MESC
Media & Entertainment Skills Council

Participant Handbook

Sector
MEDIA AND ENTERTAINMENT

Sub-Sector
Film, Television

Occupation
Camera

Reference ID: **MES/ Q 0903, Version 3.0**
NSQF Level 3

Assistant Cameraman

This book is sponsored by Media and Entertainment

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> If we have to move India towards
> development then Skill Development
> should be our mission. "

Shri Narendra Modi
Prime Minister of India

Certificate

COMPLIANCE TO
QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

MEDIA AND ENTERTAINMENT SKILLS COUNCIL

for the

SKILLING CONTENT : PARTICIPANT HANDBOOK

Complying to National Occupational Standards of
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Acknowledgements

About this Book

This Participant Handbook is designed to enable training for the Assistant Cameraman Qualification Pack (QP) with Ref. ID MES/ Q 0903. There are 4 National Occupational Standards (NOS) under this qualification pack. Each National Occupational (NOS) is covered across 8 Units in this book.

Key Learning Objectives for every NOS mark the beginning of the Unit for that NOS. In Table of Contents, you will find the module names with their corresponding NOS code. The symbols used in this book are described below.

Symbols Used

Key Learning Outcomes	**Steps**	**Time**	**Tips**	**Notes**	**Unit Objectives**

Exercise

Table of Contents

1. Introduction

Unit 1.1 - Introduction to the Media and Entertainment

Unit 1.2 –Duties and Responsibilities of a Assistant Cameraman

Key Learning Outcomes

At the end of this module, you will be able to:

1. Explain the key features of the Media and Entertainment sector
2. Discuss various processes and products of Media & Entertainment sector
3. Learn about the role of Assistant Cameraman in industry.
4. Identify the minimum requirement to become a certified Assistant Cameraman.
5. Describe the work area of Assistant Cameraman.
6. Identify the opportunities available for Assistant Cameraman.

UNIT 1.1: Introduction to Media & Entertainment

Unit Objectives 🎯

At the end of this unit, you will be able to:

1. Describe the media and entertainment industry in India
2. Describe the growth expected in the media & entertainment industry
3. Explain the various products and processes of the industry
4. Identify some keywords used in the industry

1.1.1 Media and Entertainment Sector in India

The Indian media and entertainment (M&E) sector is one of the biggest in the world. It is placed as 14th largest in the world. This sector is 1.7% of Indian GDP and expected to be 2.2% of GDP with INR 4.5 lakh crores in 2022. The sector employs 9.3% of the workforce of our country and we are expecting it to be 17% till the end of 2017

From 2014 to 2018 Media and Entertainment sector has grown by approximately 11 percent CAGR which makes Media and Entertainment sector INR 1.43 trillion industry. It is estimated that Indian Media and Entertainment market will flourish to CAGR of 13.1% in FY 18-23 reaching at INR 2.66 trillion. The industrial performance of M&E sector is given in next figure.

Overall industry size (INR billion)	FY14	FY15	FY16	FY17	FY18	Growth in FY18 over FY17
TV	433.7	489.9	551.7	595.3	651.9	9.5%
Print	248.2	268.4	288.4	308.4	318.9	3.4%
Films	126.4	126.9	137.1	145.0	158.9	9.6%
Digital advertising	32.5	47.0	64.9	86.2	116.3	35.0%
Animation and VFX	41.0	46.5	53.2	62.3	73.9	18.6%
Gaming	20.3	24.3	27.6	32.4	43.8	35.1%
OOH	19.9	22.3	25.5	28.6	32.0	11.9%
Radio	17.2	19.8	22.7	24.0	25.9	7.9%
Music	8.5	10.2	11.2	12.6	14.4	14.7%
Total	**947.6**	**1,055.1**	**1,182.3**	**1,294.7**	**1,436.0**	**10.9%**

Source: KPMG in India analysis, 2018 based on primary and secondary research

Figure 1.1. 1 Revenue of M&E Industry

In 2018, digital advertising business grew 35% as compared to 2017. Another high growth sub-sector is Gaming which grew by 35.1% in FY 2018 as compared to FY 2017. The projected growth of industry for FY 2018 to 2023 is given in next figure.

Overall industry size (INR billion)	FY19	FY20	FY21	FY22	FY23	FY18-23 CAGR%
TV	746.4	855.3	959.1	1,066.6	1,179.6	12.6%
Print	338.5	357.8	378.6	400.8	424.9	5.9%
Films	171.7	185.4	199.3	213.9	228.8	7.6%
Digital advertising	154.7	202.6	263.4	339.8	435.0	30.2%
Animation and VFX	86.7	100.9	116.8	133.5	151.8	15.5%
Gaming	55.4	70.9	84.7	103.3	118.8	22.1%
OOH	35.7	38.6	42.0	45.7	49.7	9.2%
Radio	28.3	31.8	34.8	38.8	42.1	10.2%
Music	16.6	19.1	22.1	25.6	29.6	15.5%
Total	**1,633.9**	**1,862.5**	**2,100.7**	**2,368.0**	**2,660.2**	**13.1%**

Figure 1.1. 2 Projected growth of M&E Sector

India is one of the largest broadcasters in the world with approximately 800 TV channels, 242 FM channels and more than 100 community radio networks working at present. Bollywood, the Indian film industry is the largest producer of films around the globe with 400 production and corporate houses involved.

The Government of India keeps on pushing the Media and Entertainment industry by launching various schemes such as digitizing the cable TV to fill greater institutional funding, raising the Foreign investment from 74 per cent to 100 per cent in cable and DTH satellite platforms. Government has also allotted industry status to the film industry for easy finance.

1.1.2 Employability in Media and Entertainment Sector

The Media & Entertainment sector employs 11-12 lakh people directly (as per 2017 reports) and if we consider indirect employments as well then count goes to 35-40 lakh people. The Media sector is highly dependent on advertising revenues and performance of Industry for economy outlook. This sector was having 4 lakhs workforce in 2013 and we expect it to reach 13 lakhs by 2022 which means employing 9 lakhs of additional employment in the period of 2013-22.

- 1/4th of the people employed in Media and Entertainment sector are from film industry.
- The Media & Entertainment sector has about 4.60 lakhs people employed, and is projected to grow at the rate of 13 % to reach 7.5 lakhs by 2017.
- The Media and Entertainment sector which is expected to grow at rate of 13.1 % by 2023 which means to reach 2.7 lakh crore of business for skilled professionals.
- Film & Television sector has a major portion of the workforce employed in media and entertainment. Digitization activities being done in both films and television arena are the key player for this demand.

Workforce in the sector
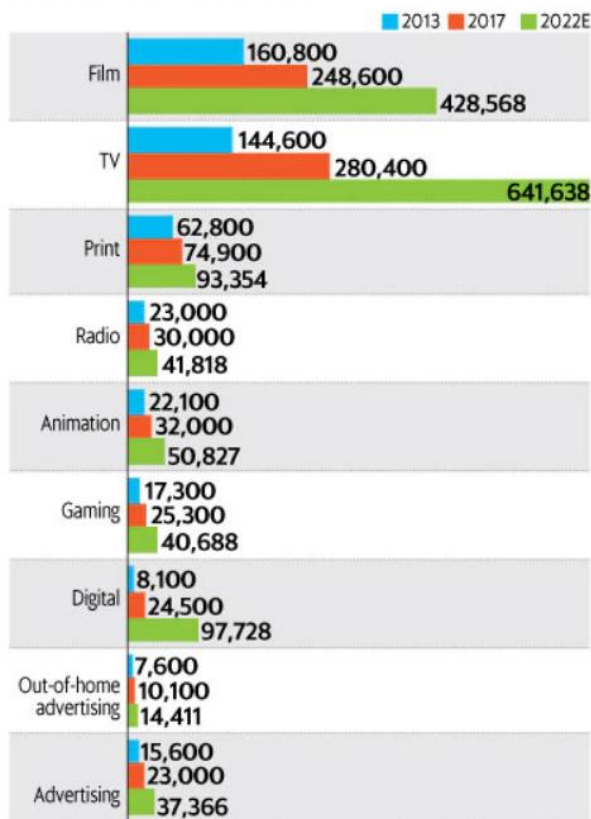
Figure 1.1. 3 Employments in Different Sectors of Media and Entertainment

1.1.3 Evolution of Media and Entertainment Sector

- Radio broadcasting came by Radio Club of Bombay in 1923 in India under the British rule.

- All India Radio (AIR), one of the largest radio networks in the world, started working in 1936.

- Doordarshan (DD) started the era of TV on Sept 15, 1959 in India.

- The Indian economy was closed until 1990, and no private player was allowed to enter the space In the 1990s, the Indian film industry was completely fragmented

- BBC launched its national service in 1995

- In 1999, the government allowed private Indian Firms to set up their FM stations on a license fee basis

- In May 2000, as part of Phase I of radio broadcast licensing, the auction was conducted and 37 licenses were issued, out of which 21 are operational in 14 cities

- Approximately 1000 TV channels and 1052 radio stations are expected to be working by 2022.

1.1.4 Major Subsector and Segments

• The Indian M&E industry comprises several sub-sectors, such as television, radio, print media (including newspapers and magazines), films, animation and visual effects (VFX), Sound & Music, Amusement & Theme Parks, Art & Culture, and Event Management/Live Performances.

• Advertising industry is the major revenues generating part of the industry and the growth of the sector decides the overall growth of the industry.

• Although there is not much to export from this industry but imports have a considerable share in the economy like imports of newsprints, set-top boxes and antennae.
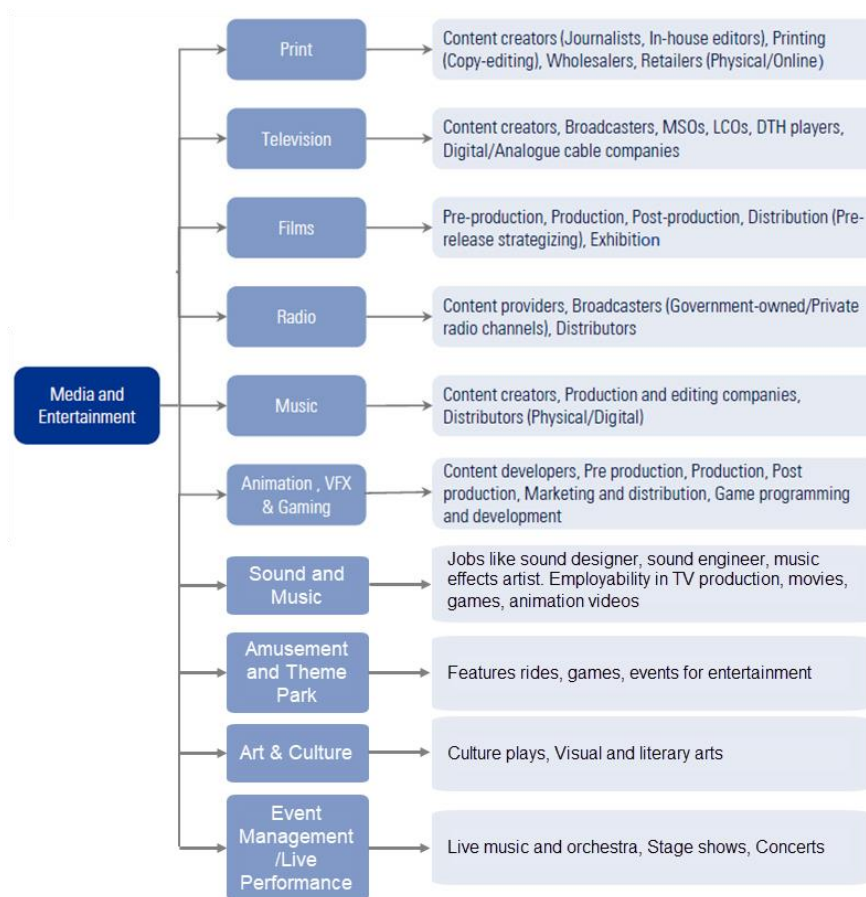
Figure 1.1. 4 Media and Entertainment Sector

• The industry is specific to cultural and ethnic backgrounds, and is organized around specific hubs that specialize in output for a given population segment. For example, the Mumbai film industry (Bollywood) is a key film hub in the country. A similar hub also exists in South India.

Growth rate by sub-sector
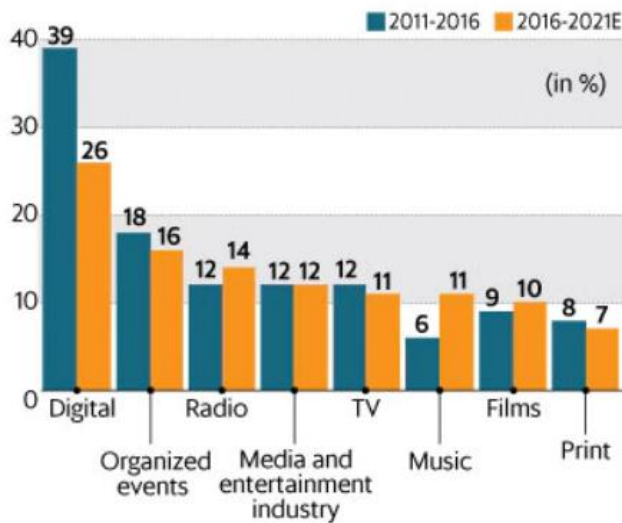
Figure 1.1. 5 Media and Entertainment Sector Growth Rates expected in 2016-2021

1.1.5 General Key Words used in this Book

Animatic: A series of images edited together with dialogues and sound is called animatic.

Compositing: Combining layers of images/elements into a single frame is called composting.

Composition: Positioning character with respect to the background and camera is called composition.

Creative Brief: A document that captures the key questions for the production including the vision, objective of the target audience, budgets, project, milestones, timelines and stakeholders is called creative brief.

Key Frame: Key poses that start and end poses for a particular animation sequence are called key frames.

Modeling: Creation of three-dimensional models for animation using a specialized software is called modelling.

Rendering: Conversion of three-dimensional models into two-dimensional images with 3D effects is called rendering.

Rigging: Process of adding joints to a static three-dimensional model to aid movement during posing is called rigging.

2D animation: Moving pictures in a two-dimensional environment is called 2D animation like in computerized animation software.

3D animation: 2D animation with depth is called 3D animation. Examples include video games such as Halo and Madden Football.

Animation: Sequential play of various inter-related frames is called animation.

Anticipation: Anticipation are created through the preparation of an action.

Aspect Ratio: The width to height ratio of a tv picture is called aspect ratio.

Background Painting: An artwork done in the background of an animation is called background painting.

CGI (Computer Generated Imagery): Creation of Figures, settings, or other material in the frame using computer software is called CGI.

Clean-Up: The process of refining the rough artwork of 2D animation is called Clean-up.

Computer Animation: Any kind of animation created in computer is called computer animation.

Frame: one of a series of still transparent photographs on a strip of film used in making movies or animations.

Frame Rate: The rate of change of frames in an animation is called frame rate. It is measured in frames per second (fps).

Graphics Tablet: This is a device used to draw sketches.

Pixel: The smallest undivisible portion of an image is called pixel.

Raster: Rastering is the projections of various pixels on CRT screen to form an image.

Rotoscoping: Creation and manipulation of background images of an animation is called rotoscoping. This can be done manually as well as using computer software.

Title Cards: Title cards are also called FIR of an animation. Title cards give brief information about the animation.

Tween: The transition of one frame to another in animation is called tween.

Vector: Some of the artwork is created by vectors rather than pixels. This allows cleaner and smoother animation because images are displayed by mathematical equation solutions.

CEL: It is a cellulose sheet used to paint characters. In practice, it is now a day. plastic sheet in combination with the outline and coloring of a character, object, and/or special effect.

Exercise-1

Discuss the role of Media & Entertainment sector in India economy.

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Exercise-2

Discuss the employability of various sub-sectors in Media & Entertainment Sector.

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UNIT 1.2: Duties and Responsibilities of Assistant Cameraman

Unit Objectives

At the end of this unit, you will be able to:

1. Learn about the role of Assistant Cameraman in industry.
2. Identify the minimum requirement to become a certified Assistant Cameraman.
3. Describe the work area of Assistant Cameraman.
4. Identify the opportunities available for Assistant Cameraman.

1.2.1 Introduction to Assistant Cameraman Job Role

Assistant Cameraman in the Media & Entertainment Industry is also known as the First Assistant / Second Assistant. Individuals at this job are responsible to mark focus lengths based on the required composition and focus and refocus the camera lenses during shoots. They are also responsible to set-up/dismantle camera equipment.

Figure 1.2.1 Work of an assistant cameraman

This job requires the individual to judge distances and mark focus lengths accurately. The individual must be creative and detail-oriented. The individual must know and keep updated on the various camera equipment, shooting techniques and mediums. The individual must have excellent communication skills and must possess the ability to work collaboratively as a part of a team.

The job of a assistant cameraman is one of the most skilled jobs in movie creation. They are responsible for marking camera details on floor and focus the camera lens as actors move within the frame of each shot. The assistant cameraman does not look though the lens to do this; he/she sets focus according to a set of complex marks set on the floor during the director's on set rehearsal time with the cast and by using their instincts/experience of judging focal lengths. As it is impossible to check focus using screen for assistant cameraman so he/she rely on experience and instinct for each focal adjustment. Reshooting a scene can be very expensive and actors may be unable to recreate their best take so assistant cameraman should be extremely reliable and good at their work.

1.2.2 Job Profile of Assistant Cameraman

An assistant cameraman performs following tasks in the industry:

- Coordinate with logistics players, where required in the context of the role, to have the equipment delivered to the vendor/own facilities (equipment can include cameras, batteries, lenses, filters, grips, track, special effects equipment, magazines, clapper boards, film stock/beta tapes/memory cards
- Prepare equipment for shoot including unpacking, cleaning and assembling cameras and lenses, loading the film stock into magazines, charging batteries etc.
- Report any damages to the camera and production teams
- Establish, or support in establishing, the focus requirements for shots (eg: pan, tilt, tracking, static, zoom, close-up, wide-shot, master shot, high/low, angle shot, long shot and mid shot), based on the creative and technical requirements of production
- Mark, or support in marking, the focus lengths/angle based on the required composition (eg: positioning of elements within a frame), perspective (eg: point of view) and aspect ratio (eg:relationship between width and height)
- Prepare, or support in preparing, a focus path for a sequence depending on the movement, timing, start and finish points during shoots
- Dismantle and pack the equipment properly (equipment can include cameras, batteries, lenses, filters, tripods, grips, dollies, track, special effects equipment, magazines, clapper boards, unused film stock/beta tapes/memory cards)
- Ensure that all the list of equipment to be dispatched matches the list of equipment received from the vendor and brought by the production team
- Coordinate with logistics players, where required, to have the equipment dispatched to the vendor/own facilities as required

1.2.3 Opportunities for Assistant Cameraman

There are various opportunities for assistant cameraman in the field of production houses and creative boutiques on projects. The main role of an assistant cameraman is to support cameraman in various tasks like setting focus length of camera, availing lenses, marking floor and so on. An assistant cameraman has following benefits for career aspect:

- Medium range of salary with low educational investment
- Opportunities in Movie production houses, news networks, and animation industry
- Lots of opportunities to grow in the industry.

1.2.4 Key Professional Skills

This job requires the individual to have a good understanding of the fundamentals and principles of film-making. The individual must know the fundamentals of depth and should possess good drawing and illustration skills. The individual must have a good working knowledge of rotoscopy software including Nuke, After Effects, Silhouette etc.

Exercise

- Who is an assistant cameraman?

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- What are the common industries where assistant cameraman finds job?

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- Discuss the job responsibilities of assistant cameraman.

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- What is the job of an assistant cameraman and what are the opportunities?

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Notes

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2. Setting up camera and equipment for shoot

Unit 2.1 – Camera and Equipment

Unit 2.2 – Setting up Camera for Shoot

MES/N0905

Key Learning Outcomes 💡

At the end of this module, you will be able to:

1. Prepare equipment for shoot including unpacking, cleaning and assembling cameras and lenses, loading the film stock into magazines, charging batteries etc.
2. Arrange for security and protection of the equipment during storage and logistics
3. Report any damages to the camera and production teams
4. Ensure cameras are mounted on grips and the locks are fastened securely
5. Label equipment and supplies accurately
6. Coordinate with logistics players, where required in the context of the role, to have the equipment delivered to the vendor/own facilities (equipment can include cameras, batteries, lenses, filters, grips, track, special effects equipment, magazines, clapper boards, film stock/beta tapes/memory cards)

UNIT 2.1: Camera and Equipment

Unit Objectives ◎

At the end of this unit, you will be able to:

1. Prepare equipment for shoot including unpacking, cleaning and assembling cameras and lenses, loading the film stock into magazines, charging batteries etc.
2. Arrange for security and protection of the equipment during storage and logistics
3. Report any damages to the camera and production teams
4. Ensure cameras are mounted on grips and the locks are fastened securely
5. Label equipment and supplies accurately

2.1.1 History of Camera

A camera is an optical instrument used to capture images in front of its lens on a film or digital media. The evolution of camera has passed through many stages of development. Cameras have passed through many stages like camera obscura, cameras using daguerreotypes, calotypes, dry plates, films, and digital media these day. The descriptions about these stages are given next.

2.1.1.1 Camera Obscura

Camera obscura was the first development in photography. In Latin, obscura means dark room. Obscura is the natural phenomena in which a scene is projected on the screen/wall through a small hole. Note that the projection is inverted image of the scene. These cameras were of the size of a room. By Niépce's time portable box, camera obscura became suitable for photography at site.
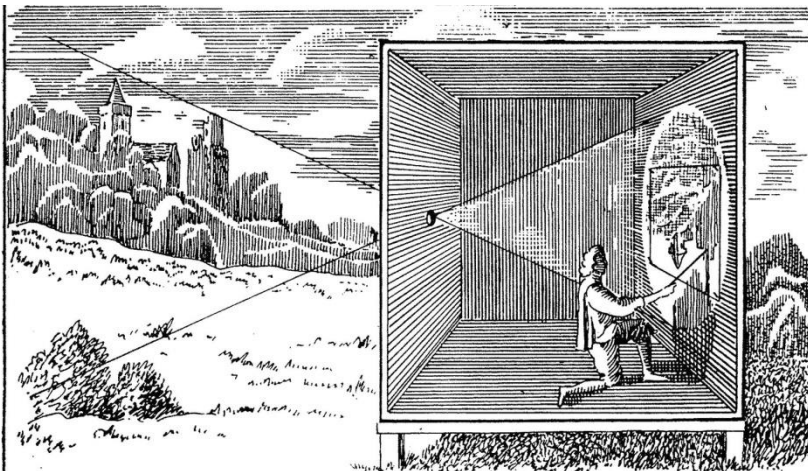

Figure 2.1.1 Camera Obscura

The first partially successful photograph was taken by Nicéphore Niépce in 1816. He used a piece of paper coated with silver chloride which darkened when exposed to light through small hole. Although the photograph was created on the paper but it was not permanent because later the whole paper became darkened due to exposure to light. Later in mid-1820s, Niépce used a sliding wooden box with surface thinly coated with bitumen of Judea. The bitumen hardened at the site of exposure and rest of the bitumen was dissolved away to create the photograph.

2.1.1.2 Daguerreotype and calotype Cameras

Louis Daguerre was the partner of Niépce and after his death, Louis continued experiment on photography. He created the first practical photography in 1837. He named it daguerreotype. He created a light sensitive silver iodine sheet and after exposure in camera he developed the image using mercury vapor and fixed it with common salt. William Henry Fox Talbot perfected a different development process using the same silver iodized paper. William brushed the silver iodized paper with gallo-nitrate of silver (consisting silver nitrate, acetic acid, and gallic acid) to protect it from light exposure. While taking the photograph the paper was washed by potassium bromide to convert silver iodide into silver bromide. After exposure to light, hyposulphite of soda was used to remove iodine and bromide to develop the image in silver particles only. The cameras using this process were called calotype.

2.1.1.3 Dry Plate Camera

Dry plates were available since 1857 but until the invention of gelatin plates the process was very slow and lower quality. The gelatin plates were very light sensitive and could generate the snapshot in instantaneous exposure. This reduced the size of cameras and people could now hold the cameras in their hand due to small size. Soon the mechanical shutters were developed to create better photo quality.

2.1.1.4 Film Camera

Near the end of 19th century, George Eastman started making photographic paper films and the first cameras which used these films were called Kodak. The company sold the Kodak camera with 100 exposure capable films. After using the film, customer send the camera back to company where photographs were developed and new film was installed in the camera.

2.1.1.5 35mm Camera

Around 1913, Oskar Barnack build his first prototype 35mm still camera. The further development was delayed due to First World War. In 1925, Leitz commercialized the first 35mm camera. Kodak soon followed the chase the produced its 35mm camera Retina I in 1934 and later Japanese company Canon produced Canon 35 mm rangefinder in 1936.

2.1.1.6 TLRs and SLRs

The Twin Lens Reflex (TLR) cameras were available since 1928 but they were bulky not quite portable. The first compact TLR was Rolleiflex which was sufficiently compact to achieve wide

spread popularity. SLR designs revolution began in 1933 with introduction of Ihagee Exhakta. Due to compact size of SLR and professional quality they soon became popular in market. The trail was soon followed by other company like Canon, Yashica, Nikon and so on.

2.1.1.7 Instant Cameras

In 1948 a new era of cameras begun with introduction of instant cameras. The Polaroid Model 95 was the first instant camera introduced in maker. Known as a Land Camera after its inventor, Edwin Land, the Model 95 used a fast chemical process to produce photograph from negative in few minutes. Although being highly priced, the camera still got pace. The first Polaroid camera, the Model 20 Swinger of 1965, was a huge success and remains the most selling camera of all time.

2.1.1.8 Digital Cameras

This is the era in which we live today and technology development rate is all time high now. Every day new inventions are made to make things cheaper and better. These cameras differ from analog predecessors as they use different media (digital memory cards) to store images. In 1988, Fuji DS-1P recorded image on a 2MB SRAM memory card. Battery was need to keep the date in memory at that time. Since 2003, the digital cameras have replaced the film cameras and companies like Kodak who once relied on film cameras have now stopped manufacturing films. Smart phones are now a days coming with high resolution cameras making it common for people to have high quality cameras.

2.1.2 Common Digital Video Cameras

There are various video cameras available in the market for movie shooting. These cameras have large sensors, variable frame rates, low compression ratios for recording or in some cases zero compression, and the ability to use high-quality optics/lenses. There are few cameras which are available only as rented and not for sale like Arri Alexa.

Some of the most used professional digital movie cameras include:

- o Arri Alexa
- o Red Epic
- o Red Scarlet
- o Red One
- o Sony CineAlta
- o Blackmagic Design Cinema Camera
- o Canon Cinema EOS
- o Panavision Genesis

2.1.3 Basic functioning of Digital Video Camera

Video cameras record a series of scenes that can be stored or transmitted video feed. In this way, a user can create detailed chronicle of events. Older video cameras of late 19th Century were used to create motion pictures. This term is still applicable as video cameras record dozens of pictures or say

frames per second that when viewed in succession form a video. Most of the cameras these days also record audio in sync with the video captured. The functioning of video camera is discussed next.

Cameras work by capturing visible and non-visible portion of electromagnetic spectrum. In case of Video cameras for videography, a controlled light is passed into the recording chamber through a hollow tube called the aperture. Then a lens is used to record this light on film. Light entering the aperture is controlled by a shutter. It also controls the length of exposure. High-end film video cameras may utilize a rotary shutter to expose accurately. Digital cameras offer a faster shutter speed since there are no moving parts. This is known as an electronic shutter, and if paired with external automation such as a motion detector, it operates better than film cameras.
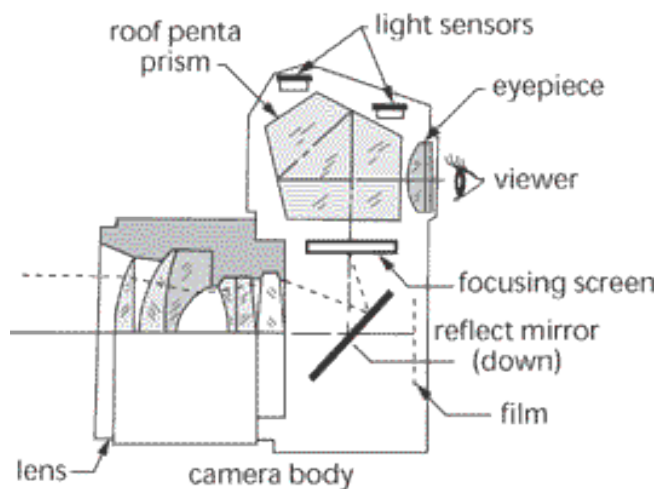
Figure 2.1.2 Functioning of Video Camera

New video recording cameras do not use films to record image sequences. These cameras use image sensors to capture videos. Image sensors turn visible light into electronic signals which are organized in the form of an image. Digital cameras use an electronic shutter to capture light. The captured image is arranged in the form of a grid pattern on the sensor. Each of this grid square is called pixel. Image sensors recognize the number of photons in each pixel. To determine color, a filter is placed on each pixel that determines the quantity of red, blue and green photons. The most common type of filter is the Bayer filter as shown in below figure. A pixel row is aligned with either a red and green, or blue and green alternating pattern. When the pixel patterns are viewed as a two-pixel by two-pixel square, the camera averages the four colors to create an estimate of the correct color; refer to figure 2.1.4. Any inaccuracy is measured as interpolation. These types of cameras use CCD, CMOS, or CID image sensing technology.
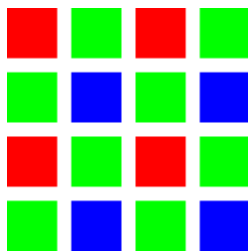
Figure 2.1.3 Bayer Filter
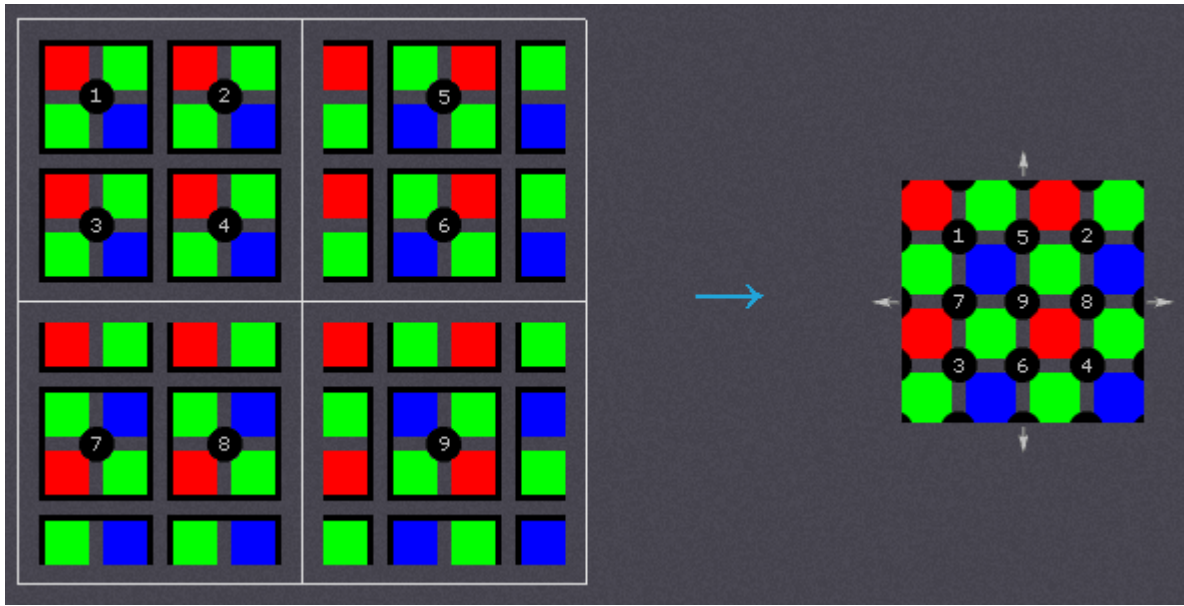
Figure 2.1.4 Color Array

The working principles of CCD and CMOS cameras are shown in below figures.
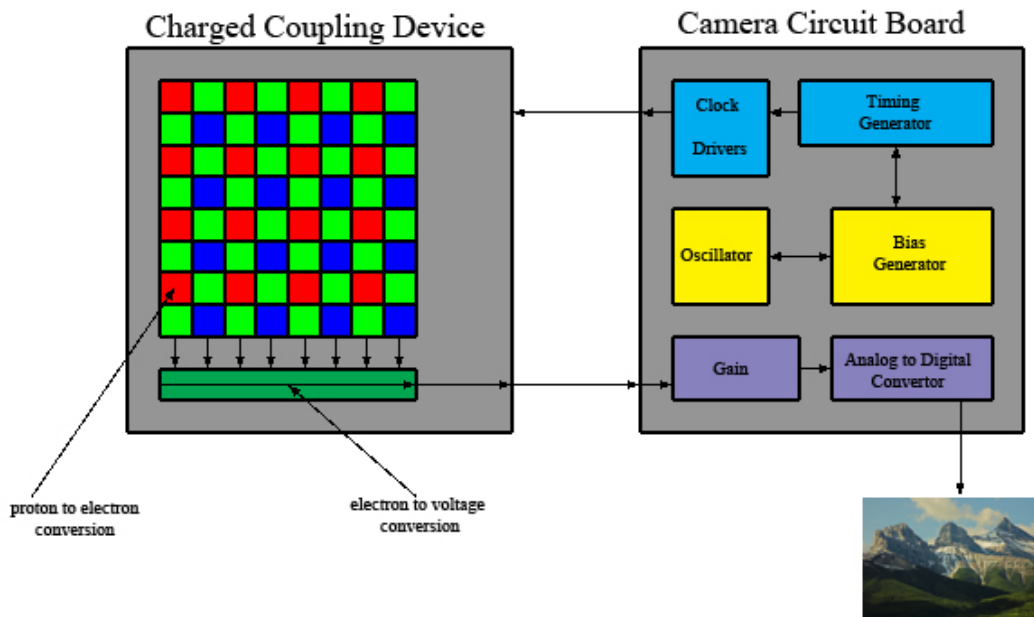
Figure 2.1.5 CCD Image Sensor Operation
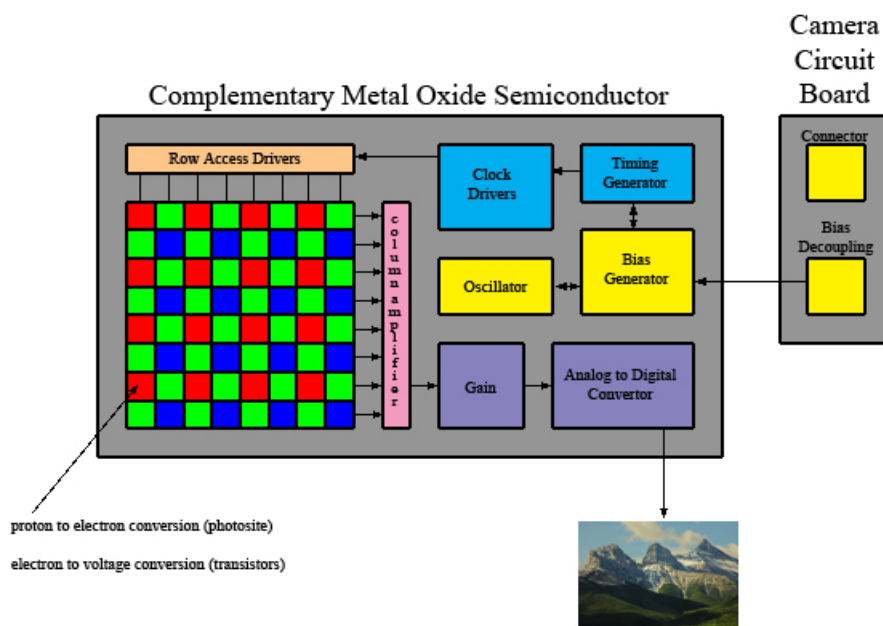
Figure 2.1.6 CMOS Image Sensor Operation

Both CCD and CMOS offer high-quality recording. CMOS imagers offer more features on each sensor, lower power use, and a smaller footprint. CCD imagers are less susceptible to noise, consume extremely more power than similarly capable CMOS imagers, and offer more pixels.

2.1.3.1 Factors that affect Video Quality

Lens

Lens is the most critical component of a camera and it mostly affects the quality of recording. You need to select correct type of lens based on your requirement. Lenses are available in different standards and mounting styles. Make sure you have correct set of lenses based on your camera.

Resolution

Resolution is measured in pixels per square inch. Most of the cameras take pictures in megapixels. One mega pixel means one million pixels. Film cameras can have 50 Megapixels or more for medium to large format films. Film resolution depends on the exposure and quality of lens.

Frame Rate

Frame rate is measures in frames per second. Human eye can differentiate between 10 to 12 images per second. When we move images faster than that then images create the illusion of movement. General cameras record at 30 frames per second.

Shutter Speed

Shutter speed is used to define the duration for which shutter will remain open to capture light. Slower shutter speed results in blurred motion pictures.

Sensitivity

Sensitivity is measures in lux. It defines the capability of camera to capture in low light situations. A lower number of lux means better picture in low light. Lux is measured differently for color and monochrome cameras.

2.1.4 Tools and Equipment

Basic tools and equipment used by assistant cameraman are given next.

Magliner - Used to transport camera equipment and accessories

Figure 2.1.7 Magliner

Rubbermaid Cart– Used to transport camera equipment and accessories.

Figure 2.1.8 Rubbermaid Cart

Canvas Tote Bag– Used to carry various camera accessories and supplies.

Figure 2.1.9 Canvas Tote Bag

AC Ditty Bag– Cloth or canvas bag with various compartments, used to carry AC tools and accessories.

Figure 2.1.10 AC Ditty Bag

Front Box – may be mounted on the gear head or fluid head for storage of key tools and accessories used regularly by the Assistant Cameraman.

Figure 2.1.11 Front Box

AC Pouch & Belt– Used by the assistant cameraman to keep tools and supplies close at hand.

Figure 2.1.12 AC Pouch & Belt

On-board Video Monitor– Used by the 1st AC for critical focus or to view the framing of the shot.

Figure 2.1.13 On-board Video Monitor

Portable GPS – To be used when traveling to unfamiliar locations.

Figure 2.1.14 On-board Video Monitor

Metal Tape Measure – used for measuring certain distances when the cloth/fiberglass tape measure will not work. Do not use it when checking focus distances to actors.

Figure 2.1.15 On-board Video Monitor

Cloth/Fiberglass Tape Measure – used primarily for measuring distances to actors for following focus.

Figure 2.1.16 On-board Video Monitor

Precision Screwdrivers – to be used for making repairs/adjustments to camera equipment.

Figure 2.1.17 On-board Video Monitor

Assorted Screwdrivers (Slotted & Phillips) – to be used for making repairs/adjustments to camera equipment.

Figure 2.1.18 On-board Video Monitor

4-in-1 Screwdriver (Top) & Stubby Screwdriver (Bottom)– to be used for making repairs/adjustments to camera equipment or for mounting camera equipment to various adapter plates or surfaces.

Figure 2.1.19 On-board Video Monitor

T-Handle Stubby Screwdriver – to be used for attaching cameras or mounting plates to head quick release plates.

Figure 2.1.20 On-board Video Monitor

Assorted Hex Keys (Allen Wrenches) – to be used for making repairs/adjustments to camera equipment.

Figure 2.1.21 On-board Video Monitor

Assorted Pliers and Cutters– to be used for making repairs/adjustments to camera equipment.

Figure 2.1.22 On-board Video Monitor

Vise Grips & Crescent Wrench– to be used for making repairs/adjustments to camera equipment.

Figure 2.1.23 On-board Video Monitor

Leatherman (Multipurpose Tool)– to be used for making repairs/adjustments to camera equipment.

Figure 2.1.24 On-board Video Monitor

Swiss Army Knife– to be used for making repairs/adjustments to camera equipment.

Figure 2.1.25 On-board Video Monitor

Razor Knife – to be used for cutting gels, tape or other items.

Figure 2.1.26 On-board Video Monitor

Scissors– to be used for cutting gels, tape or other items.

Figure 2.1.27 On-board Video Monitor

Dental Mirror – for checking sync of shutter when adjusting shutter angle for certain shots or for checking interior of camera body for loose film chips.

Figure 2.1.28 On-board Video Monitor

Clamp-on Jar Opener– can be used as a simple zoom control or follow focus if you don't have those accessories, and can also be used to remove tight screw-on filters.

Figure 2.1.29 On-board Video Monitor

Large Flashlight – used when filming in dark locations and also for checking the gate on the camera.

Figure 2.1.30 On-board Video Monitor

Small Flashlight with Pouch – used when filming in dark locations and also for checking the gate on the camera.

Figure 2.1.31 On-board Video Monitor

Lighted Magnifiers – used for checking the gate on the film camera.

Figure 2.1.32 On-board Video Monitor

Pocket Level , Bubble Level & Hot-Shoe Level – to check that camera equipment is level before shooting.

Figure 2.1.33 On-board Video Monitor

Inclinometer – used to measure the angle of tilt on the Fluid Head or Gear Head. This measurement is often taken in case you may need to duplicate the shot later in production.

Figure 2.1.34 On-board Video Monitor

3/8-16 & 1/4-20 Bolts – for attaching camera to nonstandard mounting platforms.

Figure 2.1.35 On-board Video Monitor

1-in. and 2-in. brush - for keeping exterior of camera and other equipment clean.

Figure 2.1.36 On-board Video Monitor

Electrical Tester – for checking the continuity of power in an AC electrical outlet.

Figure 2.1.37 On-board Video Monitor

Electrical Adapters & Power Strip – for charging batteries and powering any electrical device.

Figure 2.1.38 On-board Video Monitor

Voltmeter or Multimeter – used for checking batteries, bulbs, fuses, switches, cables, etc.

Figure 2.1.39 On-board Video Monitor

Large Sync Slate – to be used to identify specific information at the beginning of the shot
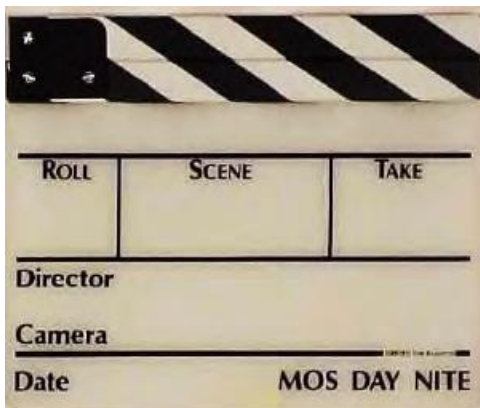
Figure 2.1.40 On-board Video Monitor

Small & Medium Sync Slates – to be used to identify specific information at the beginning of the shot

Figure 2.1.41 On-board Video Monitor

Insert Slates – to be used to identify specific information at the beginning of the shot. Used when not recording sound.

Figure 2.1.42 On-board Video Monitor

Tabletop Slate– to be used to identify specific information at the beginning of the shot. Especially useful when shooting tabletop commercials.
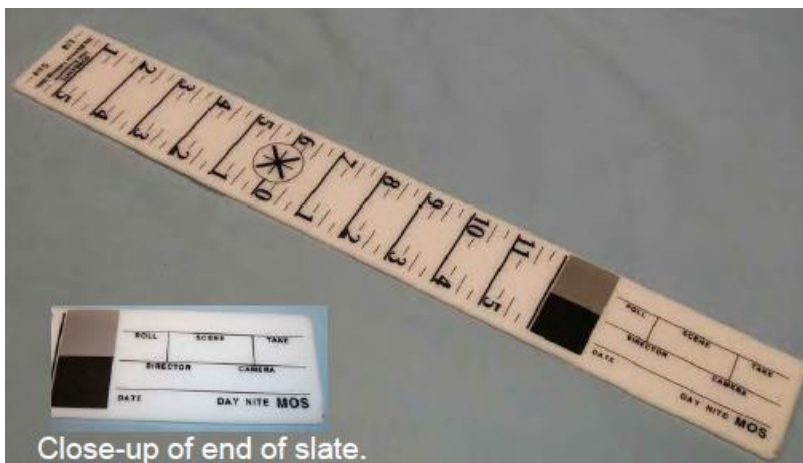
Figure 2.1.43 On-board Video Monitor

Large & Small Clapper Sticks – for slating multiple camera shots.

Figure 2.1.44 On-board Video Monitor

Changing Tent – for loading/unloading of film when a darkroom is not available.

Figure 2.1.45 On-board Video Monitor

French Flag with Arm – for keeping stray light from striking the front of the lens or filters in the matte box.

Figure 2.1.46 On-board Video Monitor

Focus Whips & Speed Crank – extensions for the follow-focus mechanism in order to give you more control when pulling focus.

Figure 2.1.47 On-board Video Monitor

Cardellini Clamp – for attaching on-board monitors, onboard lights, or other objects to camera or other device.

Figure 2.1.48 On-board Video Monitor

Noga or Ultralight Arm– for attaching on-board monitors, on-board lights, or other objects to camera or other device.

Figure 2.1.49 On-board Video Monitor

Terrycloth Wrist Bands – to be used in place of foam or chamois eyepiece covers (they are washable so they can be used over and over).
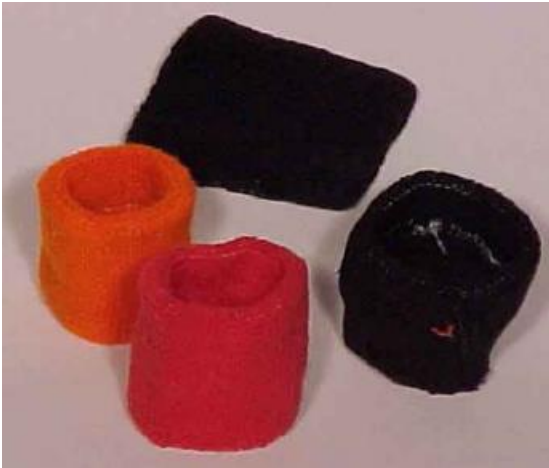
Figure 2.1.50 On-board Video Monitor

Color Charts & Gray Scales – used as a reference to adjust the colors from shot to shot. Usually shot at the beginning of roll for reference in postproduction.
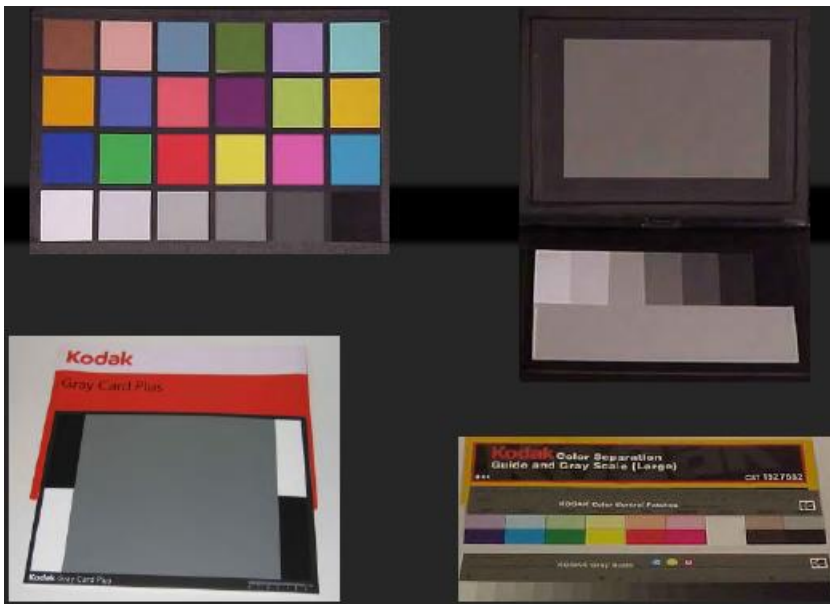
Figure 2.1.51 On-board Video Monitor

Focus Chart – used as a for checking the focus of lenses during camera prep or on the set.
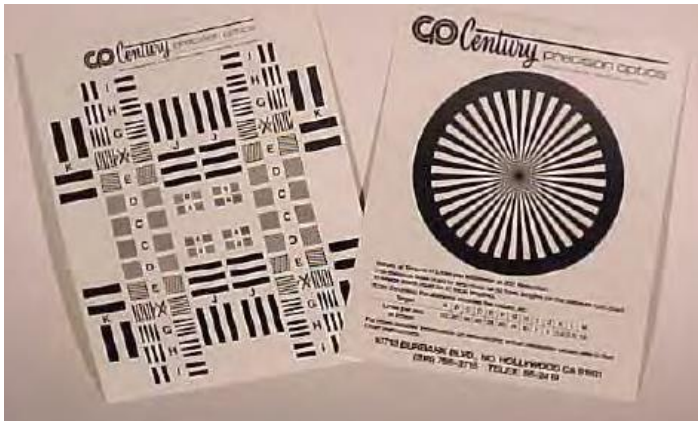
Figure 2.1.52 On-board Video Monitor

Framing Chart – used as a reference for framing each shot. Usually shot at the beginning of roll for reference in post-production.
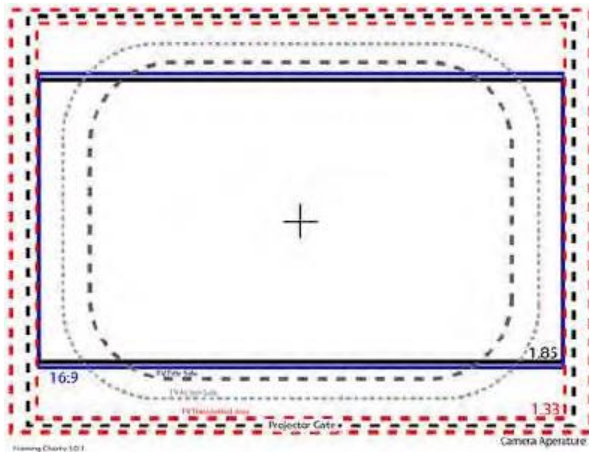
Figure 2.1.53 On-board Video Monitor

Camera Oil & Liquid Silicone – The oil is used to keep the camera movement or mechanism lubricated. The silicone is used to keep the pull down claw lubricated.

Figure 2.1.54 On-board Video Monitor

Depth of Field Calculators – for checking depth of field on critical shots.

Figure 2.1.55 On-board Video Monitor

Shot Bag T-Marks – used to mark actors outside or on surfaces where tape won't stick.

Figure 2.1.56 On-board Video Monitor

Golf Tees– used to mark actors outside or on surfaces where tape will not stick. They are especially useful on grassy areas because they are almost invisible to the camera.

Figure 2.1.57 On-board Video Monitor

Space Blankets – used for covering the camera or other equipment to protect it.

Figure 2.1.58 On-board Video Monitor

Engraved Filter Tags – for labeling the matte box to indicate what filters are currently in place.
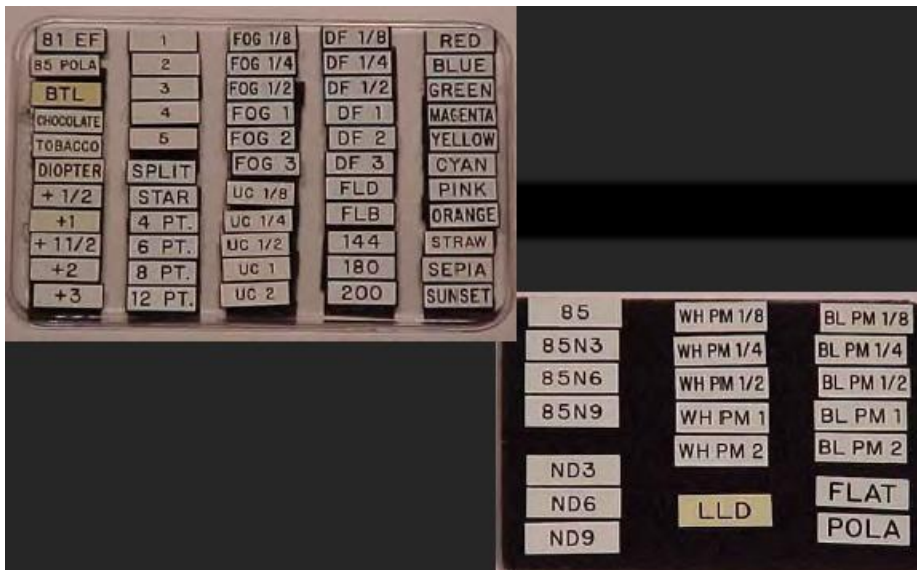
Figure 2.1.59 On-board Video Monitor

Blower Bulb Syringe – for removing dust and dirt off lens elements and filters.

Figure 2.1.60 On-board Video Monitor

Spring Clamps (Grip Clamps) – for securing space blanket, camera covers or other objects.

Figure 2.1.61 On-board Video Monitor

Bungee Cords – for securing camera and other equipment during transport.

Figure 2.1.62 On-board Video Monitor

Panavision Motor Cover Tool - used to remove the motor cover from the Panavision 35mm camera. The motor cover should only be removed if you need to change the circuit boards.

Figure 2.1.63 On-board Video Monitor

Panavision Iris Rod Wrench - used to loosen or tighten the locks on Panavision Iris Rod Brackets.

Figure 2.1.64 On-board Video Monitor

Ground Glass Puller (Hirschman Forceps) – for removing ground glass from film cameras.

Figure 2.1.65 On-board Video Monitor

Pelican Case Opener (Peli-ease) – used to open the latches on Pelican brand equipment cases.

Figure 2.1.66 On-board Video Monitor

Film Measuring Tool – used to measure the length of a Short End or Dummy Roll of film.

Figure 2.1.67 On-board Video Monitor

Loupe – used to examine film for scratches, especially when performing the camera prep.

Figure 2.1.68 On-board Video Monitor

Eye & Hearing Protection – to protect your eyes from objects or substances being projected toward the camera and to protect your ears from gunshots, explosions or other loud sounds on the set.

Figure 2.1.69 On-board Video Monitor

Video Connectors & Cables – for connecting the video tap on the camera to the video monitor.

Figure 2.1.70 On-board Video Monitor

Fingerless Gloves – to protect hands when carrying camera or other equipment (fingerless allows the assistant to be able to follow focus or thread camera without removing the gloves).

Figure 2.1.71 On-board Video Monitor

Stop Watch – to check the timing on the length of a scene or shot. It is most often used by the Script Supervisor but sometimes the Assistant Cameraman may need to use one.

Figure 2.1.72 On-board Video Monitor

Various Cinematography Books or Camera Instruction Manuals - to be used as a reference

Figure 2.1.73 On-board Video Monitor

Special Arri Tools – These are some of the tools you will need when making any minor repairs or adjustments on the Arriflex 16 SR2, 16 SR3, 416, 235, 435, 535, Arricam or Alexa cameras.

Figure 2.1.74 On-board Video Monitor

Notes

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UNIT 2.2: Setting up Camera for Shoot

Unit Objectives 🎯

At the end of this unit, you will be able to:

1. Coordinate with logistics players, where required in the context of the role, to have the equipment delivered to the vendor/own facilities (equipment can include cameras, batteries, lenses, filters, grips, track, special effects equipment, magazines, clapper boards, film stock/beta tapes/memory cards)
2. Prepare equipment for shoot including unpacking, cleaning and assembling cameras and lenses, loading the film stock into magazines, charging batteries etc.
3. Arrange for security and protection of the equipment during storage and logistics
4. Report any damages to the camera and production teams
5. Ensure cameras are mounted on grips and the locks are fastened securely

2.2.1 Transporting Camera

There are many cameras that are used to shoot movies but we will use ARRI Alexa as example to discuss this topic.

Figure 2.2.1 Arri Alexa Camera

Arri alexa is a 35-format film style digital camera. The general precautions for storage and transportation of camera are discussed next.

- To prevent damage to the optical filters and the sensor, a protective cap must be on the lens mount receptacle while no lens is attached.
- All cables have to be unplugged from the camera when it is transported or stored inside a camera case.
- Do not store the camera in places where it is subject to extreme temperatures, direct sunlight, high humidity, severe vibration, or near strong magnetic fields.
- When moving the camera from a cool to a warm location or when the camera is used in a damp environment then condensation may form inside the lens compartment. Condensation may also form on the sensor cover glass, between sensor and cover glass, and on internal or external electrical connections. Condensation on the optical components may have a visible effect on the output images. To reduce the risk of condensation:
  - Find a warmer storage location.
  - Attach the ARRI air-drying cartridge (silica bottle) to the PL-Mount of the camera during storage (NOT during transport!)
  - If camera needs to be stored in a place that is considerably cooler than the location where it will be used, consider keeping the camera powered from a mains unit in addition to using the air-drying cartridge.
  - In ambient temperatures above 30°C/86°F and/or humidity above 60%, always attach the air-drying cartridge to the PL-Mount of the camera when not in use. This not only applies to storage, but also to shooting breaks and situations when the camera remains without an attached lens for an extended time.
  - Make sure that silica bottle is securely fastened. Under no circumstances spill silica into the lens compartment.

2.2.2 Basic Components of Camera
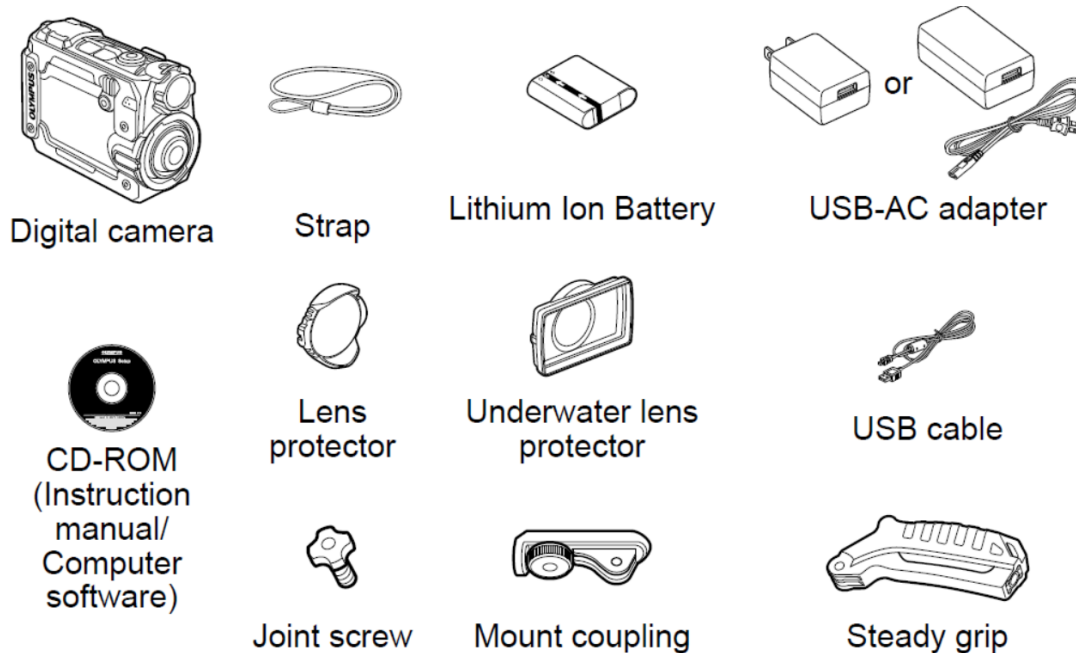
Figure 2.2.2 Basic components of camera

2.2.3 Assembling Camera

Assembly of camera varies from model to model. Some cameras come with all attachment and for some cameras; you need to buy them separately. Here, we will discuss the common procedure to assemble a video camera. You can apply the same after reading the user manual of your camera.

2.2.3.1 Inserting and removing the battery and card

- Keeping the battery/card compartment/connector cover latch pressed (1), open the battery/card compartment/connector cover (2, 3).

Figure 2.2.3 Opening Battery compartment

- Insert the battery while sliding the battery lock knob in the direction of the arrow. (Insert the battery as illustrated with the ▬ mark toward the battery lock knob.)
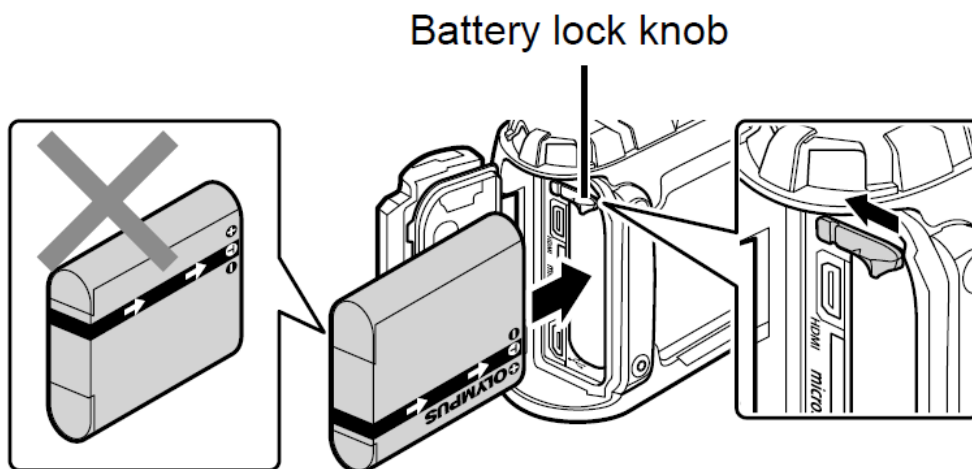
Figure 2.2.4 Inserting Battery

- Insert the card straight until it clicks into place.
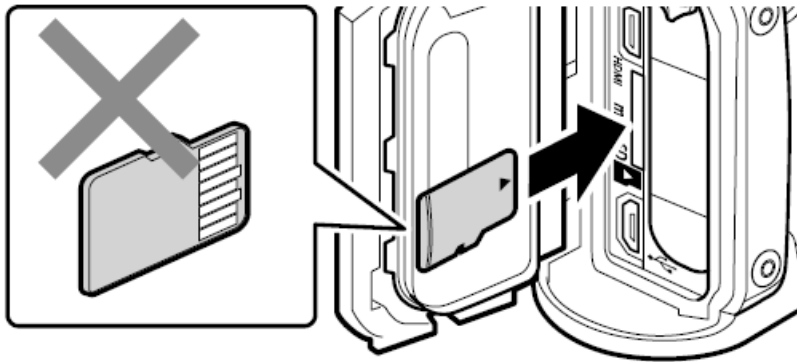
Figure 2.2.5 Inserting Card

- Follow Steps 1, 2 and 3 shown below to close the battery/card compartment/connector cover.
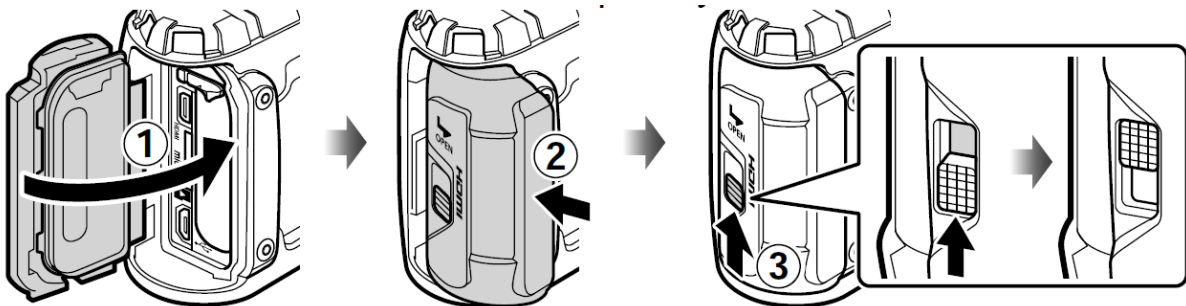
Figure 2.2.6 Closing battery compartment

To remove the card

- Before removing cards, rotate the power switch to OFF and confirm that the indicator lamp (amber) is off.
- Press the card in until it clicks and comes out slightly, and then remove the card.
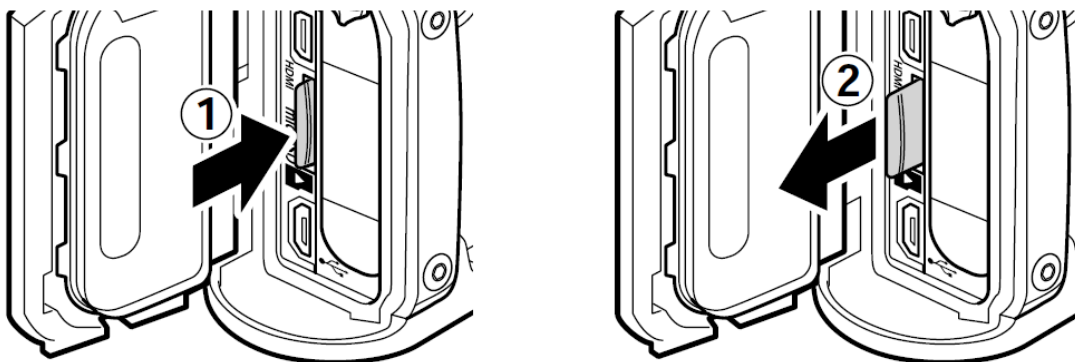
Figure 2.2.7 Removing Card

2.2.3.2 Charging the battery

- Check that the battery is in the camera, and connect the USB cable and USB-AC adapter.
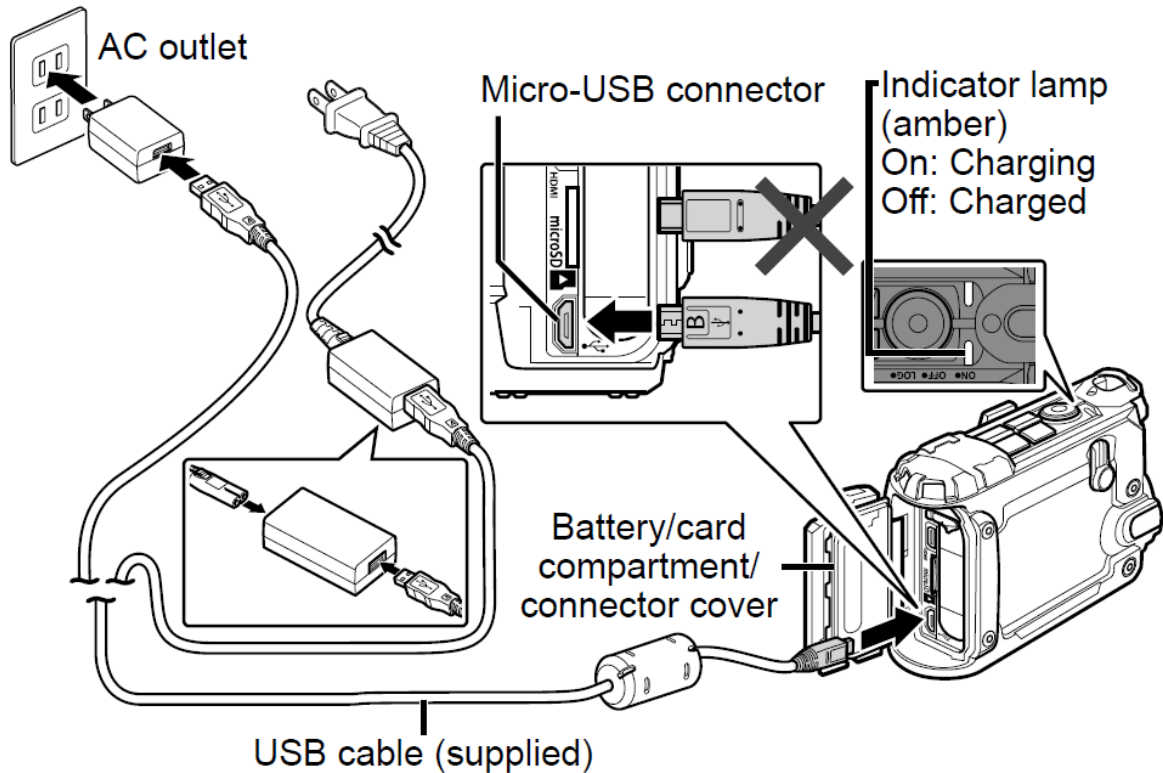
Figure 2.2.8 Charging battery

- o Never use any cable other than supplied or designated USB cable. This may cause smoking or burning.
- o Be sure the power switch is in the OFF position during charging.
- o If you received a plug-in type USB-AC adapter, plug it directly into AC outlet.
- o Charge the battery when the error message appears.
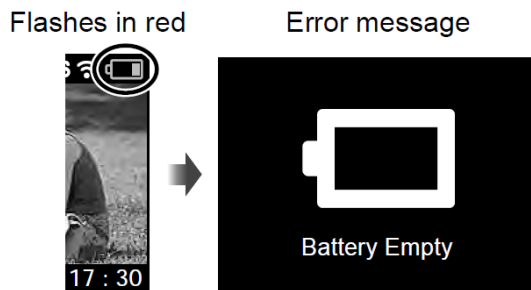
Figure 2.2.9 Battery Empty message in camera screen

2.2.3.3 Attaching Lens Protector
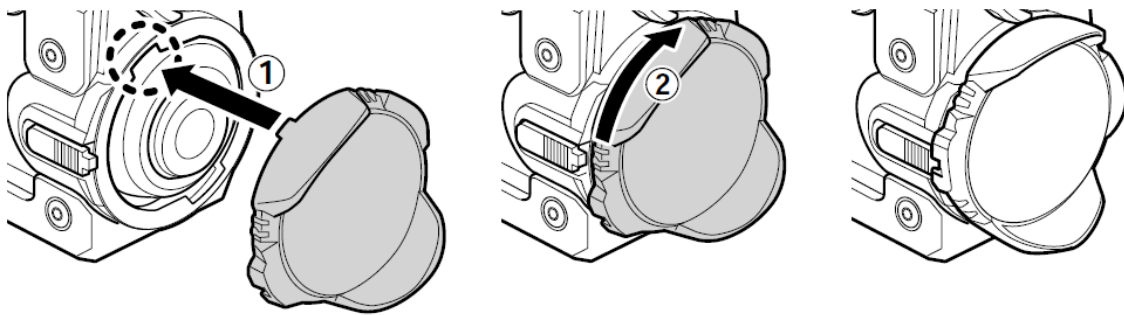
Figure 2.2.10 Attaching lens protector

2.2.3.4 Removing the lens protector
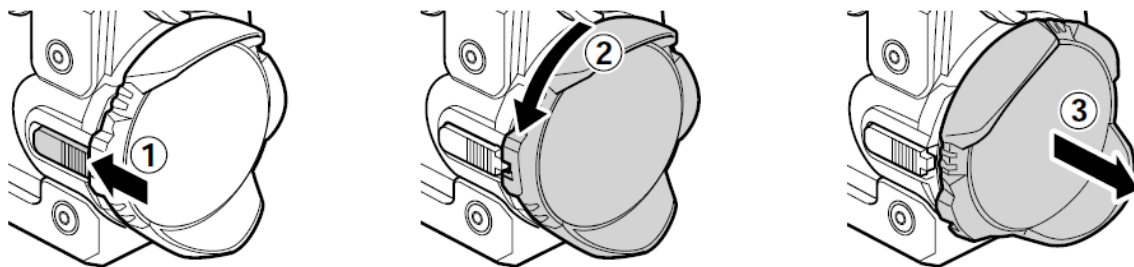
Figure 2.2.11 Removing lens protector

2.2.3.5 Attaching Underwater Lens Protector

- Before attaching the protector, shake the camera to remove water droplets from the lens.
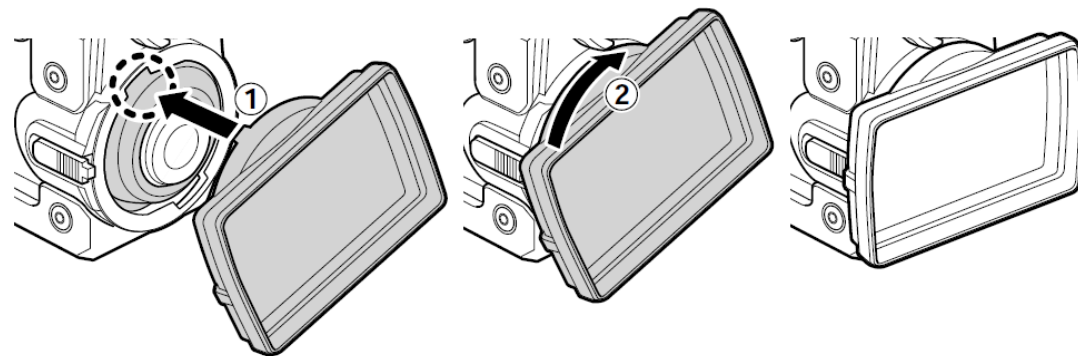
Figure 2.2.12 Attaching underwater lens protector

2.2.3.6 Removing the underwater lens protector
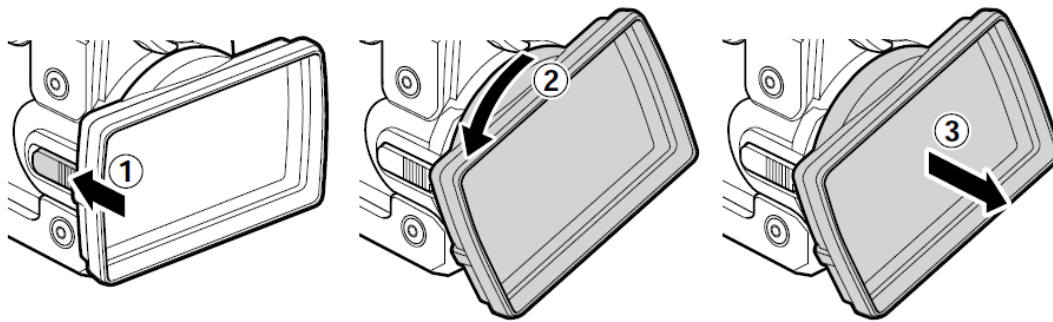
Figure 2.2.13 Removing underwater lens protector

2.2.3.7 Attaching the mount coupling and steady grip

Joint screw

Strap eyelet

Mirror for self-portraits
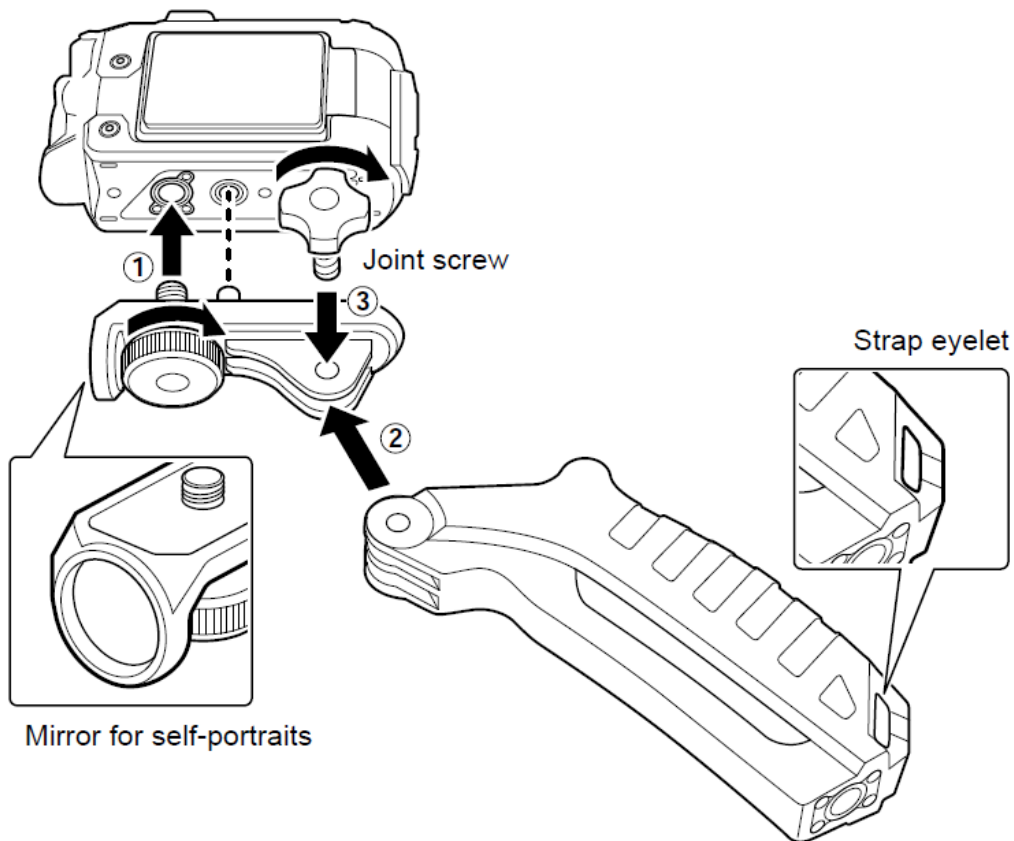
Figure 2.2.14 Removing underwater lens protector

2.2.4 Cleaning Camera and Storage

Exterior Cleaning

- Wipe gently with a soft cloth. If the camera is very dirty, soak the cloth in mild soapy water and wring well. Wipe the camera with the damp cloth and then dry it with a dry cloth. If you have used the camera at the beach, use a cloth soaked in clean water and well wrung.
- Foreign materials might be attached to the camera when using the camera in conditions with foreign materials such as dirt, dust or sand. If you continue to use the camera in such conditions, it could cause damage to the camera. To avoid such damage, wash the camera using the following method.
  - Close and lock the battery/card compartment/connector cover firmly as discussed earlier.
  - Immerse the camera lens first in a bucket or other container of fresh water and move it vigorously from side-to-side, or rinse the camera directly under a moderately strong stream of tap water while operating the buttons and opening and closing the monitor.
  - Allow the camera to dry. If condensation forms on the lens during use, remove the lens protector and let the camera dry again.
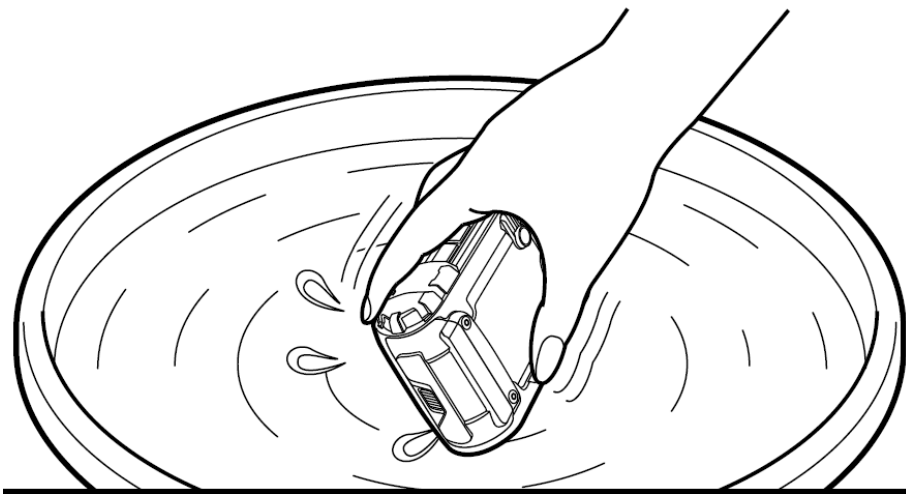
Figure 2.2.9 Cleaning camera exterior

Monitor Cleaning

- Wipe gently with a soft cloth.

Lens Cleaning

- Blow dust off the lens with a commercial blower, then wipe gently with a lens cleaner.
- Do not use strong solvents such as benzene or alcohol, or a chemically treated cloth.
- Mold may form on the lens surface if the lens is left dirty.

Cleaning Battery/USB-AC adapter
- Wipe gently with a soft, dry cloth.

Storage of Camera
- When storing the camera for extended periods, remove the battery, adapter and card, and keep in a cool, dry place that is well ventilated.
- Periodically insert the battery and test the camera functions.
- Avoid leaving the camera in places where chemical products are handled since this may result in corrosion.

Exercise

1. Write a note on history of camera development.

2. How does an analog film camera works ?

3. What are the factors that affect video quality?

4. Why do we use green or blue color only in the vfx?

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5. Discuss the steps for transporting camera from rental store.

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6. Discuss the basic steps of assembling battery and card in camera.

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3. Preparing for Shoot

Unit 3.1 – Principle of Cinematography and Focus requirements

Unit 3.2 – Camera Position and Focus Marking

MES/N 0906

Key Learning Outcomes

At the end of this module, you will be able to:

1. Establish, or support in establishing, the focus requirements for shots (eg: pan, tilt, tracking, static, zoom, close-up, wide-shot, master shot, high/low, angle shot, long shot and mid shot), based on the creative and technical requirements of production.
2. Mark, or support in marking, the focus lengths/angle based on the required composition (eg: positioning of elements within a frame), perspective (eg: point of view) and aspect ratio (eg:relationship between width and height)
3. Prepare, or support in preparing, a focus path for a sequence depending on the movement, timing, start and finish points during shoots.
4. Report potential issues to the Producer and Director and relevant teams for rectification.

UNIT 3.1: Principle of Cinematography and Focus Requirements

Unit Objectives ⊙

At the end of this unit, you will be able to:

1. Establish, or support in establishing, the focus requirements for shots (eg: pan, tilt, tracking, static, zoom, close-up, wide-shot, master shot, high/low, angle shot, long shot and mid shot), based on the creative and technical requirements of production.
2. Prepare, or support in preparing, a focus path for a sequence depending on the movement, timing, start and finish points during shoots.
3. Report potential issues to the Producer and Director and relevant teams for rectification.

3.1.1 Introduction to Cinematography

The term "cinematography" is from Greek language which means "writing with motion". Cinematography is more than mere recording video using camera. It is the process of taking ideas, actions, words, tone, emotional subtext, and other forms of nonverbal communication and rendering them in visual terms. As we will use the term here, cinematic technique is the entire range of methods and techniques that we use to add layers of meaning and subtext to the "content" of the film — the dialog and action. There are some conceptual tools (not physical tools) used in cinematography:

- The frame
- Light and color
- The lens
- Movement
- Texture
- Establishing
- POV

These conceptual tools are discussed next.

3.1.1.1 The Frame

Selecting frame is most crucial step for making a movie. Frame decides where to take the attention of viewer. Choosing the frame is a matter of conveying the story, but it is also a question of composition, rhythm, and perspective. Check the opening shot of Punch Drunk Love movie given below. The frame is decided in such a way that two person seem to be lonely and talking some secret.

Figure 3.1.1 Frame selection

The wide and distant shot emphasizes his isolation and loneliness reinforced by the color scheme and the lack of wall decoration. The dull shapeless overhead fluorescent lighting underscores the mood and tone of the scene.

3.1.1.2 The Lens

Here we are not talking about physical lens but how lens renders different images. This is a powerful tool in storytelling. Using this tool, we can change the perception of viewer about the same scene. Every lens has a personality of its own to change the flavor of image. Lens can alter the contrast and sharpness of shoot but the most important aspect of lens is focal length. A lens with short focal length provides wide field of view and lens with long focal length has narrow field of view (as in binoculars and telescopes). Next figure shows two different uses of a lens with short focal length.

Figure 3.1.2 Lens setting

3.1.1.3 Light and Color

Lighting and color give cinematographer the power to reach emotional state of viewers. Lighting and controlling color are what takes most of the cinematographer time. The figure next conveys a great deal of emotional tone and tells us something about the mental state of the character.

Figure 3.1.3 Light and color selection

3.1.1.4 Texture

There are many devices we use to accomplish changing the color and contrast of the picture, desaturating the color of the image, filters, fog and smoke effects, rain, using unusual film stocks, various printing techniques, and using the whole range of image manipulation that can be accomplished on the computer.

Figure 3.1.4 Desaturated sepia toned image

3.1.1.5 Movement

Movement is used to display both motion and time in scene. Take the example of scenes in next figure. The camera seems to circle the statue of liberty, then goes to a fairy and then final moves to the actress of movie.

Figure 3.1.5 Movement in scenes

3.1.1.5 Establishing

Establishing is the ability of the camera to reveal or conceal information; think of it as a visual equivalent of exposition, which in verbal storytelling means conveying important information or background to the audience. The figure given next conveys to the viewer that the person carrying many fake identities, and he can be a private detective.
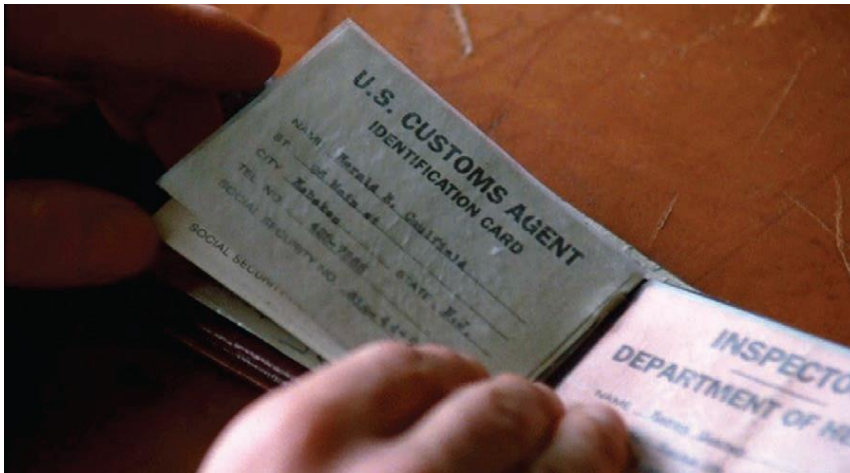
Figure 3.1.6 Establishing scene

3.1.1.6 Point of View

Point of view is used to show what our character is seeing in the movie scene. Take the example of figure given next.

Figure 3.1.7 Point of View

3.1.2 Character Shots
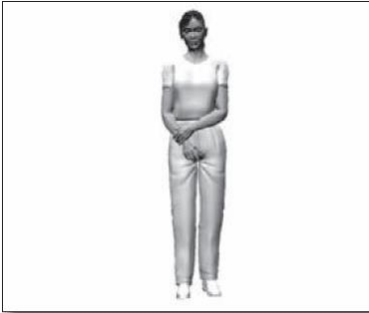
Full shot or *head-to-toe*.

Cowboy. Outside the US, sometimes called the *American shot*.

Medium. Also, any shot that shows a person alone is a *single*.

Three T's or *Medium Close-up*.

Close-up or *head and shoulders*.
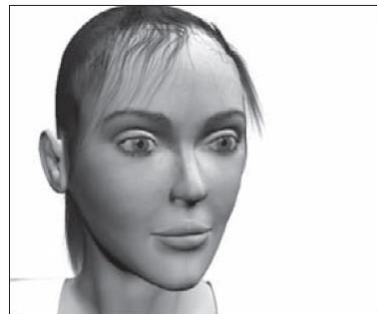
Choker or *big head close-up*.

Extreme close-up (*ECU*). It's OK to give them a "haircut."

Two shot. Any shot of two people is a two shot.

Three shot. 'nuff said.
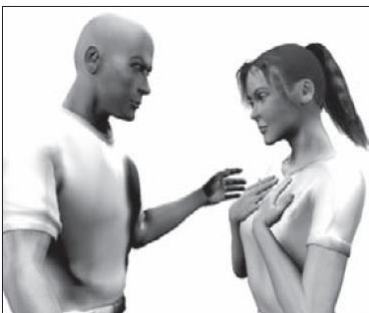
A *50-50*. Don't use it as a cheap substitute for getting proper coverage.

An *over-the-shoulder* (*OTS*). A very important shot in filmmaking.

The *answering shot* for the OTS at left.

3.1.2.1 Inserts

An insert is an isolated, self-contained piece of a larger scene. To be an insert instead of a cutaway, it has to be something we saw in the wider shots. For example, in a wider shot, the character is reading a book but the details of book are unclear. In this case, we will shoot over the shoulder of character and use it as insert shoot. Note that the timing and action of insert shots should match properly with the main shoot.

Figure 3.1.8 Insert shot

3.1.2.2 Connecting Shot

Most scenes involving two people can be adequately edited with singles of each person; whether are talking to each other or one is viewing the other from a distance, such as a shot of a sniper taking aim at someone. This is sometimes called separation. There is always a danger, however, that it will seem a bit cheap and easy and the fact that it is an editing trick might somehow undermine the scene. Any time the scene includes people or objects that cannot be framed in the same shot at some point in the scene, a connecting shot is called for. This applies especially to point-of-view shots where the character looks at something, then in a separate shot, we see what she is looking at; but it also applies to any scene where two or more people are in the same general space, whether they are aware of each other or not. A connecting shot is one that shows both of the characters in one shot, often it is in the form of an over-the-shoulder or wide angle that includes both of them. In the next figure, the last shot is a connecting shot telling us how the first and second shots are related.
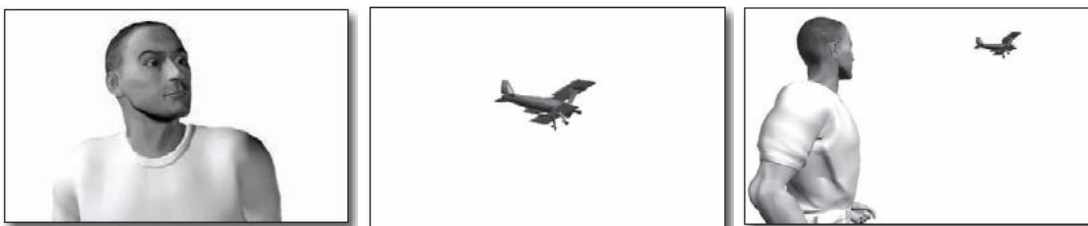
Figure 3.1.9 Connecting Shot

3.1.2.3 Pickups

A pickup can be any type of shot, master or coverage, where you are starting in middle of the scene (different from previous takes where you started at the beginning as it is written in the script). Usually a Pickup is added to the scene number on the slate so the editor will know why they do not have a complete take of the shot.

3.1.3 Shooting Methods

There are many different ways to shoot a scene, but some basic methods are used most often. The master scene method is by far the most frequently used method of shooting a scene, especially for dialog scenes. The following summaries are some of the most fundamental and frequently used techniques for shooting a scene.

3.1.3.1 The Master Scene Method

In master scene method, we shoot the entire scene as one shot and then move on to coverage. Master scene is generally wider shot. It can be moving or non-moving shot. The important thing is that it is the entire scene from beginning to end. For complex scenes, we sometimes break it into mini-masters within the scene, just use common sense to plan how to best get the scene covered.

Figure 3.1.10 An entire scene played out in one continuous shot. These scenes can be shot with a panning camera, dolly shot, Steadicam or hand-held

3.1.3.2 Coverage

The coverage consists of the over-the-shoulders, medium shots and close-ups that will be used to complete the scene. Think of the master as a framework for the whole scene — coverage is the pieces that fit into that framework to make it all work together. This is why you should always shoot the master first. It establishes the continuity for the scene — everything you shoot after that has to match what was established in the master. After you have shot the master, you will have to pick one side (one of the actors) to begin with. It is important to do all of their shots before you turn around

and do the coverage of the other actor, because changing the camera position from one side to another often involves changing the lighting and moving other equipment.

Some basic common sense principals apply when shooting with the master scene method:

- Shoot the master first; if you try to shoot coverage first and the master later, it will likely cause problems in continuity.
- Get the whole scene from beginning to end.
- If characters enter, start with a clean frame and have them enter.
- If characters leave, make sure they exit entirely, leaving a clean frame. Continue to shoot for a beat after that.
- You might want to use transitional devices to get into or out of the scene.
- Shoot all the shots on one side before moving to the other side of the scene. This is called shooting out that side.

3.1.3.3 Overlapping or Triple-Take Method

The overlapping method is also called the triple-take method. Say you are filming the manufacture of a large axle on a big industrial lathe. It's a real factory and you are doing an industrial video for the company. The metal piece is expensive and they are only making one today. The point is that you are not going to be able to repeat the action. You can ask the machinist to pause for a few minutes but there is no going back to repeat.

On the other hand, you do not want to show a 5 or 10-minute process all from the same angle — that would be incredibly boring. You need different angles. If you were using the master scene method, you would film the scene from one angle, then set up the camera for a different angle and repeat the scene, and so on for over-the shoulders, close-ups, and so on. The triple-take method is useful for scenes where the action cannot be repeated. In this method, the camera should shoot the first scene as wide shot. Once, the person has placed the work-piece on machine, you ask the machinist to pause and you move for a close shot. Now, shoot the process of cutting in close shot. If the machinist need to move the piece or re-orient it then move back to wider shot again while asking the machinist to pause.

Let us take another example: a lecturer walks into a room, sets his notes on the lectern, then pulls up a chair and sits down. This is where the overlapping part comes in. You could get a wide shot of him coming in, then ask him to freeze while you set up for a closer shot of him putting the notes on the lectern, then have him freeze again while you set up another shot of him pulling up the chair.

3.1.3.4 In-One Method

This is the simplest method of all shooting methods. In this method, the whole scene is shoot in single go. Most of the scenes shoot by this method are single actions like "lady picking up phone and talking".

3.1.3.5 Freeform Method

This method may seem like documentary style where camera is handheld, loose and the actor's movement does not seem to be preplanned but this method is more complicated than that. Our aim in shooting fiction scenes like this is to make it seem like a documentary. In most cases, scenes like this are shot several times with the actors repeating the scene for several takes. Since the camera is hand-held, the camera operator usually does their best to follow the dialog: they pan the camera back and forth to always be on the person who is speaking. This can be a disaster for the editor. Imagine that you shoot a scene three times like this. You end up with three takes that are almost the same and the camera is only on the actor who is talking. Here is a method that works well; we call it the freeform method:

- On the first take, follow the dialog. Do your best to stay with the actor who is speaking. This is the dialog pass.
- On the next take, pan back and forth to stay with the person who is not talking. This will give you many good reaction shots, which are important. It will also give the editor lots of things to cut away. This is the reaction pass.
- For the third take, (if you do one) improvise: follow the dialog sometimes, go to the nonspeaking actor sometimes, occasionally back up to get a wide shots — whatever seems appropriate. This is the freeform pass.

3.1.3.6 Montage

There is a special form of shoot that do not aim for continuity, which is called montage. A montage is simply a series of shots related by theme. Say the theme is "Springtime in the city" — you might have a series of shots of the flowers blooming, gentle rain showers, the sun breaking through the clouds, that sort of thing.

Some kinds of montage advance the story but without linear continuity. For example, Rocky prepares for the big fight: we see him working out, punching the bag, running on the streets of Philly, then finally running up the stairs to triumph. It is not real-time continuity — it takes place over months — but we see the story develop. It's a series of related shots, not scenes with linear continuity.

All of these methods share one common goal: to be invisible. We do not want the audience to be aware they are a movie because this would distract them from the story.

3.1.4 Camera Movement

Camera movements should always be motivated by actions. Camera movements should not be just for the sake of moving camera. For example, if the character gets up from a chair and crosses to the window, it is perfectly logical for the camera to move with her.

3.1.4.1 Types of Moves

Pan

Short for panoramic, the term pan applies to left or right horizontal movement of the camera. Pans are fairly easy to operate with a decent camera head — which sits atop the tripod or dolly, holds the camera, and permits left/right, up/down, and sometimes sideways tilting motions. There is one operational limitation that must be dealt with. If the camera is panned too quickly, there will be a strobing effect, which will be very disturbing. As a general rule of thumb, with a shutter opening of 180° and a frame rate of 24 or 25 fps, it should take at least 3 to 5 seconds for an object to move from one side of the frame to the other. Any faster and there is a danger of strobing.

Tilt

The tilt is up or down movement without changing camera position. The tilt, being a vertical move, is used much less frequently than the pan. For better or worse, we live most of our lives on a generally horizontal plane, and most action plays out in narrative, documentary, and informational filmmaking. The ability of the Steadicam and similar rigs to move with action up and down stairs and slopes has opened up a new variety of moves, that help with this three-dimensional effort and keeps us "with" the characters as they move through space.

Move In / Move Out

Move the dolly toward or away from the action. Common terminology is push in or pull out. For example, to the dolly grip: "When he sits down, you push in." This is different from a punch-in. Moving into the scene or out of it are ways of combining the wide shot of a scene with a specific tighter shot.

Zoom

A zoom is an optical change of focal length. It moves the point of view in or out without moving the camera. Visible zooms are not popular in feature film making — certainly not since the end of the 1970s. The reason is simple: a zoom calls attention to itself and makes the audience aware they are watching a movie — something we usually want to avoid in invisible technique. When a zoom is used, it is important that the zoom be motivated.

Punch-in

A punch-in means that the camera stays where it is, but a longer focal length prime is put on or the lens is zoomed in for a tighter shot. The most common use of a punch-in is for coverage on a dialog scene, usually when going from an over-the-shoulder to a clean single.

3.1.4.2 Moving Shots

Tracking

The simplest and most clearly motivated of camera moves is to track along with a character or vehicle in the same direction.

Figure 3.1.11 Tracking

Countermove

If the camera always moves only with the subject, matching its direction and speed, it can get a little boring. In this case, the camera is "tied to" the subject and completely dependent on it. If the camera sometimes moves independently of the subject, it can add a counterpoint and an additional element to the scene. Certainly it can be dynamic and energetic; it adds a counterpoint of movement that deepens the scene
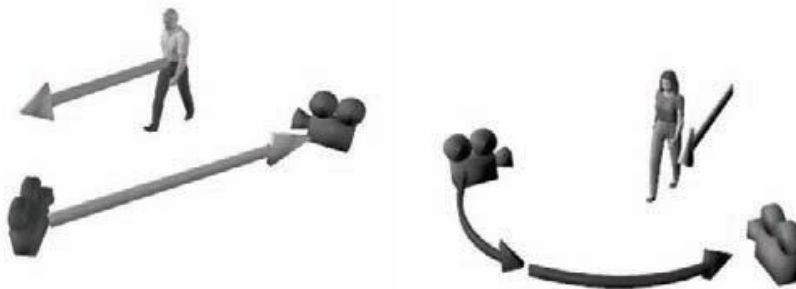
Figure 3.1.12 Countermove

Reveal

A simple dolly or crane move can be used for an effective reveal. A subject fills the frame, and then with a move, something else is revealed. This type of shot is most effective where the second frame reveals new content that amplifies the meaning of the first shot or ironically comments on it.

Circle Track Moves

When ordering a dolly and track, it is quite common to also order at least a couple of pieces of circle track. Circular track generally comes in two types: 45° and 90°. These designate whether it takes four pieces or eight pieces to make a complete circle, which defines the radius of the track. A very specific use of circle track is to dolly completely or halfway around the subject; this type of move is easily abused and can be very self-conscious if not motivated by something in the scene.

Figure 3.1.13 Circle Track Move

Crane Moves

The most useful aspect of a crane is its ability to achieve large vertical moves within the shot. While a crane may be used only to get the camera up high, the most basic variety of crane shot is to start with a high angle view of the overall scene as an establishing shot and then move down and in to isolate a piece of the geography: most often our main characters, who then proceed with the action or dialog. This is most often used to open the scene by combining the establishing shot with the closer-in master of the specific action.

Figure 3.1.14 Crane Moves

Rolling Shot

The term rolling shot is used wherever the camera is mounted on a vehicle, on either the picture vehicle or a camera car that travels along with the picture vehicle. The "picture" vehicle is the one being photographed.

3.1.5 Basics of Optics

The principles of optics and the use of lenses are the same for film and video. Nearly all principles of optics and optical design are based on a few properties of physics. The two most basic are reflection and refraction. Aside from lighting sources, most things in the real world do not emit visible light but reflect natural or artificial light. The reflection of light can be roughly categorized into two types of reflection: specular reflection which is defined as light reflected from a smooth surface at a definite angle, and diffuse reflection, which is produced by rough surfaces that tend to reflect light in all directions.

3.1.5.1 Reflection

The basic rule of reflection is: the angle of incidence equals the angle of reflection. The amount of light reflected by an object is dependent upon the texture of the surface. When surface imperfections are smaller than the wavelength of the incident light (as in the case of a mirror), virtually all of the light is reflected.
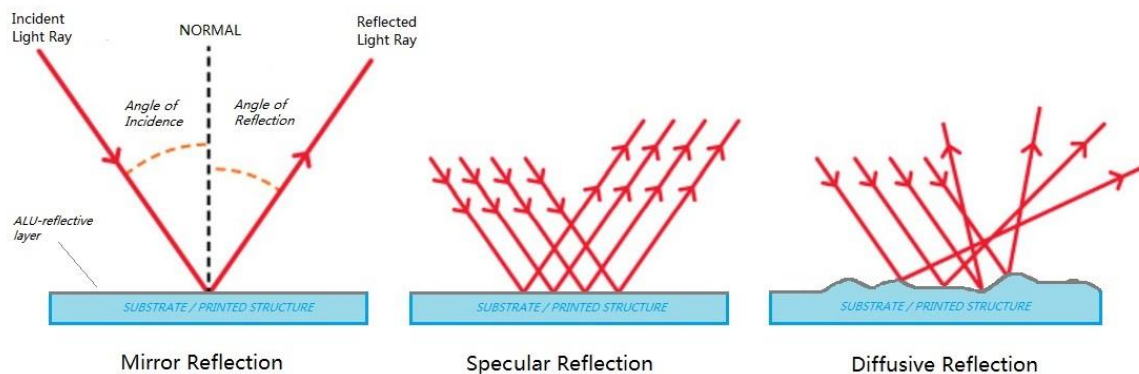
Figure 3.1.15 Reflection

3.1.5.2 Refraction

The refraction of visible light is an important characteristic of lenses that allows them to focus a beam of light onto a single point. Refraction, or bending of the light, occurs as light passes from one medium to another when there is a difference in the index of refraction between the two materials. The angle of refracted light is dependent upon both the angle of incidence and the composition of the material into which it is entering.
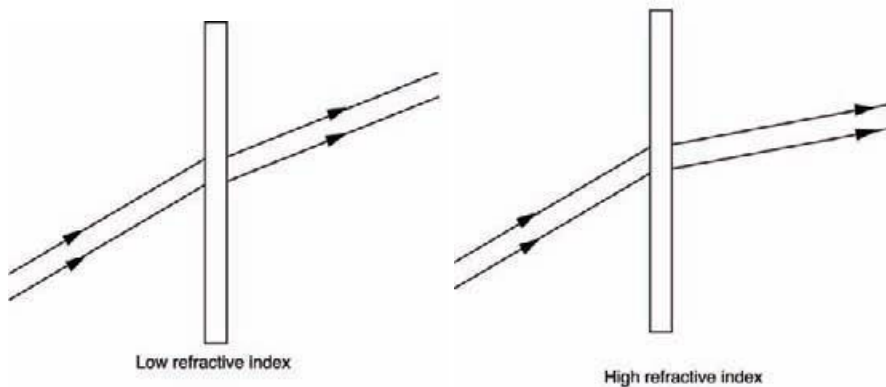
Figure 3.1.16 Refraction

3.1.5.3 F/Stop

The f/number or f/stop of a lens is a measure of its ability to pass light. The f/stop is the ratio of the focal length of a lens to the diameter of the entrance pupil. However, this is a purely mathematical calculation that does not account for the varying efficiency of different lens designs. T-stop (true stop) is a measurement of actual light transmission as measured on an optical bench. F/stops are used in depth-of-field and hyper focal calculations, and T-stops are used in setting exposure.

3.1.5.4 Focus

Lens is an optical system that projects the image onto the film or video sensor, which is called the image plane. All imaging, whether photography, cinema, video, or even painting, is the act of taking a three-dimensional world and rendering it onto this two-dimensional plane. The image plane is also called the Principal Plane of Focus or the focal plane. Assume that we are shooting a scene that has some foreground bushes, a woman standing in the middle, and some mountains behind her. The woman is our subject. We focus the lens so that she is sharply projected onto the image plane. Only objects that are projected sharply on the image plane are actually in "critical focus."

Figure 3.1.17 Changing Focus

3.1.5.5 Depth of Field

The portion of this image that falls on the image plane and is within the circle of confusion is called the depth-of-field. It has a near and far limit, but these fall off gradually. A number of factors affect depth-of-field:

- Focal length of the lens. The shorter the focal length, the more the depth-of-field.
- The aperture of the lens. The smaller the aperture, the greater the depth-of-field.
- Image magnification (object distance). The closer the subject is to the image plane, the less the depth-of-field.
- The format: larger formats (35mm or Imax) have less depth of field than smaller formats (such as 16mm or 2/3" CCD.)
- The circle of confusion selected for the situation.
- Indirectly: the resolving power of lens and film, end use, diffusion, fog, smoke, the type of subject.

Figure 3.1.18 Deep focus (extreme depth-of-field)

The tools that we use to alter focus and depth of field are given next.

- Diopters

Figure 3.1.19 Diopter

- Extension Tubes or Bellows

Figure 3.1.20 Bellow

- Macro Lenses

Figure 3.1.21 Macro lens

- Snorkles and Innovision

Figure 3.1.22 Innovision

- Frazier lens

Figure 3.1.23 Frazier lens

- Lens Extenders and Filter Factors

Figure 3.1.24 Lens extender

Notes

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UNIT 3.2: Camera Position and Focus Marking

Unit Objectives 🎯

At the end of this unit, you will be able to:

1. Establish, or support in establishing, the focus requirements for shots (eg: pan, tilt, tracking, static, zoom, close-up, wide-shot, master shot, high/low, angle shot, long shot and mid shot), based on the creative and technical requirements of production.
2. Prepare, or support in preparing, a focus path for a sequence depending on the movement, timing, start and finish points during shoots.
3. Report potential issues to the Producer and Director and relevant teams for rectification.
4. Perform Marking on floor with artist position and focus length of camera.

3.2.1 Basics of Depth of Field and Focus Setting

Depth of field may be defined as the range of distance within which all objects will be in acceptable sharp focus, including an area in front of and behind the principal point of focus. There will always be more depth of field behind the principal point of focus than in front of it. This is generally referred to as the one-third–two-thirds rule (1⁄3 – 2⁄3), which says that there is approximately 1⁄3 of the depth of field in front of the subject and 2⁄3 behind the subject.

To calculate your depth of field you must know the following:

- Focal length of the lens
- Size of the aperture (f-stop)
- Distance from subject to the camera film plane
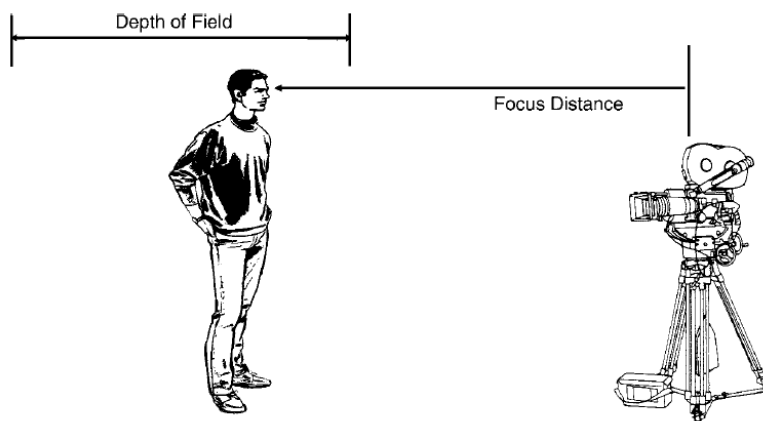
Figure 3.2.1 Depth of field

To find the depth of field for a particular situation, you may use the depth-of-field tables available in many film reference books.

Lens Focal Length = 50 mm **Circle of Confusion = 0.001"**

LENS FOCUS DISTANCE	f/1.4 NEAR / FAR	f/2 NEAR / FAR	f/2.8 NEAR / FAR	f/4 NEAR / FAR	f/5.6 NEAR / FAR	f/8 NEAR / FAR	f/11 NEAR / FAR	f/16 NEAR / FAR	f/22 NEAR / FAR
3'	3' / 3' 1"	2' 11" / 3' 1"	2' 11" / 3' 1"	2' 11" / 3' 1"	2' 10" / 3' 2"	2' 10" / 3' 3"	2' 9" / 3' 4"	2' 8" / 3' 6"	2' 6" / 3' 9"
4'	3' 11" / 4' 1"	3' 11" / 4' 1"	3' 11" / 4' 2"	3' 10" / 4' 3"	3' 10" / 4' 4"	3' 8" / 4' 5"	3' 7" / 4' 8"	3' 5" / 5'	3' 2" / 5' 6"
5'	4' 11" / 5' 1"	4' 10" / 5' 2"	4' 10" / 5' 3"	4' 9" / 5' 4"	4' 8" / 5' 6"	4' 6" / 5' 9"	4' 4" / 6'	4' 1" / 6' 8"	3' 9" / 7' 7"
6'	5' 10" / 6' 2"	5' 10" / 6' 3"	5' 9" / 6' 4"	5' 7" / 6' 6"	5' 6" / 6' 8"	5' 3" / 7' 1"	5' / 7' 7"	4' 8" / 8' 7"	4' 3" / 10' 2"
7'	6' 10" / 7' 3"	6' 9" / 7' 4"	6' 7" / 7' 5"	6' 6" / 7' 8"	6' 3" / 8'	6' / 8' 6"	5' 9" / 9' 2"	5' 3" / 10' 9"	4' 10" / 13' 6"
8'	7' 9" / 8' 4"	7' 8" / 8' 5"	7' 6" / 8' 7"	7' 4" / 8' 11"	7' 1" / 9' 4"	6' 9" / 10'	6' 4" / 11'	5' 9" / 13' 4"	5' 2" / 17' 8"
9'	8' 8" / 9' 4"	8' 7" / 9' 6"	8' 4" / 9' 9"	8' 2" / 10' 2"	7' 10" / 10' 8"	7' 5" / 11' 7"	6' 11" / 13'	6' 4" / 16' 4"	5' 8" / 23' 8"
10'	9' 7" / 10' 5"	9' 5" / 10' 8"	9' 3" / 10' 11"	8' 11" / 11' 5"	8' 7" / 12' 1"	8' 1" / 13' 4"	7' 6" / 15' 3"	6' 9" / 20'	5' 11" / 32'
12'	11' 5" / 12' 8"	11' 2" / 13'	10' 11" / 13' 5"	10' 6" / 14' 1"	10' / 15' 2"	9' 4" / 17' 1"	8' 7" / 20' 5"	7' 8" / 30'	6' 9" / 67'
15'	14' 1" / 16' 1"	13' 9" / 16' 6"	13' 4" / 17' 3"	12' 8" / 18' 5"	12' / 20' 4"	11' / 23' 11"	10' / 30' 10"	8' 9" / 59'	7' 7" / INF
20'	18' 5" / 21' 11"	17' 10" / 22' 10"	17' 1" / 24' 2"	16' 1" / 26' 7"	14' 11" / 30' 8"	13' 6" / 39' 10"	12' / 63'	10' 2" / INF	8' 7" / INF
25'	22' 7" / 28' 1"	21' 8" / 29' 7"	20' 7" / 31' 11"	19' 1" / 36'	17' 5" / 44'	15' 5" / 66'	14' / 168'	11' / INF	9' / INF
50'	41' 1" / 64'	38' / 72'	35' / 88'	31' / 131'	27' / 376'	22' / INF	19' / INF	14' / INF	11' / INF

Figure 3.2.2 Depth of field table for 35 mm film

When expressing your depth of field, it should always be stated as a range from the closest point to the farthest point and not as a single number. By always stating your depth of field as a range of distance, it will help you to remember your limits or the actor's limits for a particular scene or shot. Note that that depth of field is not an exact science and is based on different lens characteristics and designs.

The following examples illustrate how each of the three factors affects the depth of field.

1. Size of the aperture or f-stop: You have more depth of field with larger f-stop numbers (smaller aperture openings) than with smaller f-stop numbers (larger aperture openings) as long as the focal length and subject distance remain the same.

Example: A large aperture, such as f/2.8, has less depth of field at a specific distance than does a small aperture, such as f/8, at the same focal length and the same distance (see figure next).
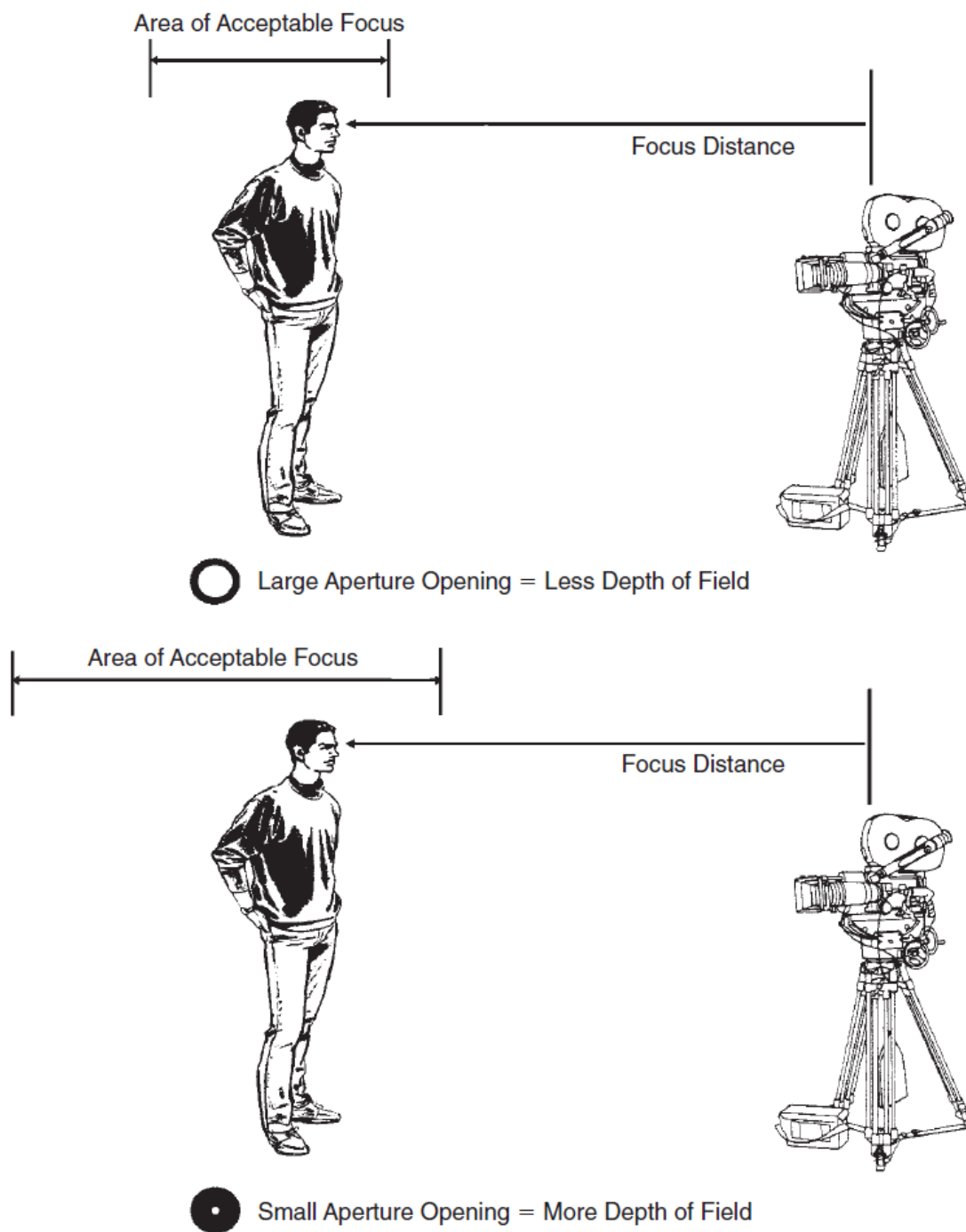
Figure 3.2.3 Effect of size of aperture

2. Focal length of the lens: You have more depth of field with wideangle lenses than with telephoto lenses as long as the f-stop and subject distance remain the same.

Example: A wide-angle lens, such as 25 mm, will have more depth of field at a specific distance and f-stop than a telephoto lens, such as 100 mm, at the same distance and f-stop (see figure next).
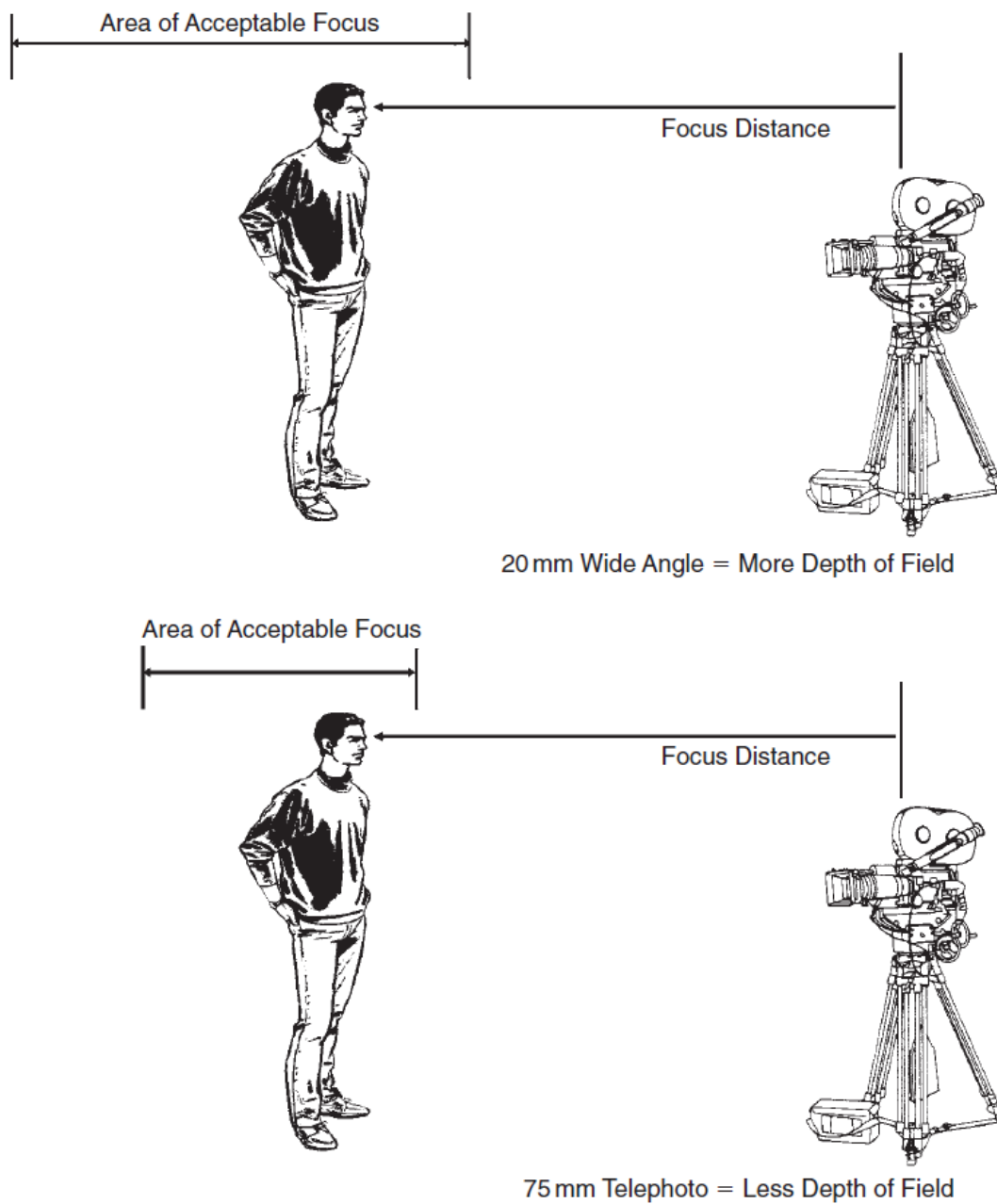
Figure 3.2.4 Effect of focal length

3. Subject distance from the camera: You have more depth of field with a distant subject than with a close subject as long as the f-stop and focal length remain the same.

Example: An object 20 ft from the camera at a specific f-stop and focal length has more depth of field than an object 8 ft from the camera at the same f-stop and focal length (see figure next).
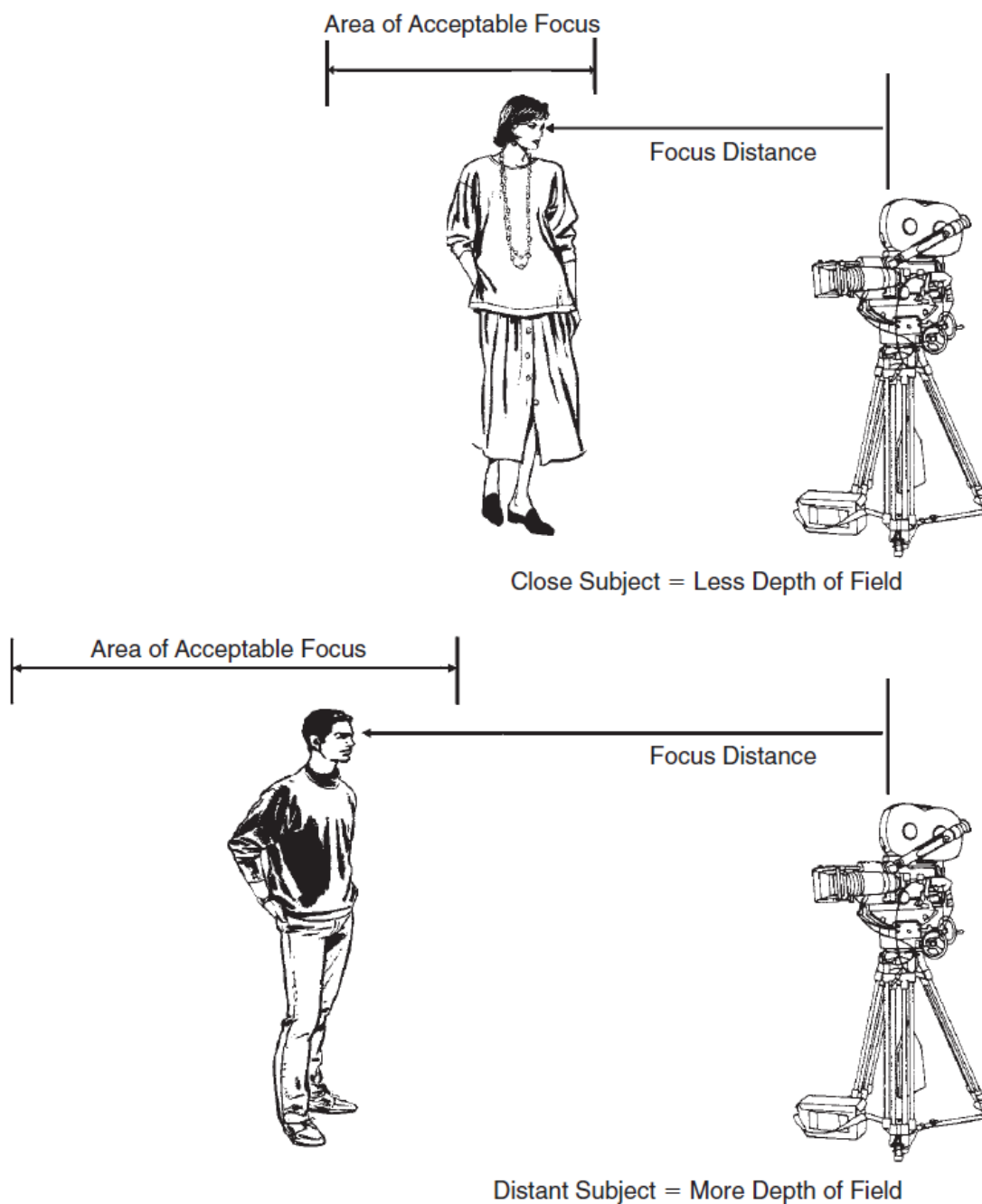
Figure 3.2.4 Effect of subject distance

3.2.2 Focus measurement and marking

3.2.2.1 Marking Actor

During rehearsals the 2nd AC places marks on the floor for each actor, for each position he or she takes during the scene. Any time an actor stops and does something or speaks a line, a mark must be placed for him or her. These marks are often referred to as action points. For example, if an actor walks in the door and stops, then walks over to a table and stops, and then goes to the window for the remainder of the scene, there will be one mark at the door, one at the table, and a final mark at

the window. Actors use these marks so that they know where to stand, the 1st AC uses them for focus measurements, and the DP uses them for lighting purposes. The marks are usually made with the 1⁄2-in. or 1-in. colored paper tape that was included in the expendables list. It is important to use only colored paper tape for actors' marks. The adhesive on the paper tape is not as strong as the adhesive on the cloth camera tape, so there is less chance of damage when removing the paper tape from the floor or carpet of a private home or business.

When placing marks, be sure to make a small tab on the end of the tape to make it easier to remove later. If the floor or ground is seen in the shot, place tape marks for the rehearsal and then remove them or make them very small for the actual shot. You may be able to use a color of tape that is close to the color of the floor surface. If the mark is small enough, the camera may not pick it up in the shot, but the actor should still be able to see it if necessary. If you are working outside or on a surface where you cannot place tape marks, use anything that is handy, such as leaves, sticks, twigs, rocks, and so on. Ideally, when working outside, you would use something that would blend in with the surroundings and not look like an actor's mark. When working on pavement or concrete, many assistants use a piece of chalk to make the marks for the actor. Just remember to remove any marks before shooting so that they are not visible on film. I once worked on a television series, and in one episode a scene required two characters to meet up with each other on the street. The 2nd AC placed a large chalk mark on the pavement for each actor. Unfortunately, when it came time to film the shot, nobody said anything about the marks; they were not removed before shooting and were clearly visible in the finished show.

If more than one actor is in the scene, each actor's marks should be a different color if possible. This makes it easier and less confusing for each actor. When ordering the expendables you would order different colors of paper tape for this purpose. The most common type of mark used is the T mark, shaped like the letter T and measuring 3- to 5-in. wide by 3- to 5-in. high. A T mark is placed with the top portion of the T just in front of the actor's toes and the center portion extending between the actor's feet; refer to figure next.

Figure 3.2.5 T mark

Another type of mark is the toe mark. These are usually 3- or 4-in. long strips of tape placed at the end of each actor 's foot. See next figure.

Figure 3.2.5 Toe mark

A variation of the toe mark is the V mark. It consists of two strips of tape placed at each actor 's foot in the shape of the letter V.

Figure 3.2.5 V mark

One final and more precise form of mark is a box created with tape that is placed completely around the actor 's feet.

Figure 3.2.5 Box mark

3.2.2.2 Focus Measurement and Following Focus

During rehearsals the 2nd AC will place tape or some other type of mark on the floor or ground for each actor's position for the scene. During this time the 1st AC will measure the distance from the camera film plane to the subject for each subject position and each camera position of the shot. There are times when actors don't stop on their marks, so by knowing the distances to these marks you should be able to estimate their distance from the camera. Focus may also be obtained by eye through the viewfinder.

For beginners, it is important to remember that the focus measurement is taken from the film plane of the camera to the actor or subject. The film plane is the point in the camera where the film sits in the gate and where the image comes into focus on the film; it is from this point that all focus measurements are taken. On most professional motion picture cameras, there is a pin or hook attached to the body of the camera that is precisely in line with the film plane. The 1st AC will connect the tape measure to this pin or hook to measure the focus distance. There is often a special symbol engraved or painted on the side of the camera to indicate the positioning of the film plane.
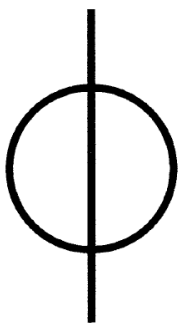
Figure 3.2.6 Mark indicating film plane

When obtaining your focus mark or measuring the distance to subjects, you must be aware of a special situation that often arises. When you are filming the reflection of a subject, such as in a mirror, you must first measure the distance from the camera to the mirror and then to the subject. For example, if the distance from the camera to the mirror is 10 ft, and the distance from the mirror

to the subject is 5 ft, then you would set the focus of the lens to 15 ft (10 + 5 = 15) to have the reflection of the subject sharp and in focus.

If an actor and camera are stationary, focusing is actually pretty simple. Measure the distance to the actor and set this distance on the focus barrel of the lens. When an actor or camera or both are moving, focusing during the shot becomes more challenging. When the camera is stationary and the actor is moving in the scene, such as walking toward or away from the camera, the 1st AC will often place tape marks or chalk marks on the ground as reference points for focusing. Depending on the complexity of the shot, there may only be a beginning mark and an end mark, or there may be these two marks plus many in-between marks. The focus marks are usually placed about 1 ft apart, but the easiest and best way is to place them according to the markings on the lens.

Because of the principles of depth of field, focus marks are not as critical when using a wide-angle lens, and you may not need to measure to as many points as you would if you were shooting with a long focal length or telephoto lens. For each distance measured, the 1st AC will mark the lens or focus-marking disk accordingly so that he or she may rack focus or follow focus during the scene. The focus marking disk is a circular white piece of plastic that is attached to the follow-focus mechanism. Using a grease pencil or erasable marker, the 1st AC marks the disk according to the distances measured for the shot. Some assistants wrap a thin piece of tape around the barrel of the lens and place the focus marks on it for the shot.
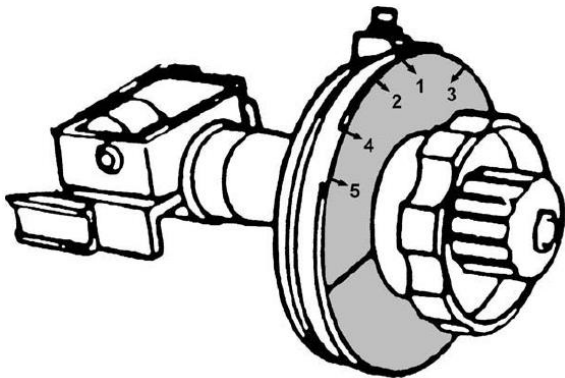
Figure 3.2.7 Focus marking disc
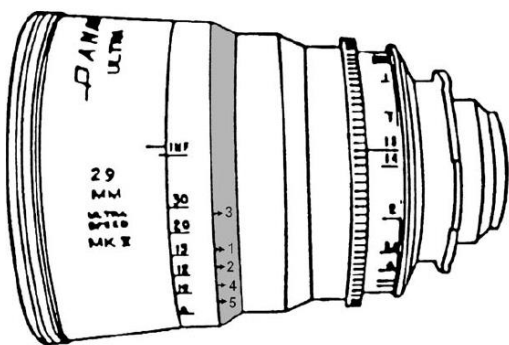
Figure 3.2.8 Focus marking on lens

Exercise

1. Discuss the conceptual tools of cinematography.

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2. Discuss the overlapping or triple-take method of shooting.

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_____

3. What are the basic moves of camera?

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_____

_____

4. Discuss the moving shots.

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_____

5. What is the difference between reflection and refraction of light?

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_____

6. Write a note on depth of field and focus setting.

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_____

_____

7. Write a note on focus measurement and tools used for focus measurement.

_____

_____

_____

_____

8. What is the effect of F/Stop on focus?

_____

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4. Dismantling and Packing Equipment

Unit 4.1 – Dismantling and Packing Equipment

Key Learning Outcomes

At the end of this module, you will be able to:

1. Dismantle and pack the equipment properly (equipment can include cameras, batteries, lenses, filters, tripods, grips, dollies, track, special effects equipment, magazines, clapper boards, unused film stock/beta tapes/memory cards)
2. Ensure that all the list of equipment to be dispatched matches the list of equipment received from the vendor and brought by the production team
3. Coordinate with logistics players, where required, to have the equipment dispatched to the vendor/own facilities as required
4. Identify and report any equipment that needs repair or replacement, as required
5. Ensure that the location and facilities used during shoot are left in their original state

UNIT 4.1: Dismantling and Packing Equipment

Unit Objectives ⊚

At the end of this unit, you will be able to:

1. Dismantle and pack the equipment properly (equipment can include cameras, batteries, lenses, filters, tripods, grips, dollies, track, special effects equipment, magazines, clapper boards, unused film stock/beta tapes/memory cards)
2. Ensure that all the list of equipment to be dispatched matches the list of equipment received from the vendor and brought by the production team
3. Coordinate with logistics players, where required, to have the equipment dispatched to the vendor/own facilities as required
4. Identify and report any equipment that needs repair or replacement, as required
5. Ensure that the location and facilities used during shoot are left in their original state

4.1.1 Packing Camera

- Find a good quality cardboard box in which everything can find comfortably. It is better to have a bigger box rather than smaller.
- Arrange the items as shown below for packing.

Scissors
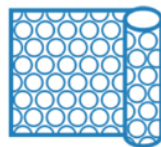
Bubble Wrap

Tape

Polystyrene Chips

New Box

Figure 4.1.1 Packing material

- Remove the peripherals and other attachments of camera like lens, memory cards, battery, straps and so on. If you use lithium-ion battery then it should remain the camera.

Figure 4.1.2 Camera attachments

- Make sure all the marking tapes have been removed and you have cleaned all the equipment.

Figure 4.1.3 Clean camera

- Apply lens caps to the lenses and wrap them in bubble sheet. Firmly tape the bubble sheet.

Figure 4.1.4 Camera lens cap

- If your camera equipment came with cases then put them in their respective cases.

Figure 4.1.5 Camera bag

- Place camera and other equipment in the cardboard box and put polystyrene chips to safeguard camera.

Figure 4.1.6 Polystyrene chips

- Close the box and shake it slowly. If you can hear the movement then fill more chips until there is no movement inside.
- Tape the box firmly and write down the fragile note.

Figure 4.1.7 Fragile marking

4.1.2 Coordination with Rental House

As a Camera Assistant, it is important to have a good working relationship with the camera rental house. If you have treated the staff and their equipment properly in the past, they will be more inclined to help you out when a production company does not have a large budget, but you need a few additional items. A good attitude can go a long way in this business, and a bad attitude will stop you in your tracks. You'll get a bad reputation very fast, and very few people will want to work with you.

Make sure everything is packed in its original shape. You can tally the items with the bill issued by rental house. A common checklist is shown in next figure.

FILM CAMERA EQUIPMENT CHECKLIST

Production Title

CAMERAS

- Aaton 35
- Aaton A-Minima
- Aaton XTR Plus
- Aaton XTR Prod
- Arriflex Arricam Studio
- Arriflex Arricam Lite
- Arriflex 235
- Arriflex 435
- Arriflex 535
- Arriflex 35 BL3
- Arriflex 35 BL4
- Arriflex 35-3
- Arriflex 2C
- Arriflex 416
- Arriflex 416 Plus High Speed
- Arriflex 16 SR3
- Arriflex 16 SR3 High Speed
- Arriflex 16 SR2
- Arriflex 16 SR2 High Speed
- Bell & Howell Eyemo
- Leonetti Ultracam
- Moviecam Super America
- Moviecam Compact
- Moviecam SL
- Panavision Millennium XL
- Panavision Millennium
- Panavision Panaflex Platinum
- Panavision Panaflex Gold II
- Panavision Panaflex Gold
- Panavision Panaflex–X
- Panavision Panastar I
- Panavision Panastar II
- Panavision Panaflex–16
- Panavision XL-2
- Photo Sonics 4ER
- Photo Sonics 4C
- Photo Sonics 4 ML
- Photo Sonics Actionmaster 500
- Photo Sonics 1VN
- Photo Sonics NAC

GROUND GLASS

1.33	2.35/2.40
1.33/1.78	TV
1.33/1.85/2.40	TV/1.85
1.66	Super TV
1.78	Super 16
1.85	Super 35
1.85/Academy	
1.33/1.78/Super 35	

MAGAZINES

200	800
250	1000
400	1200
500	
Reverse	High Speed
Arricam Shoulder	
Arricam Steadicam	
Arri 35-3 Shoulder	
Arri 35-3 Steadicam	
Arri 535 Steadicam	
Arri 435 Shoulder	
Arri 435 Steadicam	

VIDEO ASSIST

Arri 35-3 Video Door	
B & W Video Tap	
Color Video Tap	
Wireless Transmitter	
Transvideo Monitor	
Arriflex IVS	
Panavision MAV	
Panavision PAV2	
Panavision XLV	
4" Monitor	Watchman
5" Monitor	Video 8
6" Monitor	VHS Deck
6.5" Monitor	DVD Deck
8.4" Monitor	DV Deck
9" Monitor	
10" Monitor	
12" Monitor	
15" Monitor	25' Coaxial
19" Monitor	50' Coaxial
Adapters, Connectors	

HAND HELD

- Right-Hand Grip
- Left-Hand Grip
- Shoulder Pad
- Shoulder Brace
- Follow Focus
- Clamp-on Matte Box
- Arri 35-3 Handheld Door
- Lens Shade
- Handheld Microforce Handle

PRIME LENSES

3.5 mm	30 mm
4 mm	32 mm
5.9 mm	35 mm
6 mm	40 mm
8 mm	50 mm
9.5 mm	55 mm
9.8 mm	60 mm
10 mm	65 mm
12 mm	75 mm
14 mm	85 mm
14.5 mm	100 mm
16 mm	125 mm
17 mm	135 mm
17.5 mm	150 mm
18 mm	180 mm
20 mm	210 mm
21 mm	
24 mm	
25 mm	
27 mm	
28 mm	
29 mm	

ZOOM LENSES

7 – 56	18 – 100
7 – 63	18.5 – 55.5
7 – 81	20 – 60
8 – 64	20 – 100
9 – 50	20 – 120
9.5 – 57	20 – 125
10.4 – 52	23 – 460
10 – 30	24 – 275
10 – 100	24 – 290
10 – 150	25 – 80
10.5 – 210	25 – 250
11 – 110	25 – 625
11 – 165	27 – 68
11.5 – 138	28 – 70
12 – 120	35 – 140
12 – 240	40 – 200
14 – 70	48 – 550
14.5 – 50	50 – 500
16 – 44	85 – 200
17 – 35	135 – 420
17 – 75	150 – 450
17 – 102	150 – 600
17.5 – 34	190 – 595
17.5 – 75	270 – 840
18 – 90	

FILM CAMERA EQUIPMENT CHECKLIST – Page 2

Production Title

TELEPHOTO LENSES		ARRIFLEX LENSES		PANAVISION LENSES	
200 mm	800 mm	MASTER PRIMES		G-SERIES ANAMORPHIC LENSES	
300 mm	1000 mm	16 mm	40 mm	35 mm	60 mm
400 mm	1200 mm	18 mm	50 mm	40 mm	75 mm
500 mm	2000 mm	21 mm	65 mm	50 mm	100 mm
600 mm		25 mm	75 mm	ANAMORPHIC ZOOM	
		27 mm	100 mm	AWZ2 40 – 80	
		32 mm		ATZ 70 – 200	
MACRO LENSES		35 mm		PRIMO PRIMES	
16 mm	75 mm			24 mm	85 mm
24 mm	90 mm	ULTRA 16 LENSES		30 mm	125 mm
32 mm	100 mm	6 mm	12 mm	65 mm	
40 mm	140 mm	8 mm	14 mm	PRIMO SLZ ZOOM 4:1	
50 mm	200 mm	9.5 mm		17.5 – 75	
60 mm	280 mm			PRIMO SLZ ZOOM 11:1	
		VARIABLE PRIMES		24 – 275	
		VP1 16 – 30		PRIMO MACRO ZOOM	
SLANT FOCUS LENSES		VP2 29 – 60			
24 mm	63 mm	VP3 55 – 105		COMPACT ZOOM	
34 mm	90 mm			PCZ 19 – 90	
45 mm		LIGHTWEIGHT ZOOM		LIGHTWEIGHT ZOOMS	
		LWZ 15.55 – 45		17.5 – 34	
SHIFT & TILT LENSES				27 – 68	
14 mm	60 mm			85 – 200	
18 mm	80 mm				
20 mm	90 mm	ARRIFLEX ACCESSORIES		PANAVISION ACCESSORIES	
24 mm	110 mm	Arricam Speed Control Box		On-Board Video Monitor	
28 mm	120 mm	Arricam Timing Shift Box		Telescoping Eyepiece Extension	
35 mm	135 mm	On-Board Video Monitor		FTZSAC	
45 mm	150 mm	RCU—Remote Control Unit		Remote Focus & T–Stop	
50 mm		WRC-1—Wireless Remote		Modular Follow-Focus	
		ICU—Iris Control Unit		Modular Follow-Focus Remote	
EYEMO LENSES		LCS—Lens Control System		Flange Focal Depth Set	
14 mm	24 mm	IVS—Integrated Video System		Filter Frame Gel Punch	
15 mm	35 mm	LCC—Laptop Camera Controller		Digital Remote Switch	
17 mm	50 mm	RPC—Ramp Preview Controller		On-Board Battery Bracket	
18 mm		Director's Viewfinder		Preston Focus, Iris, Zoom Control	
20 mm		Wireless LCS		LAC	
		Single-Frame Shutter for 435		Phaseable Synchronizer	
		Controlled Focus Motor		Panafinder Director's Finder	
OPTICAL ACCESSORIES		Wireless Remote Focus		Panavision/Frazier Lens System	
Eyepiece Extension		EXD-1 External Display		Panavision/Century Swing Shift	
Medium Eyepiece		HC-1 Hand Crank		Panaclear Auxiliary Handle	
Eyepiece Leveler		LFF – Lightweight Follow Focus		Panavision Universal Autobase	
Super Wide Eyepiece		TSB – 435 Time Shift Box		Panatate 360-Degree Mount	
		ZMU-3 Zoom Main Unit		Panaflasher	
		WRS – Wireless Remote System		Panatape II	
		MB-20 Compact Matte Box		Smart Shutter Control II	
		Lens Data Box			

FILM CAMERA EQUIPMENT CHECKLIST – Page 3

Production Title

MISCELLANEOUS ACCESSORIES	LENS ACCESSORIES	HEADS
Short Iris Rods	Microforce Motor	Arrihead
Medium Iris Rods	Microforce Zoom Control	Arrihead 2
Long Iris Rods	Panavision Zoom Control	Panahead
Lens Bridge Support	Panavision Zoom Holder	Super Panahead
Bridge Plate	Zoom Power Cables	Mitchell Gear Head
Sliding Balance Plate	Microforce Extension Cable	Mini Worral
Studio Follow-Focus	1.4 × Extender	Worral Gear Head
Mini Follow-Focus	2 × Extender	Cartoni C 20 S
Follow Focus Right Hand Knob	Aspheron for 9.5 & 12	Cartoni C 40 S
Focus Gears	Mutar for 10 – 100	Cartoni Dutch
Focus Whip – 6", 12"	Mesmerizer	Cartoni Lambda
Speed Crank	PL to Bayonet Mount	Cartoni Omega
4 × 4 Studio Matte Box	Revolution Lens System	Cartoni Sigma
4 × 5 Studio Matte Box	Low-Angle Prism	O'Connor 1030
4 × 5.65 Studio Matte Box	Century Periscope	O'Connor 2060
5 × 6 Studio Matte Box	Snorkel	O'Connor 2575
6.6 × 6.6 Studio Matte Box	Innovision Probe	O'Connor 100
9 × 9 Studio Matte Box	Squishy Lens	O'Connor 50 – 200
4 × 4 Filter Trays		O'Connor Ultimatte
4 × 5.65 Filter Trays		Ronford Fluid 7
6.6 × 6.6 Filter Trays		Ronford 30
6.6 × 6.6 Step Down to 4 × 5.65		Ronford Fluid 2015
4 × 4 Clamp–on Matte Box		Ronford Fluid 2003
4 × 5.65 Clamp–on Matte Box	ELECTRONIC ACCESSORIES	Ronford Fluid 2004
Matte Box Adapter Rings	Eyepiece Heater	Sachtler 7 + 7
Matte Box Bellows	Eyepiece Heater Cable	Sachtler 9 + 9
Rubber Donuts	Remote Switch	Sachtler 65
Lens Shade	Lens Light	Sachtler 80
4 ½" Clamp-on Shade	HMI Speed Control	Sachtler Horizon
138 mm Clamp-on Shade	Precision Speed Control	Sachtler Studio 80
Hard Mattes	Intervalometer	Sachtler Video 90
Extra Filter Retaining Rings	Capping Shutter	Sachtler Dutch
Eyebrow	Film/Video Synchronizer	Tango Swing Head
French Flag	Obie Light	Vinten
Utility Base Plate	CE Crystal Speed Control	Weaver Steadman 2-Axis
Auto Base	Remote Follow-Focus	Weaver Steadman 3-Axis
Auxiliary Carry Handle	Wireless Follow-Focus	Weaver Steadman Multi-Axis
Camera Barney	Junction Box	
Magazine Barney	Moviecam Sync Box	
Rain Cover/Weather Protector	Preston FI + Z	
Rain Deflector	Cine Tape Measure	
Director's Finder	Camera Shaker	
Microforce Handle	Image Shaker	
Oppenheimer Handle		
Filters—See Filters Checklist		

FILM CAMERA EQUIPMENT CHECKLIST – Page 4

Production Title

SUPPORT	BATTERIES & CABLES	MISCELLANEOUS
Standard Tripod	12-Volt Block	400' Film Cans
Baby Tripod	24-Volt Block	800' Film Cans
Bazooka	12/24 Blocks	1000' Film Cans
Spreader	12-Volt Belt	1200' Film Cans
High Hat	24-Volt Belt	
Low Hat	12/24 Belt	400' Black Bags
Rocker Plate	Chargers	800' Black Bags
Tilt Plate	12-Volt On–Board	1000' Black Bags
Cardelini Head Lock	24-Volt On–Board	1200' Black Bags
	On–Board Chargers	
	Arriflex SR2 On–Board Adapter	2" Film Cores
	Arriflex SR3 On–Board Adapter	3" Film Cores
	Panavision On-Board Battery Bracket	Camera Reports
	Power Cables	Inventory Forms
	Power Cable Extension	Film Can Labels
	Junction Box	Changing Bag
		Changing Tent
		Slate
		Expendables — See Checklist
		Miscellaneous Forms & Labels

When you are returning the equipment, make sure the mark the entry in returned equipment log as shown below.

RETURNED EQUIPMENT LOG			Page #	of
Production Title				
DATE RETURNED	DESCRIPTION (ITEM NAME & SERIAL NUMBER)	RENTAL COMPANY NAME	NOTES	

If there are any equipment missing or damaged then make sure that you register it in the log book. Check the log book sample given next.

MISSING OR DAMAGED EQUIPMENT LOG		Page #		of	

Production Title	

DATE MISSING OR DAMAGED	DESCRIPTION (ITEM NAME & SERIAL NUMBER)	RENTAL COMPANY NAME	NOTES

Exercise

1. Write down the steps for packing camera?

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2. Discuss the process of returning equipment to rental store?

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5. Health & Safety Comply with Workplace

Unit 5.1 – Safety, Health, and Hygiene

Unit 5.2 – First Aid

MES/ N 0104

Key Learning Outcomes

At the end of this module, you will be able to:

1. Observing and understand the current health, safety, security policiesa and procedure of organization.
2. Understand the safe working practices pertaining to own occupation.
3. Understand the government rules and policies related to the health and safety including emergency procedures for accidents, illness, fires or others.
4. Identifying the person responsible for health and safety in the working area, including those person whom to contact in emergency.
5. Identifying the security signals in the workplace fire alarms, staircases, fire warden stations, first aid and medical rooms.
6. Identifying the possible work hazards in the working area which can cause risk to others health and safety.
7. Ensuring own and others health and safety in the workplace through precautionary measures.
8. Identify and recommend the basic terms and opportunities to the designated person of your workplace for improving health, safety, and security.
9. Identify and correct the cause of accidents, illness, and fires in your working area and within the limits of individual's authority.

UNIT 5.1: Maintain Workplace Health and Safety

Unit Objectives 🎯

At the end of this unit, you will be able to:

1. Observing and understand the current health, safety, security policiesa and procedure of organization.
2. 2. Ensuring own and others health and safety in the workplace through precautionary measures.
3. 3. Identify and recommend the basic terms and opportunities to the designated person of your workplace for improving health, safety, and security.

5.1.1 Introduction:

Emergency evacuation is needed when staying within the building not safe anymore. Every organization has an evacuation procedure. Every organization has a safe place within the organization compound or outside the organization compound where all employees are expected to assemble in case of an emergency evacuation. The team leader guides the team and takes them to safe place. It is very important in these cases, to assemble at the safe area immediately.

If you do not reach the safe area on time, the team leader who is responsible for your safety will send someone to look for you. This will put the other person's life in danger.

Conditions for Evacuation

Emergencies which require immediate evacuation includes:
- Explosions
- Fires
- Earthquakes
- Hurricanes
- Floods
- Workplace violence
- Toxic material releases
- Tornadoes
- Civil disturbances

Every company has:
- **An evacuation policy.** All the TLs are responsible for informing their employees about it. When the TL is informing you about these details, pay attention. This negligence could cost lives.
- **A designated place for emergencies.** Ensure that you know where it is.
- **A "buddy system" for individuals with special needs or disabilities.** If you are a buddy to someone, ensure that your buddy is safely out of the premises with you.
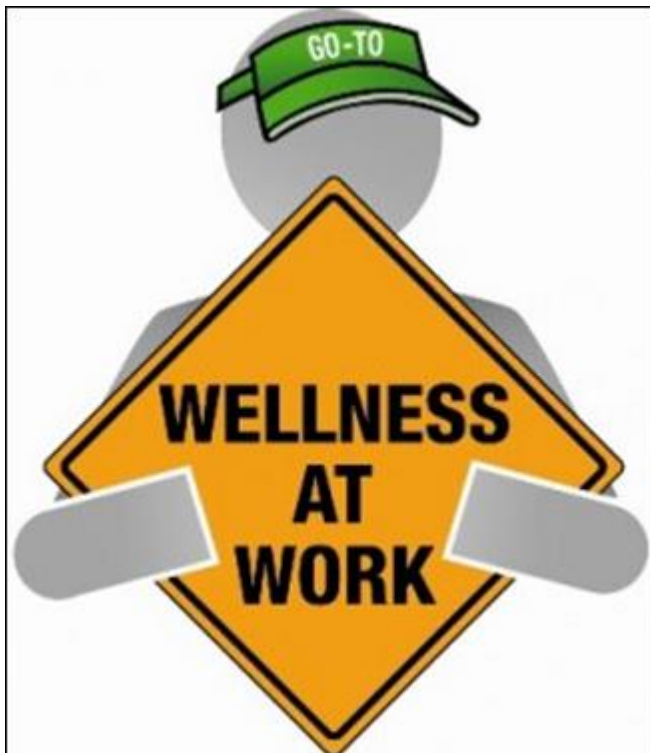
Figure 5.1.1 Conditions for evacuation

- **Floor plans with evacuation routes in work areas.** Ensure that you understand it so that you can use it in time of need.
- **Assembly areas.** These are the areas where you are required to assemble after evacuation.
- **Periodic evacuation drills.** Ensure that you pay attention during those drills. You need to save your life and you can be helpful in saving someone else's life too.

5.1.2 Mock Drills/ Evacuations

The responsibility of the safety of the workers in case of emergency is on the fire safety and evacuation workers. These workers need to go through the training to know the duties and responsibilities. In a workplace, the practice drill should be done in every 3 months under simulated fire conditions so that the workers know the techniques of saving their and other life. By practicing in the fire drills, all the workers area able to know the lifesaving method required in case of emergency.

Fare the exercises designed check the staff response as per emergency. It is also a test of the emergency staff, working staff and other members of fire safety department. Sometime the drill is not successful but that's okay because human learn from previous mistakes. But it is important for all the members that they correct their mistake on time. Sometime all the mistakes were not done by the members of staff, the mistake is done the faulty equipment and safety plans. But, there is a need of staff training periodically.

Figure 5.1.2 Mock Drills

There are two vital components for preparing the fire safety plan which are written below:
1. An emergency action plan, which tells the procedure to be optimize in case of emergency.
2. A fire prevention plan, which tells the methods to be optimize to cool the fire as soon as possible.

You need to participant in arranged by organization for your personal safety and also for others safety. These drills help you in understanding the

Fire safety and evacuation plans sketch staff duties and accountabilities in time of emergency. Continuing training is required to help safeguard that the employees are conscious of those duties and responsibilities. Firefighting trainings serve as an prospect for staff members to validate, under replicated fire conditions, that they can perform those duties and responsibilities safely and efficiently. It's also a time for the workers or employee to demonstrate about the defend-in-place strategies and also the workers are able to take advantage of facility's fire protection features and exit facilities to protect the people in their care.

Fare excellent exercise designed to evaluate staff response to a replicated emergency. The fare is also a test of facility's fire safety/evacuation strategies and staff training programs. It is not essential that all frun smoothly. That's okay, so long as staff and the organization understand from them and correct mistakes made. It's vital, therefore, that there be a analysis of each drill so that any problems met can be addressed. Perhaps the problems are due to unfinished or out-dated fire safety/emigration plans. Perhaps there's a need for further training of staff.

The two essential components of a fire preparedness plan are the following:
1. An emergency action plan, which details what to do when a fire occurs.
2. A fire prevention plan, which describes what to do to prevent a fire from occurring.

5.1.3 Medical Emergencies

Everyone plans for emergencies. That is the reason why we keep a first aid kit with ourselves. At work, however one is exposed to a lot of stress and physical activity. This could lead to certain medical emergencies. It's better to be prepared with the first aid measures and knowledge of implementing them on ourselves and on others. This module equips you with that information. Pay

attention to these medical emergency procedures to understand how to conduct you in theses crucial movements. Pay attention during these sessions. You might be able to save your own and your friend lives.

5.1.3.1 In case of Medical Emergency

A medical emergency is a situation in which a worker met in accident and needs medical help. The medical injury may be severe or life threating. Some situation where:

- Person is not inhaling
- Heart attack or stock
- Heavy or severe bleeding
- Electric Shock
- In case of Poisoning
- Person get somebody Burns

In case of medical emergency, the person or victim requires the immediate help. Sometime the person need attention before the you call the emergency helpline.

It is important to know or remember the number of emergency helpline or Emergency Medical Service (EMS) for the safety of self and other workers.

DON'T

- Let the victim to eat or drink anything.
- Confine the victim
- splash any fluid on victim face or on injury.
- shift the victim to another area or place unless it is the only way to protect the victim.

Bleeding

- Apply any type of pressure on the wound of victim with the help of bandage or any other means.
- Elevate the wound to slow the bleeding.
- When necessary, apply the pressure on pressure points near wound to block excess bleeding.

Fainting

- Fainting is a loss of consciousness which is due to temporary reduction flow of blood in the victim's brain.
- The unconsciouness of the victim may led to more injury in the workplace.
- Slow pulse of the victim.
- The pale, cold skin and sweating of the victim.

Causes of fainting:

- Eating or drinking lack of fluids which is also known as dehydration.
- The low blood pressure of victim.
- Due to lack of sleep.
- Over exhaustion of the worker

First Aid for Fainting:
- Lie down the victim on the back and raise the legs above his heart level.
- Ensure the clearance of victim's nose.
- Check for indication of coughing, or breathing problem.
- Loose the tight cloths like neck ties, collars, and belts.
- If the victim remains unconscious from the 1 minute, call the EMS as soon as possible.

Shock

The shock occurs in the human body on the failure of circulatory system. When insufficient amount of oxygen is reached in the body tissue, the shocks also occur. This condition is treated as soon as possible if not, it may lead to organ failure, and may cause death. Shock becomes worse by fear and pain of victim.

First Aid for shock:
- If possible, keep the victims in lying down position.
- Raise the legs 10-12 inches from the ground level unless you suspect a injury in back and bone.
- If the victim is feeling cold then cover him. If the victim is feeling hot then don't make suffocation by covering him.
- If the victim starts vomiting then move the victim to the suitable place.
- Loosen the tight clothing.

Muscle Cramps
- Stretch out the affected muscle of the victim to counterbalance the cramp part of the body.
- Firmly massage the cramped muscle.
- Apply some kind of moist heat on the affected area.
- If the cramp remains in the muscle, get medical help as soon as possible.
- Rest- avoids movements and activities that cause pain.
- Apply the ice on the cramped muscle it may reduce the pain and swelling of the muscle.
- Applying the light compression like elastic bandage on the affected area may reduce the swelling.
- Raising the affected area above the heart level may reduce the swelling as well as pain.

Fractures

As we all know about the fracture that is the crack or break in the bone.

Dislocation

A dislocation occurs when the bone slips out from the specified location. It generally occurs in the shoulders, thumb, elbow, fingers, lower jaw and other movable joints.

First Aid for Dislocations & Fractures:
- Immobilize the effected part.
- Stabilize the effected part
- Use a cloth as a sling.
- Use board as a sling.

5.1.4 First Aid

First aid is the assistance given to any person suffering a sudden illness or injury with care provided to preserve life, prevent the condition from worsening, or promote recovery.

Kits vary in contents but most kits have the following items:

- Band-aids / Adhesive bandages
- Gauze pads and tape
- Scissors, cold pack
- Wound bandage / compress
- Eye pads / eye wash solution
- First aid / burn cream
- Antibiotic ointment
- Face shield or barrier mask for providing CPR
- Forceps / tweezers
- Disposable thermometers
- First aid instruction booklet

5.1.5 Personal Protective Equipment's (PPE)

Personal protective equipment (PPE) refers to protective clothing, helmets, go   ggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The safety by protective equipment includes electrical, heat, physical, biohazards, chemicals, and airborne particulate matter.

Figure 5.1.3 Personal Protective Equipment's

In the workplace, there are many situations which require immediate first aid to the victim and many countries have made some regulation, legislation, and guidance which specify the minimum level of first aid to be given to the victim. For this, the worker needs the special training and area for achieving the immediate first aid. Go achieve this, the training should be given by specialist first aid officer and necessary training given by learning institute. The training of first aid does not need any type of specific tools and equipment but may involve the improvisation with material offered at the time of training.
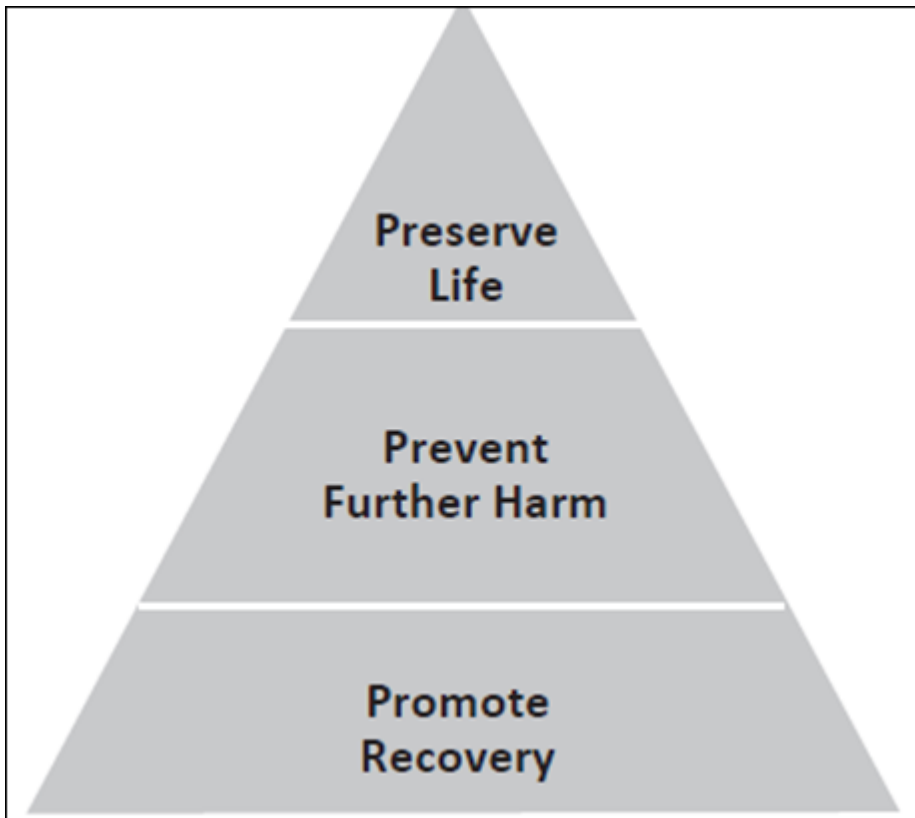
Figure 5.1.4 First Aid pyraimid

While delivering First Aid always remember:
- To prevent from degradation.
- Act deliberately and confidently with the victim.
- The timings of Golden Hour should be first 60 minutes from an accident .
- The timings of Platinum Period should be first 15 minutes following an accident.
- Prevent the body shock and choking.
- Stop bleeding from the wound.
- Loosen the clothes of victim.
- Regulate the respiratory system of the victim.
- Avoid crowding near the victim.
- Take the victim to safe place or hospital near the workplace.
- Attend the emergencies situation with ease and without fear.
- Always remember to not overdo. Because the person giving the first aid is not doctor.

Exercise

1. Discuss some general safety rules for working in the workshop.

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2. What is PPE and are the common components of PPE?

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3. What is an accident and what are the types of accidents?

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4. Discuss the types of fire-extinguisher and their uses?

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5. Write a short note on health and hygiene?

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6. What are the common components of First-Aid kit?

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7.   What are the symptoms of shock and what should be the first-aid?

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8.   What are the symptoms of heat exhaustion and what should be the first-aid?

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