

全国高等农业院校教材

英 语

(第 二 版)

上 册

北京农业机械化学院主编

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全国高等农业院校教材
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北京农业机械化学院

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Set 1

A. MECHANISM ILLUSTRATION

In the transmission of technical information, a picture or a diagram may give information to people when descriptive words might be inadequate. Most of today's complex farm equipment requires an interpreter to convey technical data from the designer to the consumer. The translation of design data into clear and simple diagrams is a proper objective for an agricultural mechanization specialist.

A *perspective drawing* of a part, an assembly, or a machine, indicates in a single view all three dimensions — height, width, and depth. These drawings are rather difficult to prepare and they are not to scale. They are of little value to the person who has to make the part, but they do convey rapid, general understanding of the nature of that part or assembly.

Orthographic projection is used in charting the design and manufacture of mechanisms. The primary advantage of this type of presentation is that lines and surfaces parallel to the projection plane appear in the views in their true length and area. Accurate dimensional measurements of the mechanism can be taken directly from the drawing since it is an accurately scaled presentation. These drawings are essential to the people who will actually make the part. They are not parti-

cularly useful in conveying information to the people who to understand the function of the part.

The views of an orthographic projection are called side (right, and/or left), top, and sometimes back and bottom. The front view is selected to present the most representative view.

An *assembly drawing* is an orthographic projection of several parts drawn in their intended working positions. Such drawings are valuable for:

1. Showing how the parts are assembled
2. Determining the overall dimensions of an assembly
3. Determining the motion relations between parts

The ability to understand the shape and function of a part, or the action of a mechanism from either orthographic or perspective drawings, is a valuable asset to the agricultural mechanization specialist. The preparation of sales and service literature requires the transformation of the designer's orthographic drawings into perspective drawings. The use of such literature requires interpretation of perspective and exploded drawings. Design change suggestions from a field representative are best expressed as orthographic projections.

Schematic diagrams convey technical information by showing relationships other than spatial; that is, flow relationships or order relationships.①

Photographs are also important conveyers of technical information. A photograph is taken of a part or assembly, then the surrounding background is blotted out. Photogra-

phs are often less expensive and quicker to prepare than are drawings, but they may not be as effective in presenting the interior workings of a mechanism as are other presentation methods.②

All the techniques mentioned have a place in the transfer of technical information from the designer to the consumer. An agricultural mechanization specialist should be competent in all techniques and able to select and use that technique which conveys the needed information quickly, accurately, and at least cost.

New Words and Expressions

descriptive [dis'kriptiv] *a.* 描述的

inadequate [in'ædikwit] *a.* 不足的, 不适当的

interpreter [in'tə:pritə] *n.* 译员; 讲解员, 解释者; 解释程序

convey [kən'vei] *vt.* 输送; 传达

consumer [kən'sju:mə] *n.* 消费者, 用户

perspective [pə(:)'spektiv] *a.* 透视的

view [vju:] *n.* (视)图; 景(色)

dimension [d(a)'menʃən] *n.* 尺寸; 维(数)

scale [skeil] *n.* 标度; (指实物与图表等之间的)比例, 比率。 *v.* (按比例或标准)绘制

orthographic [ɔ:θə'græfik] *a.* 正交的, 正射的; (用)直线投射的
~ projection 正投影(图)

chart [tʃɑ:t] *n.* 图, 图表。 *vt.* 用图表表示(或说明)

dimensional [d(a)'menʃənl] *a.* 尺寸的; 维(数)的

representative [ˌrepri'zentətɪv] *a.* (有)代表性的, 典型的, *n.* 代表
field ~ (公司)现场代表(或代理人)

intend [in'tend] *vt.* 企图; 预定
 valuable ['væljuəbl] *a.* 有价值的; 重要的
 asset ['æset] *n.* 优点; 贵重的东西; (*pl.*) 财富
 service ['sə:vis] *n.* 使用; 维修
 literature ['litərɪtʃə] *n.* 文学; 文献
 sale ~ 有关销售的各种资料
 service ~ 有关维修的各种资料
 exploded [iks'pləʊdɪd] *a.* 爆炸了的; 分解的
 ~ drawing 分解图
 schematic [ski'mætik] *a.* 示意的
 other than 不同于; 除了
 spatial ['speɪʃəl] *a.* 空间的, 立体的
 blot [blɒt] *vt.* 涂污
 ~ out 涂去, 抹掉
 interior [in'tɪəriə] *a.* 内部的

Notes

- ① Schematic diagrams convey technical information by showing relationships other than spatial: spatial 之后可理解为省略了 relationships.
- ② ... but they may not be as effective ... as are other presentation methods: 比较状语从句中因为主语长而谓语短, 故语序颠倒。

Exercises

I. Are these statements true or false according to the text?

1. A picture, a diagram and descriptive words all have a place in the transfer of technical information from the designer to the consumer.

2. Complex as today's farm equipment may be, we can convey technical data by clear and simple diagrams.
3. A perspective drawing is used for charting the design and manufacture of mechanisms.
4. An orthographic drawing indicates in a single view all three dimensions — height, width, and depth.
5. An orthographic drawing is presented according to a certain scale but a perspective drawing is not.
6. An orthographic drawing is of great value to the person who has to make the part while a perspective drawing is of little value to the people who will actually make the part.
7. An assembly drawing is a perspective drawing of several parts in their working positions.
8. Perspective drawings may be more effective than photographs in presenting the interior workings of a mechanism.

II. Choose the right answer according to the text.

1. Which of the following statements is correct?
 - A. A picture or a diagram is the best means in the transmission of technical information.
 - B. Descriptive words are the best means in the transmission of technical information.
 - C. A picture or a diagram and descriptive words are proper means in one way or another in the transmission of technical information.
2. _____ is most essential to the people who will actually make the part.
 - A. A perspective drawing
 - B. An orthographic drawing
 - C. A photograph
3. The ____ view is chosen to present the most representative view.
 - A. top
 - B. side
 - C. front

4. The word "asset" in the text means _____.
 - A. property
 - B. wealth
 - C. quality
5. Design change suggestions are best expressed as _____.
 - A. perspective drawings
 - B. orthographic projections
 - C. neither A nor B
6. Schematic diagrams convey technical information by showing _____.
 - A. flow relationships
 - B. spatial relationships
 - C. both A and B

III. Answer the following questions according to the text.

1. Which conveys rapid, general understanding of the nature of a part or an assembly, a perspective drawing or an orthographic drawing?
2. What are the purposes of an assembly drawing?
3. Make a comparison between photographs and drawings.
4. What techniques are mentioned in the text for the transfer of technical information from the designer to the consumer?

IV. Fill in the blanks with suitable words or expressions according to the text.

1. An assembly drawing is an _____ of several parts drawn in their intended _____ positions. Such drawings are valuable for:
 - ① Showing how the parts are _____
 - ② Determining the overall _____ of an assembly
 - ③ Determining the motion relations between _____
2. Photographs are also important conveyers _____ technical information. A photograph is taken _____ a part or assembly, then the surrounding background is blotted out. Photographs are often less expensive and quicker to prepare _____ are dia-

wings, but they may not be — effective in presenting the interior workings of a mechanism — are other presentation methods.

V. Translate the Chinese in brackets into English.

1. We have done many experiments (不同于这个实验) (other than)
2. Photographs may (不如其它的描绘方法那样好) in presenting the interior workings of mechanism. (not as ... as)
3. Orthographic drawings are (比透视图更有用) to the person who has to make the part. (more ... than)
4. Photographs are (比其它绘图方法更易制作) (easier)

B. DRAWING

All construction should be done from drawings or sketches, as they make it possible to plan a job carefully before work is started and to visualize it in its different stages. Planning is essential for economy in the selection and purchase of materials, for efficiency in construction, and for the realization of desired specifications and standards in the finished product.

Plans and drawings for much of the construction on the farm are available. They range from plans in complete detail to simple sketches of ideas. To make proper use of plans, some general knowledge of the meanings of the lines and figures and of the arrangement of the parts of a drawing is necessary.

The ability to make sketches and drawings is an asset to

the farmer, as it enables him to plan a construction job according to his individual designs or ideas. Often simple working sketches, shown clearly and neatly, suffice. In other cases, more detailed plans are necessary and will save time and money in the end. To make detailed, neatly lettered drawings requires much patience and rather continuous practice, but this should not discourage the making of sketches before starting a project.

The ability to read prepared plans correctly is also a desirable achievement. Careful study of the details, with a clear understanding of how the finished article will look, can save material and time and yield a finished product free from errors.

Drawings consist of some form of projection, such as orthographic, oblique, and isometric. The type used depends upon the skill and understanding of the draftsman and the features to be shown.

When separate drawings are made to show each side of an object, the type of drawing is an *orthographic projection*, which means that the projecting lines are perpendicular to the projecting plane. All dimensions are shown in true scale on this type of projection.

An *oblique projection* is one that shows three sides of the object in one view. The corner angles are not equal, and the scale is accurate for only one side. The length line of the object is at right angles to the vertical corner line, while the width line is at a 60° angle. The long side of the object is drawn to scale, but the other sides are usually about three-fourths of

their true scale size to give better proportions to the drawing.

The *isometric projection* is commonly used to show three sides of an object in one view. The term *isometric* means equal measure; the two lines between the vertical line and the horizontal make the same angle with the vertical, which is 60° . Thus all horizontal lines of the object are 30° from the horizontal, and all vertical lines are perpendicular to the horizontal. All dimensions are shown in true scale.

Isometric and oblique projections are convenient types of drawings because, as three sides of an object are shown in the one view, they are more pictorial and, if correctly made, are usually easier to interpret. It is important to note that all lines of the object which are parallel to each other appear in the same relative planes of the drawing.

New Words and Expressions

visualize ['vɪzjuəlaɪz] v. (使)具体化; (目视)观察

purchase ['pɜ:tʃəs] n. (购)买; 购得物

specification [,spesɪfɪ'keɪʃən] n. (pl.) 技术规格; 说明书

range from ... to ... (在一定范围内)变动, 变化

suffice [sə'faɪs] vi. 足够; 有能力

neatly ['ni:tli] ad. 整齐地; 光滑地

letter ['letə] vt. 写上字; 加标题

patience ['peɪʃəns] n. 耐心; 忍耐

discourage [dɪs'kʌrɪdʒ] vt. 使气馁; 使泄气

desirable [dɪ'zaɪərəbl] a. 所希望的; 合乎需要的

oblique [ə'blɪk] a. 倾斜的; 斜交的

isometric [ˌaɪsəʊ'metrik] *a.* 等角的, 等距的, 等轴的

~ projection 等角投影

draftsman ['draʊtsmən] *n.* 绘图员

horizontal [ˌhɒrɪ'zɒntl] *a.* 地平的, 水平的, 卧式的

pictorial [pɪk'tɔːriəl] *a.* 绘画的, 图片的, 形象化的

perpendicular [ˌpɜːpən'dɪkjələ] *a.* 垂直的, 成直角的 (to)

Exercises

I. Are these statements true or false according to the passage?

1. Drawings or sketches are essential for planning construction.
2. Plans and drawings are generally available in complete detail.
3. General knowledge of the meanings of the lines and figures and of the arrangement of the parts of a drawing is essential to making proper use of plans.
4. The ability to make sketches and drawings is a valuable quality to the farmer.
5. Since working sketches are simple, they are of little value to a construction job.
6. The ability to read prepared plans correctly is also a valuable asset.
7. It is essential to study carefully the details of a part to be made so that it will be finished economically, quickly and perfectly.
8. An orthographic drawing indicates in a single view each side of an object.
9. All dimensions of an oblique projection are shown in true scale while those of an isometric projection are not.
10. Isometric and oblique projections convey rapid general understanding of the nature of an object, as the three sides are shown in the one view.

II. Choose the right answer according to the passage.

1. The word "suffice" in Para 3 means _____.

- A. be inadequate
 - B. be enough
 - C. be possible
2. The phrase "free from" in Para 4 means _____.
- A. liberated from
 - B. loose
 - C. without
3. An orthographic projection means that the projecting lines are _____.
- A. perpendicular to the projecting plane
 - B. parallel to the projecting plane
 - C. at a 60° angle
4. Projections are usually of ____.
- A. two forms
 - B. three forms
 - C. four forms
5. The type of projection used depends on _____.
- A. the skill and understanding of the draftsman
 - B. the features to be shown
 - C. both A and B

C. IDEAL AND PRACTICAL MACHINES

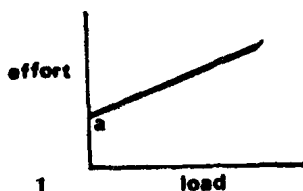
A machine is any device which allows work to be done more conveniently. A machine has an input member to which an effort is applied and an output member which moves a load. The advantage of a machine is that the effort applied can be very much smaller than the load to be overcome. The mea-

sure of this advantage is the ratio of load to effort and is known as the Mechanical Advantage (M.A.)

$$\text{M.A.} = \frac{\text{Load}}{\text{Effort}}$$

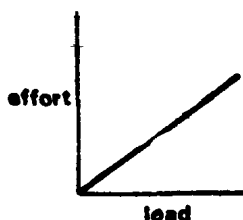
In a practical machine energy is lost because of friction. The M.A. of a practical machine changes as the load it carries changes because the percentage of effort required to overcome friction depends on the size of the load.

For very small loads a large percentage of the effort is needed to work against friction whereas with larger loads the fraction is less. A graph of load against effort has the shape shown in Diagram 1:



In the above diagram, *a* is the effort required to overcome friction.

- (a) The M.A. of a practical machine is a constant.
- (b) A practical machine requires more effort to move small loads than large loads.
- (c) A machine can lift a large load with a smaller effort.
- (d) This is a graph of load against effort for a practical machine.



To obtain a high M.A. a machine must be designed so that the distance moved by the effort is much greater than the output displacement of the load.

The ratio of the two distances is termed the Velocity Ratio (V.R.) that is:

$$\text{V.R.} = \frac{\text{distance moved by the effort}}{\text{distance moved by the load}}$$

The V.R. of a machine depends on its design and has a fixed value for each machine. In other words it is a constant.

We can think of the effort which is applied to the machine as the work input. The work done by the machine on the load is the work output.

The efficiency of the machine is then the ratio of the work output to the work input, that is:

$$\text{Efficiency} = \frac{\text{work output}}{\text{work input}}$$

In practice the work output is always less than the work input because some energy is lost inside the machine in overcoming friction. Thus the efficiency of a practical machine can never reach 100%. Efficiency tends to increase sharply with load, then flatten out as it reaches a limiting value as shown in Diagram 2: