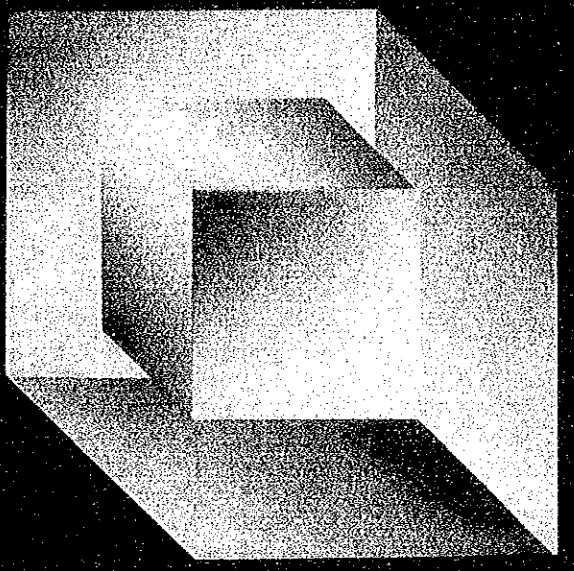
HANDBOOK FOR SLIDE & VIDEO PRODUCTION



Institute for International Cooperation
Japan International Cooperation Agency

HANDBOOK FOR SLIDE & VIDEO PRODUCTION

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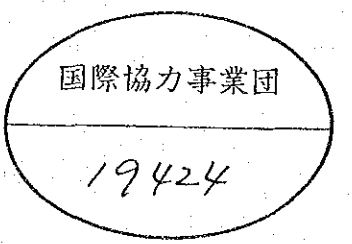

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FOREWORD

Audio-visual technology has made such a remarkable advancement in recent years in both hardware and software aspects that even audio-visual specialists feel it difficult to fully apply the technology. The review of expert training and study of audio-visual technology conducted by the Institute for International Cooperation of the Japan International Cooperation Agency show that JICA experts are keenly interested in the know-how of audio-visual technology and wish to apply it in their assignments.

It is under such circumstances that the Institute published "Audio-Visual Media Handbook" of Japanese version in 1987, a practical and easy-to-use manual that would serve as a guide for the experts in selecting audio-visual equipment and as a guidebook in the application of audio-visual expertise.

Now the Institute has prepared an English-language edition of the handbook by re-editing the Japanese handbook. The English edition is intended as a text to be used by the experts in transferring the technology to their counterparts, such as the methods for preparation and use of audio-visual teaching aids, or to be employed by their counterparts as a reference material and to further promote effective use of audio-visual equipment.

It is hoped that the handbook renamed as "Handbook for Slide and Video Production" will be widely utilized by JICA experts and their counterparts and serve to further promote technical cooperation between them.

March 1989

Kiyoshi KATO

Director,
Institute for International Cooperation,
Japan International Cooperation Agency

HOW TO USE THIS HANDBOOK

This handbook explains the effective and attractive uses of the audio-visual media as well as general production techniques. In particular, this book takes up slides and videos which are media in great demand.

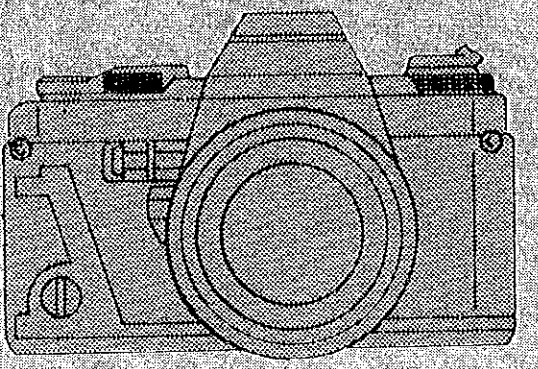
The handbook consists of two parts. Part 1 deals with slide production and part 2 with video production. This was written with the beginners to the field of AV media in mind. Therefore, those without experience in media production will be able to understand this process just by reading the book and are expected to read each part from the beginning. Those with some experience in media production will also be able to accumulate further knowledge of the media from this book and can pick out the areas of interest by looking at the contents.

A glossary can be found at the end of the book for use in looking up unfamiliar terms. In addition, there is a chart which lists the electrical usage situations as well as color TV broadcasting systems found in different countries. The chart may be used when traveling to these different countries. As from now on video softwares will increasingly come to require modifications, this chart was included to avoid troubles due to differences between various systems.

CONTENTS

PART 1

SLIDE PRODUCTION



Slides as Instructional Media

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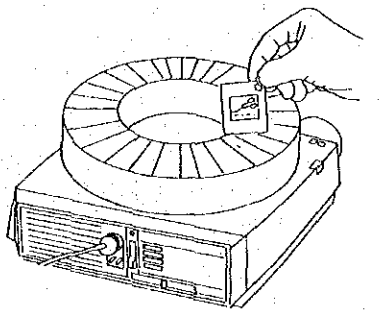
1-1 Recent Trends in Slides

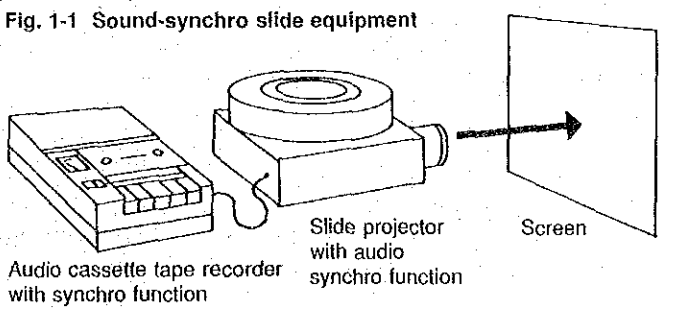


In Japan and other Asian countries, most people are not familiar with slides, as they believe slides are completely different from negative-printed photographs. However, in Western countries (particularly in the U.S.) slides are quite popular. People often take pictures during trips and enjoy watching them as slides with their families and friends upon their return home. This difference may be partly attributable to the difference in lifestyle and culture between East and West, and partly to the difference in what people take photographs for. In Asian countries, people take photographs mainly as mementos or records. In America, photographs are given another role, that of communications media. In fact, slides are clearer and more beautiful than printed photographs.

Slides have been traditionally and widely used as an educational medium for ordinary schools, job training, driving schools and others. As OHP and video technologies were developed and have become popular; however, slides have come to be regarded as an old-fashioned audiovisual medium and have gradually lost popularity. At the Tsukuba Science Expo '85 in Japan, slide technology attracted people's attention due to the projection of their clear and beautiful images on large screens or multi-screens. This triggered the spread of multi-screen projection technology, with peripheral equipment improving and environmental conditions getting better.

Recently, it has become possible for ordinary processing labs to prepare slides from negative films in some countries. Polaroid has developed and released "Polachrome", an instant slide film based on instant photography. Kodak offers a slide developing kit with which anyone can develop slides easily. Auto-focus automatic exposure single-lens reflex camera is now widely used and anybody can easily take sharp, clear slides. Sound-synchro slide equipment, such as cassette tape recorder with slide synchro function, can be obtained at reasonable prices. (Fig. 1-1) These developments should help people familiarize themselves more with slides. This chapter describes some advantages achieved through better and easier use of slides as a popular audiovisual medium and superior educational asset.

Fig. 1-1 Sound-synchro slide equipment



1-2 Slides as Instructional Media

Slides have some distinctive features as instructional medium, which other media do not have.

• *Clear image*

Slides provide the clearest image of all the audiovisual media currently in use. The image area of 35 mm slide film is twice the size of the screen film for theaters. And also, when compared with the 16 mm film, it is approximately four times larger. Therefore, the image of slides is vivid and commands interest from most learners. Slides are the medium with an attractive image and many scholarly societies designate slides as their common media of presentation.

• *Wide versatility*

Flexible utilization is possible, such as to stop, to add and to use only the necessary parts, at any time. These activities can be performed for self-produced slide shows as well as the ones sold at a store.

• *Easy production*

The minimum equipment needed for the production of slides are a camera and a projector. The cost of the equipment is reasonable. Therefore, it is possible to produce instructional slide shows for an individual according to his or her own need.

• *Ease in storage and reference*

Slides can be used for over 10 years if managed properly. They are also easy to stock and to look up with a slide viewer. A storage cabinet is widely used for safekeeping and sorting in most Western countries, but it was not popular in Japan, for there were no domestic products of a kind. However, recently Japanese manufacturers have started to produce such kind in order to meet the need of large-scaled sorting cabinet of slides by some medical schools.

• *Standardized format*

Slides mounts are common all over the world, and any kind of projector can be used to project. However, be aware that synchronized projection with sound has certain different standards.

1-3 When to Use Slides

Documentation in the form of photography is important. Photographs convey one's field survey better than without them. Utilization of slides makes it possible to communicate better not only for on-the-spot training but also for meetings. The following are some advantages in recording documents with slides in technical cooperation activities.

• *Recording events*

At various ceremonies and events, it is ordinary to take pictures with negatives for distribution of pictures to VIPs and guests or for making of albums. But it is better to prepare two cameras, one for negatives and the other for slides in slide production of events, such as recording of annual activities. Transferring negatives into slides in developing countries is not as easy as it is in Japan. If only one camera is available, it is better to shoot with negatives and then copy prints into slides.

• *Recording everyday activities*

People usually remember to take pictures for special occasions, but not for daily activities. It is recommended that pictures be taken of daily activities using extra films left after special occasions. Also, it is com-

mon for most people to forget to take their own pictures. As much as possible, it is better to have one's own activities made into images by using a self timer with tripod or asking the staff to do it. Those slides would be of great help in explaining conditions for session reports and many other occasions.

• *Recording for training and research*

In the field of agriculture it is very important to take slides of seasonal changes and phenomena at times. Also, large-scaled experimentation needs to be recorded with slides due to difficulty in repeating. In this case, accuracy in color and size of the subject, and recording of exact date and time are very important. This can be done by taking a subject together with data or with some object, such as a cigarette, which provides a good comparison. If color is an important factor of the subject, shooting with one F stop overexposed and one F stop underexposed, in addition to shooting with appropriate exposure, is recommended. This will help in the selection of the most realistic color slide after developing.

• *Producing instructional slides*

There are various types of instructional slides, which come in sets. The simplest of all is a set of slides with explanatory materials. Making of titles and a sound tape would give it a sophisticated touch. Slide shows with synchronized sound would be possible with a slide projector called "Slidecorder" and synchronized cassette player. An instructor can produce such slide shows. A film strip is a roll of film made up of slides. Most instructional slides on the market in Western countries are of the strip type. A film strip made up of slides has to be prepared in professional laboratories, posing difficulties in most developing countries. However, some educational institutions in those countries produce their own film strips.

2 Equipment for Slide Production and Projection

2-1 Slide Projector

A wide variety of slide projectors are available on the market: from low-cost compact home-use units to costly bulky ones for hall projection. A slide projector must be selected for a specific purpose. The projector, screen and camera which make up an all-projecting system must be of similar grades.

Structure of slide projector

(1) Basic structure

All slide projectors have the same basic structures. (Fig. 2-1)

The light from the lamp passes through the two condensers that make the light uniform, and reaches the slide. The transmitted light out of the slide is magnified by the lens and projected on the screen. Like OHPs and 16 mm film projectors, slide projectors incorporate a cooling fan to prevent overheating. If the lamp stays on after the fan is turned off, internal temperature goes up to possibly burn the slide. Many projectors therefore are designed so that switching the lamp on activates the fan and, after the lamp is turned off, the fan stops only when internal temperature is lower than the specified level.

Furthermore, many projectors are equipped with a corded or cordless remote slidefeeling and focusing controller.

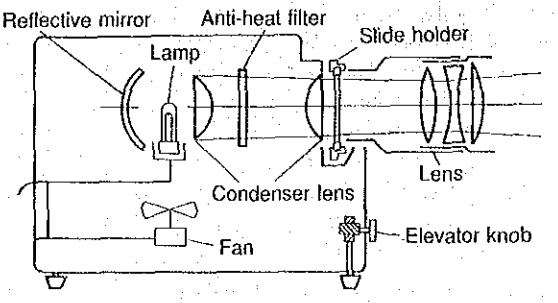


Fig. 2-1 Structure of slide projector

(2) Source lamp

Most existing slide projectors use halogen lamps. For use at big halls, projectors using high-cost but bright Xenon lamps are being developed. Two types of halogen lamp, 100 V AC and 24 V DC, are available. The 24 V DC (250 W) halogen lamp is most popular. With the same lamp and the same lens used, screen brightness is inversely proportional to the second power of distance between the projector and the screen. Thus, a projector using a bright lamp must be used for big screen projection.

In developing countries, voltage shows extreme changes to often burn lamps out. Under such condition, use of transformer is required for stable power. Some projectors have spare lamps that can be set with simple lever operation.

(3) Projection lens

Lenses of 100 mm or less focal length are usually used at home or in a small lecture room. Lenses of 100 mm or more focal length are usually used up a big lecture room, conference room, or hall. Recently, approximately 75 to 120 mm focal-length zoom lenses are being used. Projected-

image size is inversely proportional to focal length of lens and is proportional to projection distance.

$$\text{Image Width} = \frac{\text{Film Width} \times \text{Projection Distance}}{\text{Focal Length of Lens}}$$

The image widths and projection distances with lenses of 85 mm and 100 mm focal lengths used are given in Fig. 2-2.

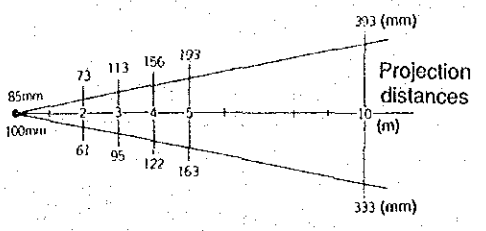


Fig. 2-2 The relationship between image widths and projection distances

(4) Autofocus mechanism

Lamp heat dries the mounted slide and moves it to and the mounted slide, causing out-of-focus condition. This is most obvious with slides projected for the first time after being developed. Focus adjustment, if manually made, must therefore be made for each slide. Autofocus mechanism frees the projector operator from this adjustment, and is a must for big-screen projection. Autofocus mechanism is built in the projector or can be incorporated as required.

Heat-caused slide movements can be prevented by setting the slide between two plates of glass called the "glass mount". Glass mounts are used for multi-screen projection requiring fine positioning. Autofocus mechanism should be more convenient for usual projection than the costly glass mount, which forces troublesome slide setting.

Projector selection by audience size

A projector must have a lamp and a lens that satisfy environmental conditions: room size and audience population. Table 2-1 shows recommended lamps by audience size.

A single-slide feeding projector with a 100 to 300 W halogen lamp should allow for small audience-population. Cube-type rear screen is also suitable for small population.

Halogen 300 to 700 W lamps or low-voltage 240 V (250 W) lamps are convenient for usual lecture-room. Xenon lamps are desirable for bigger rooms. A Xenon lamp produces slightly bluish, images due to its high color-temperature, but very beautiful images. However, Xenon lamps, and naturally projectors using Xenon lamps are extremely expensive.

Table 2-1 Slide projectors classification by audience size

Audience size	Light source	Focal length of lens	Characteristics
5 ~ 15	100 ~ 300 W Halogen lamp	50 mm	Manual single-slide-feeding type Cube-type
15 ~ 20	300 ~ 700 W 24 V (250 W) Halogen lamp	75 ~ 130 mm	*Single-slide-feeding type for* average lecture room Carousel type
50 ~ 200	1 kW Halogen lamp 300 ~ 500 W Xenon lamp	200 ~ 230 mm	Carousel type for large scale education Single-slide-feeding type
More than 200	100 V (1 kW) Xenon lamp	250 mm ~	Carousel type for lecture halls and conference halls

Types of projectors

Slide projectors can be grouped into two types: single-slide feeding and magazine types.

(1) Single-slide feeding system

Slides are fed one by one by a controller or manually. Three types are available: 1) slides are set one by one (Fig. 2-3), 2) ten to twenty slides at a time are fed one by one, and 3) a carrier handling ten continuous slides is used. (Fig. 2-4)

Single-slide feeding type is easy to set up and saves preparation time. Its simple mechanism allows anybody to handle. A projector of this type is widely used at school, presentation, and academic meeting where a small number of slides are projected at intervals.

(2) Magazine (tray or carousel) system

Slides are set in a case called magazine, tray, or carousel and are fed in sequence. The smallest magazine accommodates 36 slides and the biggest about 140 slides.

Slide can be present with the magazine system. It also makes sound-synchronized projection possible. Recently, popular multi-screen projection uses this type of projector.

The German Rollei and Leica projectors use a square straight magazine alternatively called the European type. A straight magazine can accommodate up to 50 slides. (Fig. 2-5)

The round magazine is also called "carousel" or "rotary" type, and is mounted vertically (Fig. 2-6) or horizontally. Eighty to 140 slides can be loaded. Horizontally-mounted magazine is alternatively called the Kodak or carousel type. (Fig. 2-7 and 2-8) A slide falls into the projector from the round magazine due to the slide's own weight into the projector. This simple mechanism minimizes failures.

The Kodak system can accommodate many slides and has a superior mechanism, thus being widely used. Most projectors used in developing countries have this Kodak carousel magazine type.

A popular variation of this type is the cube-type (TV type) projector incorporating a TV-type rear screen and a cassette type recorder and satisfying diversified needs.

This system is compatible with a standard carousel projector. (Fig. 2-9) The other naration of the Kodak system is a multi slide presentation system. These days this multi-slides system is becoming popular. (Fig. 2-10)

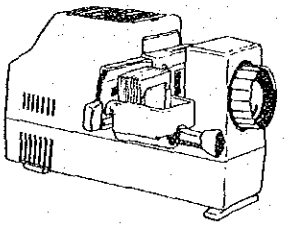


Fig. 2-3 Single slide projector, one slide type

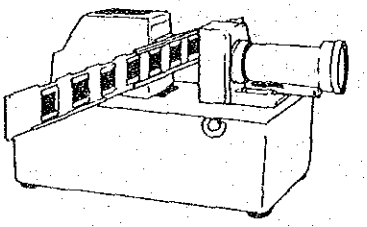


Fig. 2-4 Single slide projector, ten continuous slides type

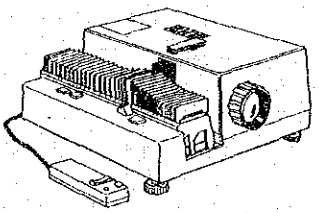


Fig. 2-5 Straight magazine type projector

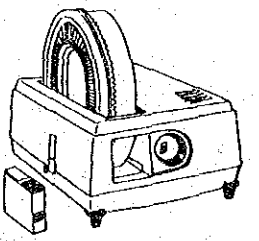


Fig. 2-6 Rotary magazine type projector

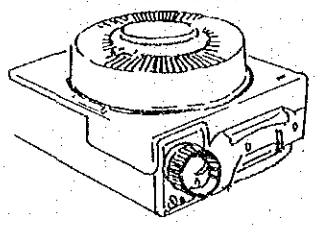


Fig. 2-7 Standard type of carousel

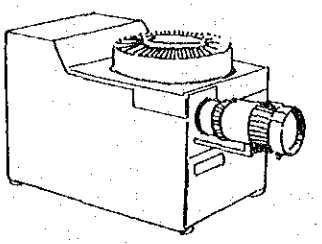


Fig. 2-8 Carousel type projector with a Xenon lamp for a big hall

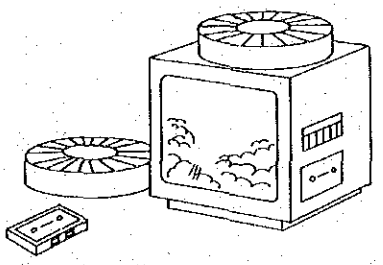


Fig. 2-9 Cube type slide projector

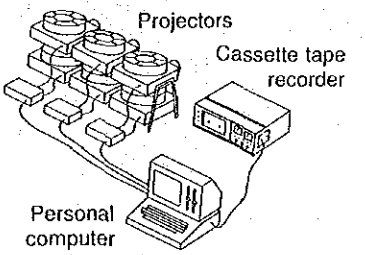


Fig. 2-10 Set for multi slide presentation

2-2 Screen

Slides can be viewed only when they are projected on the screen. Drawing paper or wall cannot substitute for a good screen.

(1) Quality of screen

A good screen:

1. is pure-white. This is a must.
2. has a high reflectance. A low reflectance results in dark cloudy colors.
3. has a high flatness. A wavy screen gives distorted or out-of-focus images.
4. has a wide orientation. A narrow orientation results in a narrow view range.
5. must have easy storage capability.

(2) Types of screen

Some screens like those incorporated in cube-type projectors are of the transmitting type for rear projection. Most screens are of the reflection type. Table 3-3 shows the five types of reflection screen.

For slide projection only, high-reflectance glass-bead screen is suitable. For OHP and slide projection, mat screen must be used. Daylight screen is often used for either slide projection and OHP, but gives partly cloudy slide-projected images. High-reflectance screens are expensive and offer fewer applications than low-cost screens do.

(3) Screen setups

Screens can be grouped according to the three setup modes.

• *Tripod screen*

Being easily removable, the tripod screen is the most popular. However, easy breakages are seen in springs or hardware fittings of the tripod or for keeping the screen flat. Diecast tripod is slightly heavy but strong. A fitting for screen-hanging capable of being pulled forward allows use of OHP.

• *Roll-up screen*

The roll-up screen is usually attached above the blackboard or in a ceiling pit and is set electrically or manually as required. At a conference room or hall, this type can be set for either movie or slide projection.

• *Ceiling screen for OHP*

The ceiling screen is mounted on the ceiling at an angle to allow either slide projection or OHP. This type is convenient for lecture-room application, but as it cannot be moved after being mounted, its mounting location must be carefully selected.

Fig. 2-11 Tripod screen for slide and OHP

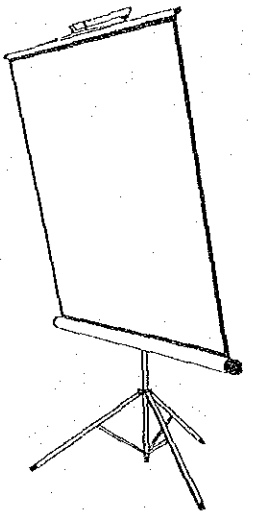


Fig. 2-12 Roll-up screen used in a big hall

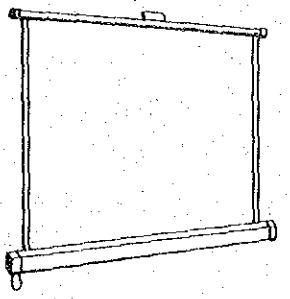


Fig. 2-13 Ceiling screen for slide and OHP

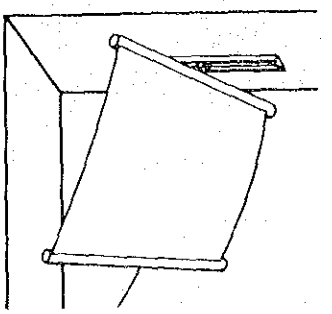


Table 2-2 Types of Screen

Type	Quality of material	Characteristics or weak points
Mat		Wide directivity Low cost It's possible to use with OHP in parallel
Silver	Aluminum flake powder is added	High reflectance but narrow directivity
Glass beads	Fine glass beads is added	High reflectance but narrow directivity
Lenticular	It has uneven vertically with plastick or others	High reflectance but narrow directivity
Daylight	It utilizes specular reflection of metals or a black screen	It is possible to appreciate slides or films at bright places Directivity is very high / Field of vision is limited Expensive.

2-3 Cameras and Film

Cameras

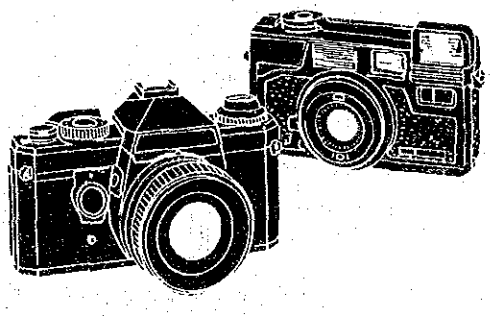
There are no special cameras made specifically for slide shooting, and any cameras can be used for that purpose. However, some cameras are more suitable for taking slides. Since slide films are 35 mm in size, the cameras for blony-type films and pocket-sized films cannot be used. The most suitable of all the cameras is the single-lens reflex camera which is supplied with a wide variety of interchangeable lenses to accommodate the need for copy work, close-ups and so on. A single-lens reflex camera with a built-in TTL meter would be a good choice for obtaining correct exposure, since the range of appropriate exposure of slide film is narrower than that of the negative films, which means that it can be easily over- or under-exposed if not done properly. Of all, an automatic focusing single reflex camera equipped with automatic exposure would be best suited for slide shooting. However, some cases may require revision of exposure according to the contrast of the subject, and this will be discussed later. Automatic exposure in these cases would not be usable.

A 35 mm lens shutter camera, so-called "foolproof camera", is compact, lightweight and has a built-in flash. It is very convenient and suited for shooting in the field and on a trip, although copy work and close-up with this camera is difficult. In addition to heavier and bigger single-lens reflex camera, it would be a good idea to have one foolproof camera around for handy and more frequent shooting of slides.

Lenses

(1) Macro-lens

One of the reasons the single-lens reflex camera is suitable for slide production is in the usage of macro-lens. Macro-lens is essential for copy work and close-ups. Although exclusive lenses are available from most manufacturers, it is enough to have a macro-lens and an adaptor, so-called "life-size adaptor", in normal shooting of copy work and close-ups. Macro-lens itself is designed to make shooting possible from an unlimited distance to half-size (or life-size) and to be able to obtain high resolution even with magnifying shooting. With a life-size adaptor, it is possible to shoot from half-size to life-size. In other words, shooting up to the actual film size of 24 x 35 area is possible. The maximum aperture for a macro-lens is F2.8-3.5 and is slower than that of normal lenses (F1.4 ~ F2).



Manufacturers produce interchangeable lenses exclusively for their cameras. Therefore, lenses should be of the same manufacturer's as that of the camera body.

(2) Zoom lenses

Zoom lenses were originally developed as lenses used in movies for continuous changes in the angle of view through rotation of the zoom lens. Because of its disadvantages of being heavier, bigger and lower in resolution than fixed focal-length lenses, zoom lens had not been popular in the field of photography. Recently, however, designing skill of lenses utilizing computers has made remarkable progress and lightweight, compact, high-performance and low-cost zoom lenses have been developed. As a result, zoom lenses have become popular as normal lens for a single

lens reflex camera. There are various types of zoom lenses sold, covering a range of 28 mm to 200 mm. Most of them are equipped with a range of 35 to 75 mm.

Many have macro built-in mechanism. Because a zoom lens is made up of more than 10 lenses which makes various aberrations compared with single focusing lens, a knack of using a zoom lens is to use a smaller aperture.

Unlike movies and videos which utilize the zoom effect, zoom lens in photography is used as a combination of some single focusing lenses. In this sense, the ones with zooming area are convenient, but they are heavier and not easy to carry around. A zoom lens covering a range of 35-75 mm would be the most convenient substitute for normal lens.

Films

The most popular slide film all over the world is EKTACHROME by Kodak. EKTACHROME has excellent forming color, and self-processing is not difficult. There are ISO (ASA) 100, 200 and 400. Of these three, ISO-100 is the most suitable for tropical regions where sunlight is very strong. On the other hand, in high latitude areas such as Europe and North and South America, ISO-200 is better for common use.

ISO-100 FUJICHROME and AGFACHROME are also easy to use but difficult to obtain in developing countries.

KODACHROME has the advantage of creating natural color condition and is suitable for printing manuscripts. It is also obtainable all over the world including developing countries, but has to be sent to designated processing laboratories. In Asian regions, a roll of KODACHROME has to be sent to processing laboratories either in Australia or Japan. Therefore, processing takes time in countries where postal situation is not optimal.

There are two types of color films: daylight type and tungsten type. Both types of EKTACHROME are sold but the tungsten type is hard to obtain in developing countries. The tungsten type in slide production is used for copy work and close-ups, but it is recommended that the daylight type be used in all situations utilizing sunlight, flash or blue lamp.

2-4 Accessories

Flash

Unlike negative films, color correction of slides in printing process is not possible. Therefore, it is important to choose the appropriate light source according to the type of film. Daylight film produces a reddish image when exposed in tungsten light. Tungsten film produces a bluish image when exposed in daylight. However, the use of flash makes shooting with daylight film both indoors and outdoors possible. Because flash has the same color temperature with the sunlight (as explained in the Part 2 Video Production), it can

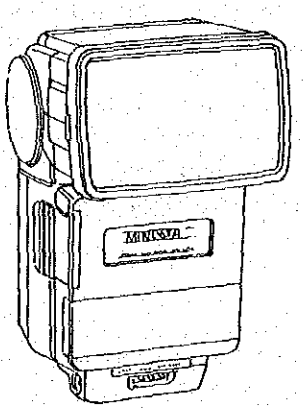


Fig. 2-14 TTL control flash

replace the sunlight, and is therefore essential for slide shooting.

Most flash units currently on the market are auto-type (Automatic Thyristor Flash) and their operation is simple. By just setting a lens on the fixed aperture, proper exposure is automatically obtained. This is done by altering the amount of light emitted by flash according to the lens-to-subject distance. Many single-lens reflex cameras are now prepared with the built-in TTL Control Flash (Through the Lens Automatic Thyristor Flash), which is controlled by the amount of light through the lens. With this function, auto-flash shooting of close-ups, which had been difficult with the conventional automatic light control unit, is now possible. Thus, this function works powerfully in slide production.

Flash tends to be thought of as a device used in the dark but it also functions as a supplementary light in the sunlight. This is called "day time synchronization" and it works well especially in against-the-light condition. This function can now be operated by anybody since the camera automatically controls the amount of light emitted by the flash.

Fig. 2-15 Copy stand

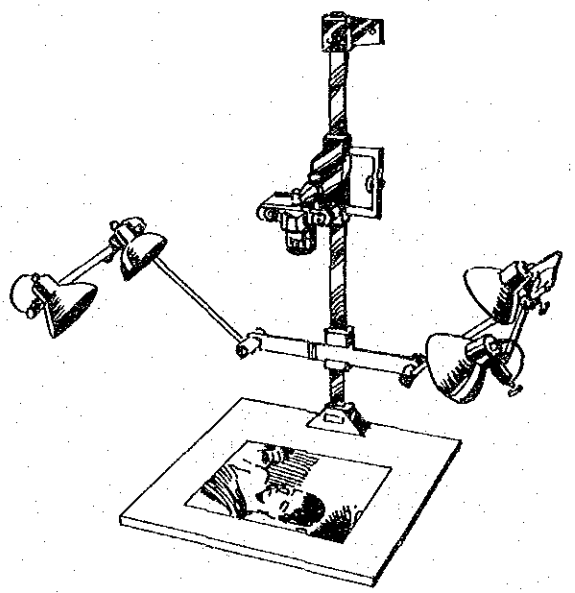
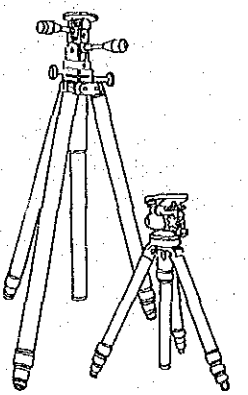


Fig. 2-16 Tripod



Copy stand

Copy stand is an equipment necessary for close-ups of small objects, or for copies of titles, illustrations and materials from books. It is available from most manufacturers and all of them do the same job. Because close-ups and copy work require long exposures, the sturdier the copy stand, the better.

The stands are designed for additional lighting, which should be purchased to match the model of the stand. Ordinarily, a stand is equipped with one light on each side, but two lights on each side would be even better for the shooting of size B5 or larger.

Tripod

Since the slide image is designed to be enlarged twenty to thirty times on the screen, camera shaking and unfocusing can be quite apparent. To avoid this, a sturdy tripod is a necessity for shooting in slower shutter speed.

A tripod is always used for close-up shooting which requires slower shutter speed with a smaller aperture for greater depth-of-field.

The tripod from Gitzo in France has traditionally been

most popular for its sturdiness and handiness. Recently, Japanese products of good quality have also been developed. The key points in choosing a good tripod are:

1. Not only should the camera on the tripod be movable all around, but the angle of the camera should also be adjustable.

2. The height is adjustable by controlling the legs of a tripod and finer adjustment is also possible with the attached elevator.

3. To avoid reflection, the painted body is preferred over the shining one.

4. Most important of all, a tripod which is durable and solidly built.

Accessories for lens

(1) Close-up lens

By attaching a close-up lens onto the front of a normal lens, considerable close-up shooting is possible. There are lenses with magnifying power of 0,1 and 2; bigger the number, higher the magnifying power. The focus setting area differs depending on each number. With a normal lens, the number 0 and 1 lens are easy to use and 2 is more suited for telephoto lens.

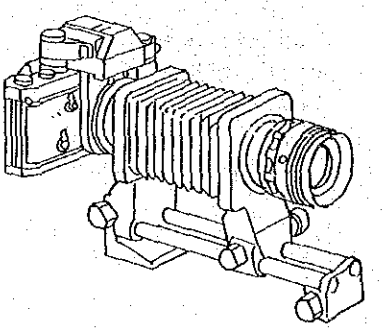
(2) Close-up ring

A close-up ring is set between the lens and the camera body for close-up shooting. It makes life-size shooting possible when set onto a life-size adaptor for macro-lens.

(3) Bellows

A bellows is an elastic device which allows close-up shooting of up to four times life-size. When the required magnification is more than life-size, the lens-to-subject distance becomes short to a point that lighting becomes difficult. In this case, telephoto (100 mm) macro-lens is often used to provide enough lens-to-subject distance.

Fig. 2-17 Bellows device



Basics of Slide Shooting 3

Basically, slide shooting and regular photography are not different, although there are some points to be considered. Since slide shows are usually viewed by an audience, a series of slides should have some dramatic projection effects. The following are some key points in shooting slides:

3-1 Shots, Angles, Perspective

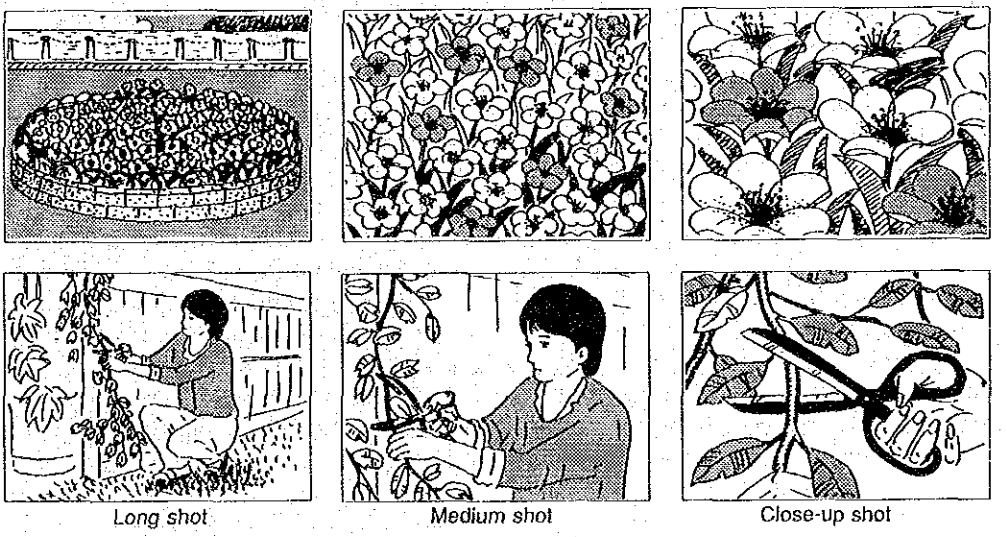
Shots

Slides shots can roughly be divided into three categories: Long shots, Medium shots, Close-up shots. Long shots are for shooting of a general view of subject and its setting. Medium shots are intended for shooting of an action and are most frequently used. Close-up shots are for the details of the subject. It is recommended that the same subject be shot with the three types both indoors and outdoors. They will allow selection of better slides for the balance of the show. (Fig.3-1)

Angles

The camera position is where the camera is in relation to the subject. And the camera angle refers to the relative height of the camera to its subject. In other words, the camera position depends on the angle between the camera and the subject, either from the front or the side. The shooting should be made from various angles in order to make the show interesting. The continuous projection of a long-shot and an up-shot of the same subject from the same angle gives the unnatural feeling of jumping of a scene. This jumping shot should be

Fig. 3-1 Shots



Long shot | Medium shot | Close-up shot

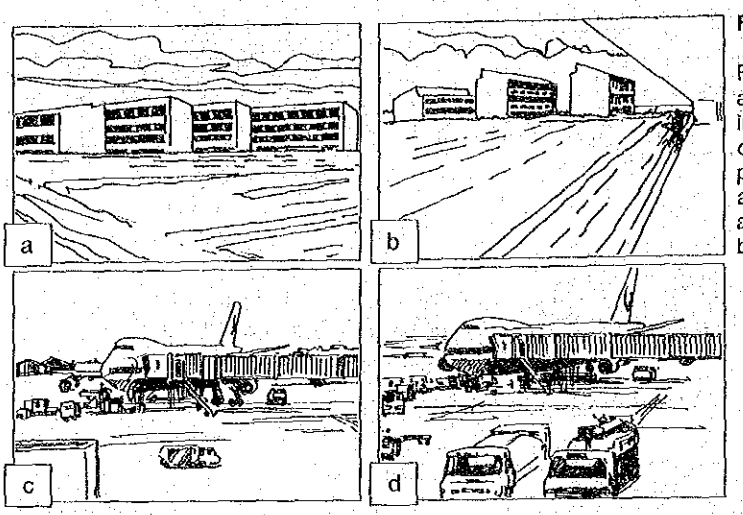


Fig. 3-2 Perspective

Figure *a/b* and *c/d* are almost the same. But the image for *a* and *b* or *c* and *d* are quite different in perspective. Picture *b* and *d* have a foreground, a middle ground and a background.

avoided. The projection of slides taken from different positions adds movement to the screen and gives a natural flow to the show, thus making the show attractive.

The most natural camera viewpoint should be from eye level. However, the continuous projection of slides from this level becomes rather boring. It is more effective to change angles according to the subject, such as shooting from above to give an overall view. Low-angle shots tend to give particular atmosphere, such as massiveness, width, and dominance to the screen.

Selection of the best suited positions and angles to the subject is the same with video shooting. However, in video shooting, it is the subject which does the moving, resulting in effective screen without changing positions and angles of the camera. In slide shooting, it is important to change positions and angles since the subject is still.

Perspective

The role of slides is to fix the three-dimensional world onto the two dimensional film and then to reproduce it on the screen. It is to express the three dimensional world on the two dimensional screen. Perspective, therefore, becomes very important, and the followings are some points of expressing perspective:

(1) Include foreground, middle ground and background (See Fig. 3-2)

The pictures *a* and *b* are the shots of the same building.

The difference lies in the consideration of perspective. Picture *a* is plain and uninteresting because it simply shows the building without any perspective or contrast. While *b* has depth and gives the feeling of being there because its composition is well arranged with some flowers in the foreground, the street in the middle and the building in the background.

The pictures *c* and *d* are the shots of the same airplane; *d* gives the impression of solidity by having a tanker in the foreground and its driver walking in the middle ground.

(2) Select an appropriate lens

The next point of having good perspective and contrast between the foreground and the background is in the selection of an appropriate lens. The pictures of Fig. 3-3 are each taken with a wide-angle lens (24 mm), a standard lens (50 mm) and a telephoto lens (200 mm), from the top. The size of a person in the foreground is made the same size.

With a wide-angle lens, perspective is exaggerated; thus, the person stands out, giving a strong impression. Because wide-angle shots have greater depth-of-field, sharp focus of a whole scene is obtainable.

Perspective with a standard lens is similar to that of a scene perceived by the human eye. With a telephoto lens, perspective is compressed resulting in the creation of two dimensional image; the size of the background is increased and the distance between the person and the one in the back becomes closer. The depth-of-field becomes extremely shallow and the background out-of-focus.

The purpose of changing lenses is to get the best perspective and depth-of-field according to one's intention. A wide-angle lens which gives distinctive perspective is suited for the presentation of clear assertion. A normal lens is more appropriate for natural-looking shots. A telephoto lens is for portrait shots. A zoom lens seems convenient but by zooming it changes perspective as well as the size of the subject. A zoom lens should be thought of as a lens which can change perspective rather than the one which can alter the size of the subject.

Fig. 3-3

Wide-angle lens (24 mm)

Standard lens (50 mm)

Telephoto lens (200 mm)

Fig. 3-4

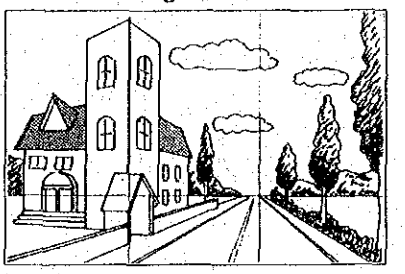


Fig. 3-5

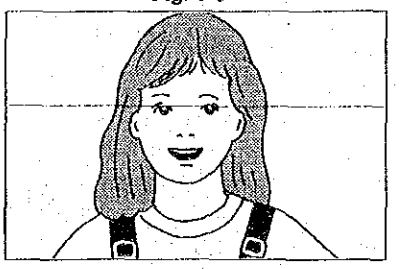
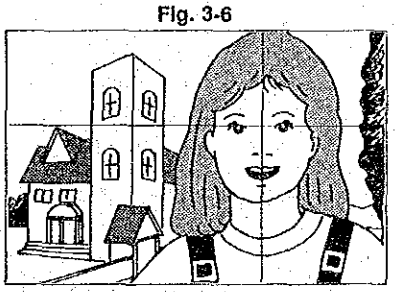


Fig. 3-6



This alteration of perspective and depth-of-field is the same thing with the difference in dollying and zooming in the operation of a video camera.

(3) Divide a scene into three equal sections

If a horizontal line or a vertical line comes across the center of a scene, the scene would be split into two equal sections, giving the feeling of restlessness. In order to obtain classically settled composition, a strong line or a center of interest, such as the human eye in case of portrait shooting, should be placed at one-third of the scene.

3-2 Close-up and Copy Work

Although there is no clear distinction between close-up and copy work, the term "copy work" is usually employed to shoot charts, graphs and printed materials of about B5 paper size or larger, and "close-up" is used to shoot smaller objects. It may depend on the content of the script, but in slide production, more than half of the shooting would be copy work, which usually requires a macro-lens and a copy stand.

Fig. 3-7 Copy stand and lighting

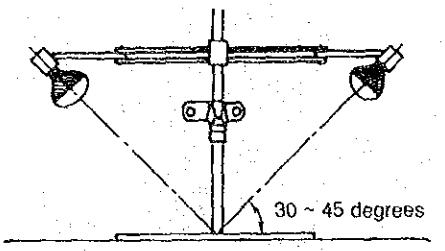


Fig. 3-8 The distance between the lamp and the center of the stage is more than three times the diagonal line of the copying area.

Operation of copy stand

Fix the camera vertically with screw fittings on the post of the stand. The surface of the film and the stage of the copy stand must be parallel to each other. Make sure by looking and checking a lined paper, such as a graph paper, through the viewfinder. The camera must be set firmly before shooting, and special attention should be given to the position of the camera during the shooting because the camera tends to jiggle when advancing the film.

(1) Lighting of copy work

Even light distribution is very important when copying. As seen in Fig. 3-7, the lamps should be placed at an angle of 45 degrees or lower to the stage of the stand. If the angle becomes higher than 45 degrees, the light reflects on the surface of the paper. Better result may sometimes be obtained by lowering the angle to about 30 degrees according to the condition of the copying

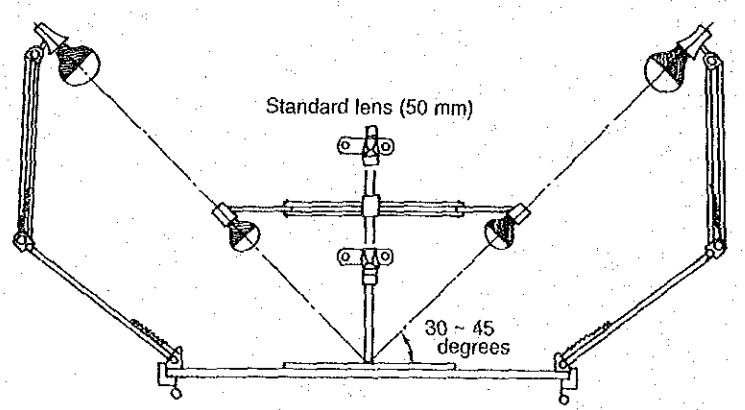
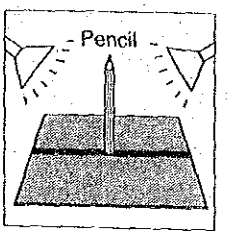


Fig. 3-9 The easiest way to assertion even distribution of the light



surface. The standard distance between the lamp and the center of the stage is more than three times the diagonal line of the copying area; shorter distance would result in uneven distribution of the light. Shooting of the cabinet size of the copying area would be the maximum when the lights attached to the post of the stand are used. Therefore, if the copying material is larger, attach the Z-shaped light directly on the desk in order to secure adequate distance. (Fig. 3-8)

The easiest way to ascertain even distribution of the light is to place a pencil in the middle of the copy area as shown in Fig. 3-9, then check if the shadows are equal on both sides of the pencil. The position of the lamp can be checked by straightening the shadow.

(2) Types of lamps

Two types of lights are used in photography: flood lamps and spotlights. Flood lamps used in copy work are divided into two kinds: white and blue lamps. White lamps are used for tungsten type film, whereas blue lamps are employed for daylight type film. The role of blue lamps can be replaced by covering the lamp with blue filter (about the size of B5 paper) which is usually used in stage lighting, or by fixing blue light balancing filter (CC filter, Kenko C12) onto the lens. As explained in the section on Films, in developing countries tungsten films, blue lamps and filters are hard to get. When these are not available, sunlight can play the role of the blue lamps. Using daylight films, the copy stand should be set outdoors. For ideal shooting, the light should be bright and even as the spot under the eaves (Fig. 3-10). Direct rays of the sun should be avoided. There will be no inconvenience in tropical regions since the position of the sun is high and daylight hours are stable all year round.

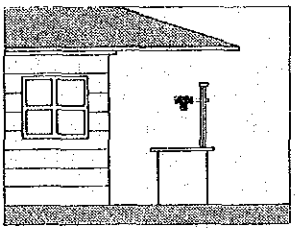


Fig. 3-10
One of the ideal shooting places on the spot under the eaves

(3) Exposure

Since copy work and close-up shots demand shallow depth of field, the best aperture would be around F8, the highest resolution of the lens. If the aperture becomes too small, its resolution would lessen. The aperture should first be determined and the shutter speed should be adjusted accordingly. The ideal shutter speed is around 1/4 sec. to 1/2 sec. The shutter speed slower than few seconds should be avoided, for it may result in underexposure or unbalancing of color.

To check the distribution of light on the copying area, exposure meter is employed. It is a device to measure light levels, either incident (incident-light meter) or reflected (reflected-light meter). Normally, the exposure is measured with the incident-light meter by placing it over the copying material facing the camera. The measurements should be taken at the center and each corner of the copying area. All the readings should be the same, although in practice the difference in the range of 1/2 aperture would not cause any problem. If the exposure meter is not available, a built-in through-the-lens meter (TTL meter) may be used. The TTL meter falls into the type of the reflected-light meter, and it sometimes measures more light than is actually falling on the surface, according to its reflectance. In this case, a gray card of reflectance 18% is a great help in determining the accurate exposure. A gray card is often supplied with a copy stand.

As in Fig. 3-11, if the subject is placed on a white paper, or written on the white background, the reflectance of the white paper becomes greater than the subject itself, and the TTL meter indicates the reading of about five times lower in comparison with that of a gray card. If reading of the TTL meter is followed, the resulting slide would be

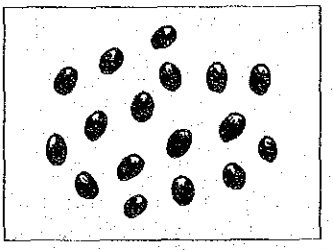


Fig. 3-11 The subject is placed on a white paper

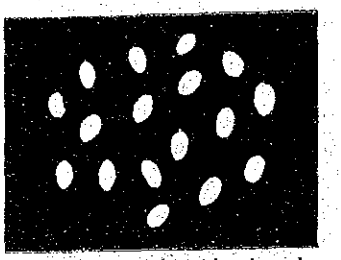


Fig. 3-12 The subject is placed on a black paper

underexposed. The color of the image turns out black because the meter averages the reflected light from a wide area of the scene. On the contrary, the subject on the black background, as in Fig. 3-12, would be overexposed since the reflectance of the black is so low that the image turns out white.

The case may not be so extreme as seen in Figs. 3-11 and 3-12, but automatic exposure set by a built-in camera light meter is not reliable. It is much better to use the incident-light meter, gray card or neutral color picked from among the copying materials, and then set the exposure manually. In order to get the best slide shot, shoot three slides of the same scene each with different exposure, the most appropriate one, 1 over (+1) or 1 under (–1), and pick the best one. Use the exposure compensation when automatic exposure is used.

(4) Nonreflective glass

When copying a thick book, thin newspaper, or a pile of papers, the difficulty in maintaining a flat surface may result in shadows or warps. To avoid these defects, a nonreflective glass is placed over the copying materials. A nonreflective glass, made of fine-grained frosted glass, is easy to get at large camera shops in Japan but rather difficult to procure in developing countries. When not available, a glass of a picture frame or a photocase with frosted glass can be used in place of the nonreflective type.

3-3 Development of Slide Film

In recent years, many film processing laboratories in developing countries have started to conduct slide development, but they still take much longer time to meet the customers' urgent needs. Although home processing of slide films had been considered difficult, easy slide processing kits are now available from Kodak, which has made the processing of slide film as easy as that of black and white films. It is convenient to have one set of such kit for a project. Only EKTACHROME, FUJICHROME and those films which are designed to be processed in Process E-6 should be developed by such kit; however, KODACHROME must be sent to designated processing laboratories.

Basically, there is no difference between development of slide film and black and white films. The slide film processing procedures can roughly be divided into three parts: loading the processing tank, developing and mounting.

Loading the processing tank

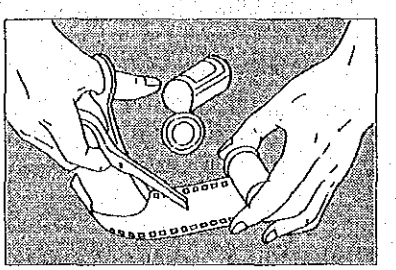
Step 1 *Straighten the tip of film*

Cut the tongue off the film with scissors and straighten it. This step becomes easier if the film end remains outside the film cassette when winding the film after shooting is finished. Otherwise, pull it out with a film puller, or do it in a darkbag or in a darkroom.

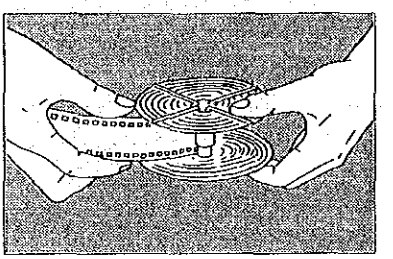
Step 2 *Load the film onto the reel*
Attach the film end to the clip at the center of the spool. Hold the reel with the left hand and bow the film slightly between the thumb and the index finger of the right hand. Rotate the reel so that the film is pulled smoothly out of the cassette and onto the reel. Be sure not to pull the film too forcefully, otherwise it will come out of the groove of the reel. The reel will be filled with a roll of 36mm film. Finally, cut off the spool with scissors.

Step 3 *Set the reel into the tank*
After loading, place the reel in the tank and close the lid tightly.

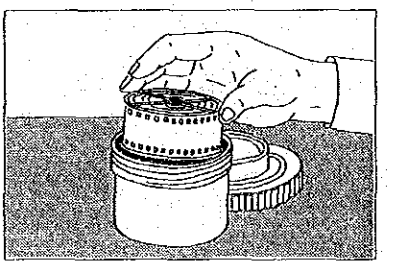
Step 1



Step 2



Step 3



Preparing the chemical solutions

There are several types of developing chemicals available and the most popular of all is E-6 processing solutions which have two solution types: Nos. 4 and 6. The following procedure will be explained using the No.4 type for its temperature control is not difficult and easily used by anybody.

Step-1 *Check the contents of the kit*
The No.4-type kit contains six bags, one bottle, instruction sheet and a quick-reference process guide concerning developing time.

Step-2 *Mix the solutions*
Mix the solutions according to the instruction sheet. There will be four solutions all together: 1. First Developer, 2. Color Developer, 3. Bleach-Fix, 4. Stabilizer.

Stir while adding the content of the packets, 1A and 1B, to 250ml of water and continue till the total volume reaches 500ml. Do not overstir, for oxidation loss will occur.

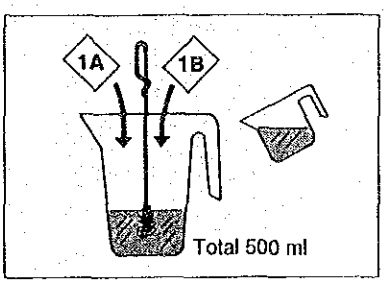


Fig. 3-13

Step-3 *Put the solutions into homoiothermal bath*
Prepare four solutions in the similar way (only one packet is needed to mix stabilizer), and put them into the homoiothermal bath.

All four solutions are harmful. Especially in case of contact with 1~3 solutions, rinse the skin thoroughly with plenty of water.

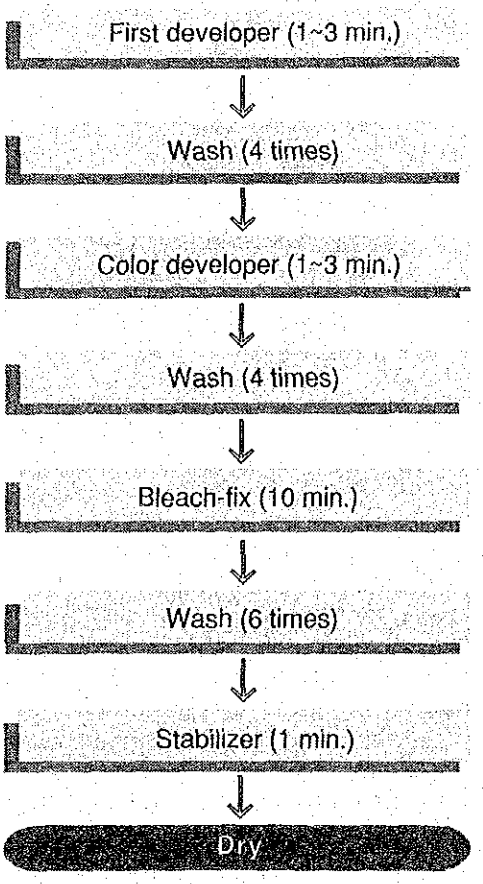
Step-4 *Control the temperature of solutions*
The best processing temperature is 38°C but about 30°C is acceptable. The developing time depends on both the temperature of the solutions and the number of the processing rolls. Processing at higher temperature reduces the total process time but reduction of time may result in drastic changes to the process. Therefore, it is recommended to use processing temperature lower than 38°C.

Processing

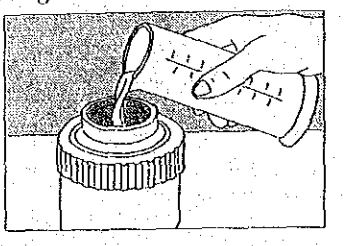
The steps of processing are shown in Table 3-1.

Table 3-1

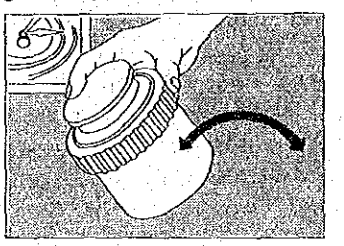
(At 35 °C)



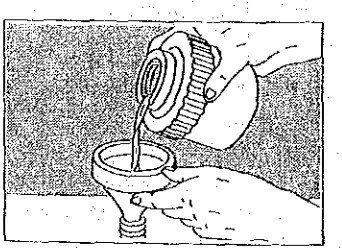
Step-1 *Pour in the solutions*
Remove the lid and pour the developer quickly into the tank. In case of a stainless-steel tank, 200ml~220ml will be enough. Too much developer results in overflowing and inadequate agitation. Start timing at the same time. Take approximately 10 seconds for pouring. Hold the tank at a slight angle for quick filling.



Step-2 *Agitation*
After pouring, close the lid and start agitating consistently for one minute. Turn the tank over continuously in case of a stainless-steel tank. Return the tank to the bath after one minute. After that, agitate at 30 second intervals (5 seconds for each agitation) during the required time.

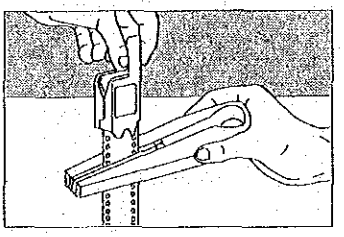


Step-3 *Drain and wash*
Start draining 10 seconds before the end of the processing step. Take 10 seconds to drain. Return the developer back to the bottle. Immediately fill the tank with water, agitate for 10 seconds and drain. Wash four times after the first developer and the color developer. Wash six times after the bleach-fix.



Step-4 *Dry*
Remove the film from the reel after one minute in the stabilizer without washing. Hang it up to dry with a clip in a dust-free area. Attach another clip to the lower end of the film to prevent curling while drying.

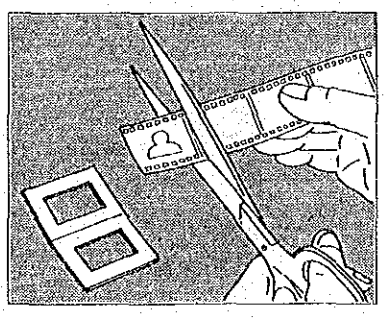
Wipe off the surface moisture with a wiper or a well-squeezed sponge. Drying is completed in approximately 40 minutes to one hour when the film base becomes transparent.



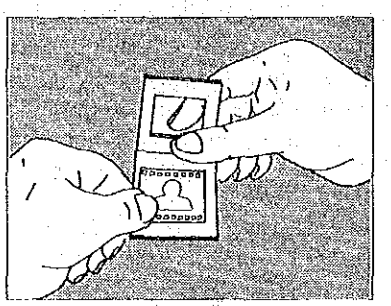
Mounting

Slides can be mounted in plastic mounts, cardboard frames or between glass plates. Of all, plastic mounts are the easiest to use. Cardboard frames require different methods of sealing: gluing, iron heating or using a special device called "mounter".

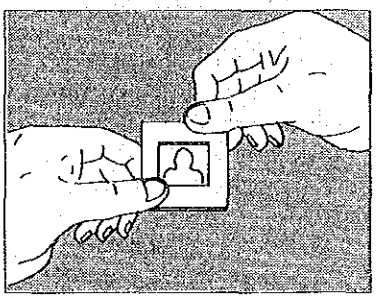
Step-1 *Cutting the film*
Cut the film frame by frame. Make sure each frame lines up between the pictures with a viewer. Darker background may be misleading. But six perforations make up one frame.



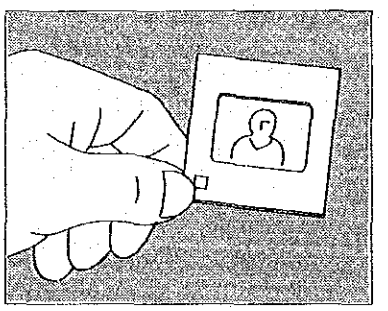
Step-2 *Place film in the mount*
Align the cut film in the mount and press it with the fingers to seal it. Wear gloves to avoid fingerprinting on the film.



Step-3 *Press the mount*



Step-4 *Checking the slide*
Check the slide surface and the backside. After this, write the slide number on the left end corner of the mount.



3-4 Duplicating Slides

If the number of slides needed is known beforehand, all of them can be photographed as originals. However, in some cases additional sets may be required after photography has been completed, or a large quantity of the copies may be necessary, or superimposition may be essential when copying slides or "duplication" is conducted. As in video, picture quality of duplicates gets bad when compared with those of the originals, resulting in an increase in contrast and a shift in colors (turn bluish in many cases). Sometimes, however, the result may turn out in higher degree of perfection with well-tones color when duplication of slide sets is done by a specialized film-processing laboratory. Duplicating slides is not difficult to do by oneself. Following are some of the methods:

Bellows and slide copier

The simplest duplication method is done with a bellows and a slide copier. As shown in Fig. 3-14, a macro-lens is fitted to the front of the bellows, then a slide copier is attached to the lens. Magnification of duplication can be controlled by the dispatch length of the bellows and the copier. The magnification range of 0.8 to 2.8 is possible with this method.

The methods of lighting for bellows utilizing photoflood lamp (Fig. 3-16) or using an electronic flash (Fig. 3-17). All of them can be measured by the TTL meter. Automatic light control by the TTL meter is especially convenient in the usage of an electronic flash.

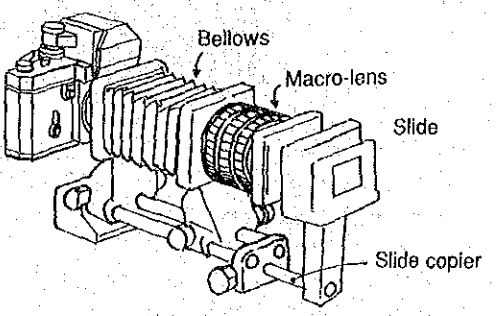


Fig. 3-14 Bellows and slide copying unit

Slide-duplication equipment

Although used frequently in Western countries and Asian region, slide-duplication equipment are not produced in Japan. The most popular type is the one with a built-in flash bulb, shown in Fig. 3-18. Its price is around ¥100,000, excluding the cost of a camera. (Fig. 3-18)

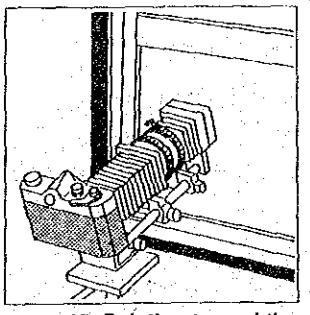


Fig. 3-15 Pointing toward the sun (Daylight use film)

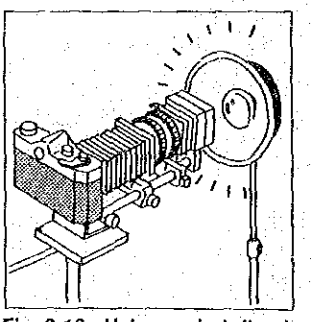


Fig. 3-16 Using a photoflood lamp (Tungsten-type film)

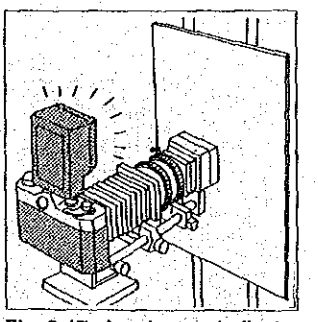


Fig. 3-17 An electronic flash reflected on the board (Daylight use film)

Set up the camera and connect it with the synchronizing cord of the duplicator. The camera exposure must be in manual mode and its shutter speed should be at the flash synchronizing speed (less than 1/60 sec. or 1/125 sec.).

Step 1
Set up the original slide on the slide-hold and adjust focus using a built-in tungsten lamp.

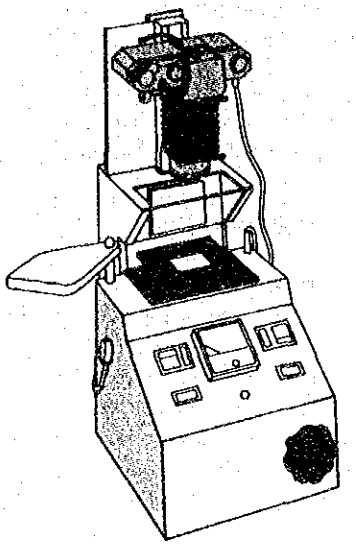
Step 2
Swing the exposure meter cell over the slide. By checking the meter, turn the knob in front until a built-in flash bulb is set at an appropriate height.

Step 3
Adjust contrast controlling dial for an appropriate contrast.

Step 4
Remove the meter cell and make the exposure.

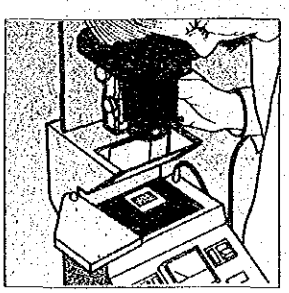
Upon purchasing the equipment, it is necessary to check the corresponding position of the meter when the appropriate exposure is obtained. There is a filter-setting stage underneath the slide-holder where color balancing filter is to be set.

Fig. 3-18 Slide-duplication equipment

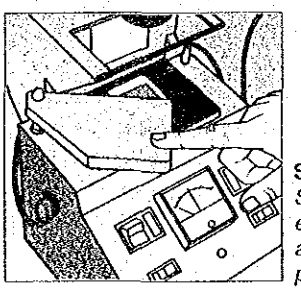


When using the slide-duplicator which requires an electronic flash, it is better to use pale amber (orange) filter because the duplicates tend to become bluish.

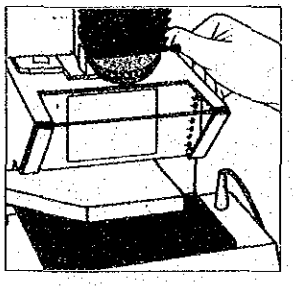
Fig. 3-19 Steps in using slide-duplication equipment



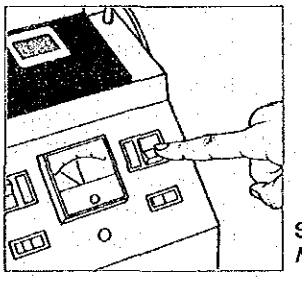
Step 1
Set up the original slide and adjust focus



Step 2
Swing over the exposure meter cell and check the exposure



Step 3
Adjust contrast with contrast controlling dial



Step 4
Make the exposure

3-5 Titles and Superimpose

As seen in the Video Production chapter, there are various types of titles and superimposes and methods of producing them. In this section, one of the methods of procuring title and superimpose with high-contrast negative film will be discussed as special characteristics of slides.

Titles and graphs

In order to superimpose the title white, double expose the original slide and high-contrast negative film using the duplicator. The exposure of high-contrast negative film will be 1/2 or 1/f stop underexposed compared with the original slide. If the same aperture is used for both exposures, the light will come through from the black part when exposing the superimpose resulting in an unclear background color. Also, if contrast of high-contrast negative film is not strong enough, the resulting slide would be rather dull.

Bluish background slide is produced by printing the high-contrast negative onto a file film. Its development is done with diazo process using ammonia vapor. Since these are difficult to obtain at the site, it is better to bring them from Japan.

High-contrast slide

EKTACHROME can make general shots, charts and titles into slides, while the high-contrast negative for copying is used for superimpose and color background slides.

Minicopy ISO-32 and high-contrast copy ISO-62 from Kodak are easy to obtain as high-contrast films.

Besides using the high-contrast black and white film as the reversal slide, there are many more useful ways; as follows:

1) Make the color slide by coloring the reverse side;

2) Make a bluish-background slide by printing on a diazo film (Sakura color foil film, etc.); and,

3) Use as an original for superimpose slide.

Shooting and development of a high-contrast slide negative film are necessary techniques to make titles and superimpose and they are similar to those of the black and white negatives.

(1) Prepare original graphic

Write titles or charts in black on white paper. The A4 size paper would be of easier use. Instant lettering or letter-plates can be used for the alphabets such as in English. Japanese letters can be produced by hand-writing or a portable word-processor, and the one with the enlarged printing capacity would be a better choice for fast and fine result.

Fig. 3-20 High contrast slide

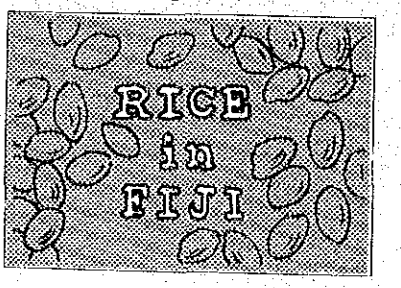
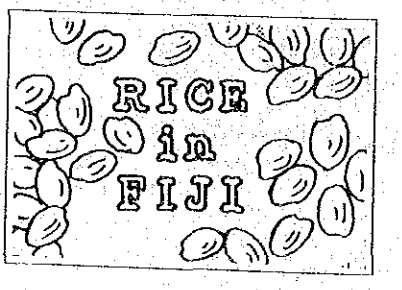


Fig. 3-21 Superimposed slide



(2) Copy it using a copy stand

High-contrast film, such as Minicopy, has low sensitivity, usually around ISO-32. Since the original is on white paper, exposure measurement with the TTL meter should be performed around ISO-6. The result will also depend upon the developing time and the temperature of chemicals; therefore, shooting of the same original should be undertaken five times, each with 2 f/stop and 1 f/stop overexposed, appropriate exposure, 1 f/stop and 2 f/stop underexposed.

(3) Development

Use developing chemical for high-contrast films, such as Copinal. Fixer will be the same as that for the black and white films. The procedure will be as follows:

Step1 *Develop*
Developer such as Copinal: 20°C

Developing time is 5 minutes. Continuous agitation for the first one minute, then agitate for five seconds at each 30-second interval.

Step 2 *Stop*
Stop bath is 1.5% acetic acid, produced by adding 50% acetic acid to one liter of water. After continuous agitation of 30 seconds, empty the chemical in one minute time. The chemical is disposable.

Step 3 *Fix*
Fixer such as FUJI-Fix: 20°C

Fixing time is 10 minutes. Continuous agitation for the first one minute, then agitate for five seconds at each 30-second interval.

Step 4 *Wash*
Wash under running water for more than 15 minutes or it will be reduced to six minutes if a quick-wash agent, such as FUJI-QW, is used.

Step 5 *Dry*
Wipe the film with a sponge and, with a clip, hang it to dry in a dust-free place.

Because high-contrast films have narrow film latitude, taking the data on the appropriate developing time by checking the results at each developing time of 4 and a half minutes, 5 minutes and 5 and a half minutes is recommended. After drying, mount the film as same as the slide film.

3-6 Camera Operation

Camera operation has been made easier year by year. Most auto-focus single-lens reflex cameras recently produced are handy, operated just by depressing a shutter release. Initially, however, such a camera may sometimes be confusing. The proverb "practice makes perfect" is applied to the equipment which are manually operated, such as cameras. The *following points are essential when operating a camera for the first time.*

Film loading

(1) The most common error in camera operation occurs when removing the back cover of the camera, especially when loading the film. Although the method of film loading varies depending upon the camera type, the most popular one is easy-loading, which places the film into the camera and no longer requiring insertion of the film into the film take-up reel. The method has been changed so drastically that it may cause some people to make mistakes.

(2) Before removing the back cover of the camera, check carefully to see that a film is not already loaded by looking through the film-checking window. Do not spoil the undeveloped film by opening a film-loaded camera.

When removing the back cover, hold

the camera firmly by placing the back side up.

Try not to touch the shutter curtain when opening the back cover because it is one of the most sensitive parts of the camera. (Fig. 3-23)

Touching the shutter curtain by the tip of the film may scratch it. Turn the core part of the film cartridge slightly to facilitate insertion into the camera. (Fig. 3-24)

(3) Pull the film lead out of the cartridge and fit the film perforations onto the sprocket wheel. (Fig. 3-25) Since the film is advanced by the sprocket wheel, it is important for the perforations to fit well onto the sprocket wheel for smooth advancement of the film.

(4) Loose winding film may cause the engagement to come off when replacing the back cover; make sure to suppress the film in order to take in the slack.

(5) To close the camera, press the back cover softly until the lock clicks. If slammed in closing it, the film may detach from the sprocket. It is usually wound automatically up to "1" of a film counter. (Fig. 3-26)

Fig. 3-23 Open the back corner

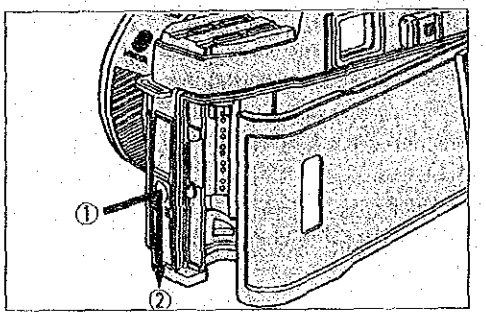


Fig. 3-24 Set the film

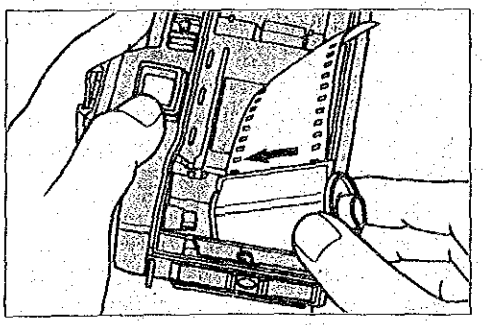


Fig. 3-25 Fit the film perforations onto the sprocket wheel

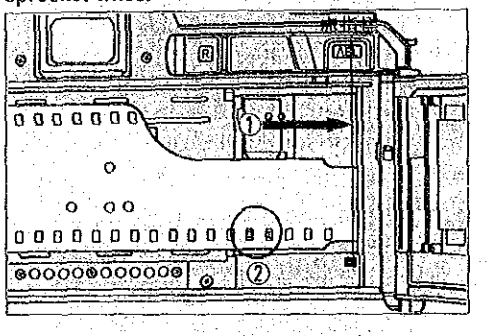
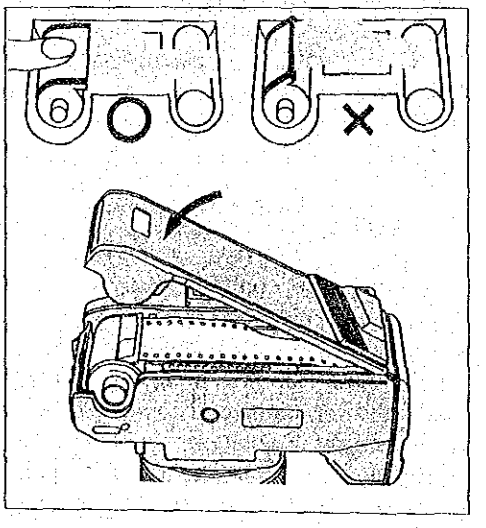


Fig. 3-26 Check the film perforations setting and close the camera back



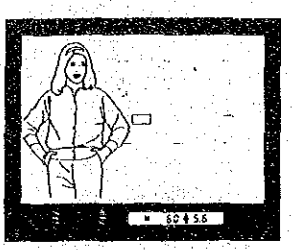
When the subjects which auto-focus are not appropriate

The following subjects require focus-lock, manual mode or flash to focus, for the auto-focus distant measurement will not function or the focusing may be out of order.

Table 3-2
Focusing indication in the viewfinder for the following subject

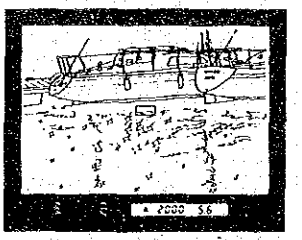
Subject	Focusing indication
A B C	▶◀ Red LED blinking
E F	● Green LED blinking
D	No indication

Fig. 3-27 The subjects which auto focus are not appropriate



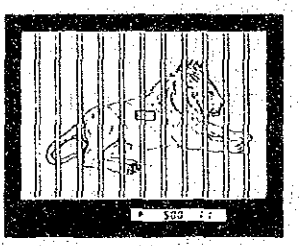
A *Subject with extremely low contrast; Subject with no horizontal contrast*

B *Extremely dark subject*

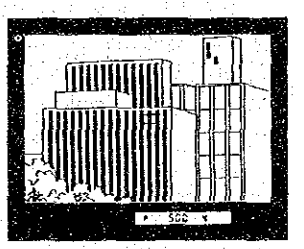


C *Subject in strong against-the-light condition; Extremely bright subject*

D *Subject moving at high speed*



E *Coexisting subjects in the foreground and background*



F *Subject with continuously repetitious patterns*

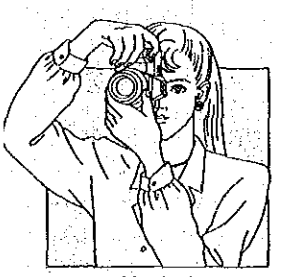
Photograph the slides with horizontal format

The basic format of the slides are horizontal. A vertical format causes incoherence in a set of slides.

Fig. 3-28 Horizontal format is appropriate

Horizontal

○



Vertical

×

4 Planning and Producing a Slide Show

4-1 Planning

(1) Objectives and Audience

It is the same with any media that good work cannot be produced without structured planning before actual production. The objectives and audience of the show must be identified clearly. With what objectives does this show intend to reach to what kind of audience? They should be spelled out with "words of behavior".

The following is an example of objectives of the show "Structure and pollination of a flower". The audience is expected to perform the following services after they have seen the show.

(a) To name each parts of the flower
(b) To identify generative parts from nonreproductive parts of the flower
(c) To define a complete flower and an incomplete flower
(d) To describe the process of pollination
(e) To show the difference between allogamy and autogamy
(f) To explain the difference between an entomophilous flower and an anemophilous flower
(g) To list the example of entomophilous flowers and anemophilous flowers

The objectives should be developed by assuming specific actions, such as to name, to identify, to define, or to give examples. Its purpose is to clarify what should be said and what should be the key points in the show.

In an instructional slide show, since emphasis must be on the content of learning, it does not have to follow the example of existing pattern or flow of the show, but should be intended for better and more effective learning. Therefore, various ways of slide presentation may be invented for instructional purpose; for example, ask questions after having shown some slides or conduct discussion session between the slides.

(2) Duration of program

If the program lasts more than 20 minutes, the audience usually feels uneasy, although the time may vary depending upon the audience. Also, the audience cannot keep still and starts feeling bored if the narration for one slide exceeds more than one minute. Whether recording the narration on the tape or reading it aloud, the maximum words spoken in one minute are 200 letters for Japanese and 100 to 120 words for English. The standard figures should be 100 Japanese letters and 50 to 60 English words for one frame of the slide. As a whole, the appropriate time of a show should be less than 20 minutes with 50 slides. If more material should be included, separate it into two shows for easier production and utilization.

(3) Schedule

When planning production schedule, it is important to remember that the conditions, such as the way to get films and mounts, days to be spent on the develop-

ment, and possibilities of location shooting, will differ greatly in an assigned area compared with that of Japan. Some latitude should be allowed in the production schedule.

It may also be essential not to spend too much time and labor by making full use of the existing slides and charts to be used because the instructional slide show is prepared for use in daily lectures.

4-2 Storyboard

The storyboard is not popular in Japan but in the United States it is used to plan the outline of the program before developing a script. It is also called the "planning board" (Fig. 4-1).

Try to put the following items on the planning cards measuring 8cm × 13cm.

1.Write down every idea suggested, sketches or comments.

2. Divide them into some sequences and arrange them in a logical order on the storyboard. This will make it possible to see one's own idea objectively as well as to discuss it in a group.

3. Examine the storyboard. Complete the storyboard by adding new ones, eliminating the unnecessary ones, or rearranging the sequence.

The balance of a whole program should be taken into consideration when developing a story. For example, if four interesting episodes are included, the following questions arise: Are they well balanced with each other? How are their logical sequences? How is the balancing in length of each episode, introduction and conclusion?

In an instructional slide show, presentation of example and rule should also be a crucial point. Which type should be adopted, egrule type (example—rule) or ruleg (rule—example)? It depends on the content or the theme of the show, but the egrule type is more popular for most instructional slide shows. Some cases may adopt the ruleg type but many times returns to indicate rule at the end (rulegrule type). It should also be determined according to the objectives of the show, because if the objective is put to open discussion, the general rule does not have to be deduced as its conclusion is left to the classroom discretion.

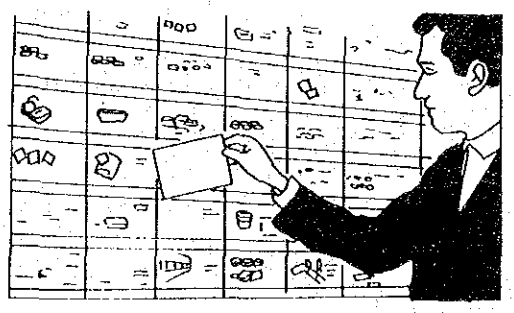


Fig. 4-1 Storyboard or planning board (1 m × 1.5 m)

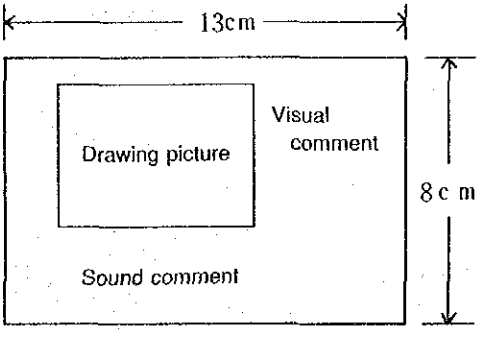


Fig. 4-2 Planning card

4-3 Script

(1) Script

The script in slide production is like a blueprint in construction. As already explained, the script may be prepared before shooting, or after shooting to provide an opportunity to organize the materials which have been photographed. The script becomes a guide directions for art work, narration, music and sound effects.

In Fig. 4-4, a part from the script "Mangrove Ecosystem" is presented as an example.

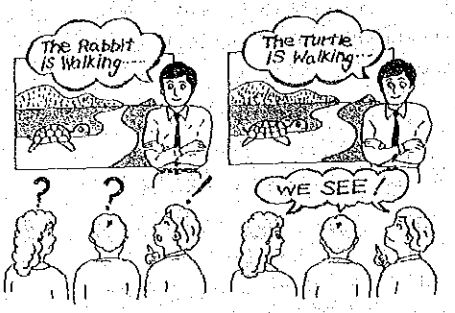
The following key points are described for script writing:

(a) There should be a unity of narration and pictures in order not to cause audience's confusion. Since emphasis is on the pictures in case of instructional slides, the narration tends to become explanatory. However, there is no need to explain the obvious because it will not help to stimulate the imagination of the audience if everything is mentioned in the narration.

(b) It is better not to change the slide in the middle of the narration. Complete the sentence before showing the next slide to make the audience feel at ease.

(c) Easily understood words and phrases should be used (10 to 15 words per sentence being the best.)

Fig. 4-3
A unity of narration and picture is important



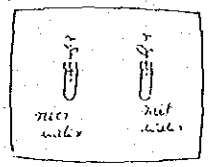
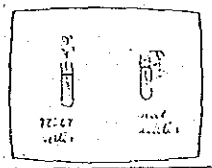
(d) As a basic rule, narration, music and sound effect should not be heard simultaneously. If the three of them are heard together at the same time, the audience will not know which one to concentrate on.

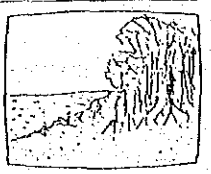
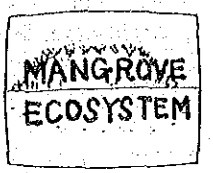
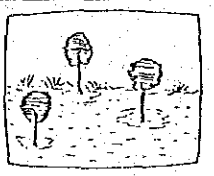
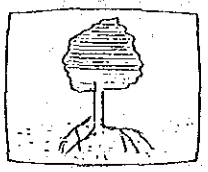
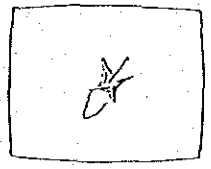
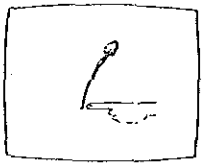
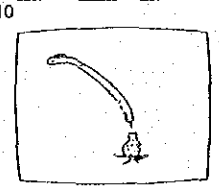
(e) The narration only, with no other sound, will be effective when delivering an important message.

(f) It is not necessary to use such expressions as "as we see . . ." or "in the next slide".

(g) New terms or concepts in the slide show should be placed at the beginning of a sentence. For example, the sentence "The rapid access of pictures on videodisk is accomplished by laser . . ." should be replaced by "Laser accomplishes the rapid access of picture on videodisk . . ."

Fig. 4-4 An example of the slide script "Mangrove Ecosystem"

Display	Audio effect	Narration
No. 1 		These two test-tubes contain two types of water: RIVER WATER and SALT WATER. Two similar land plants are placed in each of the test-tube. After a few hours, what do you think has happened to these 2 plants?
No. 2 		Are they still the same? Surely not, as we can see. The one in river water is still fresh whereas the other has withered. What has made this plant withered? Obviously the salt water. Can all land plants survive in salt water? Obviously not. Only some can survive in such conditions.

Display	Audio effect	Narration
No. 3 	SE-In (Wave) SE-Out	And these are the mangroves which are adapted to such *conditions.*
No. 4 	M-In M-BG	MANGROVE ECOSYSTEM.
No. 5 	M-BG	A section of a mangrove swamp where the action of the tides has caused the area to be waterlogged, unstable and of high salinity. Why do you think these plants can still survive in these adverse conditions?
No. 6 	M-BG M-FO	This Rhizopnora plant is different from a normal land plant. What are the differences? It has stilt roots spreading outwards into the soil. Why? Of course, such root system shows how mangrove plant adapt to this type of condition to provide good anchorage.
No. 7 		This plant produces this type of fruit.
No. 8 		And it has now developed an elongated structure as shown. Unlike other normal seeds, this fruit germinates while still *attached to the parent plant.* Such phenomenon is a common adaptation for all mangrove plants and is referred to as viviparous germination.
No. 9 		As the fruit matures, a greenish structure emerges from its base and can grove to a length of 20 - 30 cm.
No. 10 	ME-In ME-Out	The elongated structure is actually the radicle and the pointed end is the shoot. The whole structure is a germinated seedling.