotive design.
6. Thermodynamics involves a study of heat in relation to mechanical work.
7. Air conditioning controls the pressure of air within an enclosure.



LESSON 3

ELECTRICAL ENGINEERING

A. Dialogue

Student: Could you give me a general idea of what electrical engineering is like today? My knowledge is pretty much limited to the appliances around our house.

Professor: I'll try, although it's a very broad field. To start with, there is the power engineer. The problems he deals with concern the efficient generation and distribution of electrical power.

Student: What are some of the problems?

Professor: They have to do, for example, with the voltage at which power must be generated. Then there are the problems of controlling the phase, the frequency, and the loads of power systems.

Student: I imagine this is one of the oldest areas of electrical engineering.

Professor: Yes, but it is still a very important and complex field. More recent are the fields of communications, computers, and industrial electronics.

Student: Could you give me an idea of what they are?

Professor: In communications, of course, the object is to send messages of many types from one location to another. Modulation, channel capacity, and waveguides are only a few of the problems that come up.

Student: I see.

Professor: The term "computer" is often misunderstood. Some computers handle basically simple problems of arithmetic at unbelievably high speeds. There are other types, however. And the primary purpose of industrial electronics is to control large amounts of power.

Student: That gives me a pretty good idea, I think.

Professor: We haven't even touched on many new fields, such as solid-state engineering. But we can discuss these another time, if you like.

B. Terminology Practice

appliance: in this sense, an electrical device, usually for household convenience

My knowledge is pretty much limited to the appliances around our house.

Here is a list of parts for this appliance.

The wiring is not adequate for the appliances you plan to have.

channel: as used here, a range of frequencies within which a station sends messages

Channel capacity is one of the problems that come up.

A radio station operates on a given channel.

The width and position of the channel is different for each type of communications system.

communications: as used here, the sending of messages by electrical signals

The field of communications is a relatively recent one.

Many new communications devices have been discovered recently.

Noise is a great problem in communications.

computer: an instrument for the solution of problems that can be expressed in mathematical terms

Computers take only seconds to solve problems that would take years to solve by ordinary methods.

This computer can play chess.

Many uses for computers are found in modern industry.

electronics: the field of science dealing with devices which operate through the action of electrically charged particles, known as electrons

More recent is the field of industrial electronics.

The progress in electronics has made radio and television possible.

Electronics is used in many ways in aviation equipment.

frequency: the number of occurrences, or cycles, per second

There is the problem of controlling the frequency of power systems.

He is capable of hearing unusually high frequencies.

The frequency of most electric power in the United States is 60 cycles per second.

generation: production—said of electrical power

The problems he deals with concern the efficient generation of electrical power.

This plant uses coal for power generation.

The generation of electric power must meet the needs of the consumers.

modulation: variation of some characteristic of a radio wave

Modulation is only one of the problems that come up.

In frequency modulation, we vary the frequency of the radio wave.

This circuit will provide a special type of modulation.

phase: as used here, part of a cycle, with reference to a starting point

There is the problem of controlling the phase of power systems.

Many electrical appliances use only one phase.

The two voltages have the same phase.

power: as used here, electrical power

To start with, there is the power engineer.

He is making a study of power systems.

Power is now available in rural areas at low rates.