EXPOSURE
With Natural and
ArtificialC ontinuous Light

GUIDE

Ontario Police College
Identification Training

Module P-5

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Douglas S.B. Johnston
Subject Coordinator

Graeme B. George
Course Coordinator

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INTRODUCTION

RATIONALE

Identification Officers photograph still and moving subjects under continuous light of varied intensity. In this module you will learn to use the built-in and hand-held exposure meters for subjects illuminated by continuous light, learn the characteristics of and apply different metering methods, choosing exposures that stop action and compensate for reciprocity failure.

PREREQUISITES

- P-1, 2, 3, 11,8, 4, 16

WHAT THIS MODULE CONTAINS

- GUIDE - this booklet, a resource guide
- ACTIVITIES - the booklet of practice activities
- ACTIVITY CHECK-OFF SHEET - a progress report
- CRITERION TEST - a test instrument

HOW TO WORK THROUGH THIS MODULE

- read the objective to discover what you will attain for your efforts
- gather the resources listed in this guide
- examine the Criterion Test to learn how you will provide evidence of attaining the objective
- start reading this guide and follow written instructions

The material in the Guide and the Activities booklets, although integral parts of this training package, are by no means adequate by themselves to ensure success. Study the resource material. The resources have been carefully selected for their relevancy to the objective.

THINGS YOU WILL NEED

- tripod
- 35mm camera kit
- photographic gray card
- shutter release cable
- hand-held exposure meter

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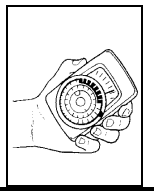

OBJECTIVE:

Given camera, film, accessories, video and written materials, at the end of the session the student will be able to determine continuous light exposures for moving and still subjects to the extent that the student will: choose a shutter speed appropriate to stabilize the photographic image; properly employ various incident and reflected light metering methods; effectively deal with reciprocity failure; analyze negatives for their desirable characteristics; as evaluated by the facilitator.

KEY CONCEPTS:

- set film speed
- reflected-light readings: meter pointed at subject to read light reflected from subject
- incident-light readings: meter pointed at light source to read light falling upon subject
- hand-held meters: exposure data presented, decide on camera settings and transfer to camera
- built-in meters: display data in viewfinder, null brightness scale
- effect of light on film
- elements and significance of characteristic curve
- reciprocity: relationship between shutter speed and aperture
- equivalent exposures
- reciprocity law failure
- exposures to reduce camera movement, stop action, blur action, control depth of field
- auto exposure and focus overrides
- backlight compensation
- effects of under and overexposure on shadow detail, mid-tones, highlights and contrast
- desirable characteristics of negatives
- metering methods:
    - incident
    - average/overall
    - range-of-brightness
    - exposing for shadows/highlights
    - gray card

RESOURCES

Video: *On Assignment: Photographic Light*
(Cassettes #3 & #4)
Exposure Control
Measuring Light
Reflective Metering
Spot Metering
Incident Metering
Tonal Control
Film Latitude
Challenges

Book: *Nikon F-601 Instruction Manual*

Book: *Introduction to Photography*

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Book: *Photography, Art And Technique*

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The Effect of Light on Film	120
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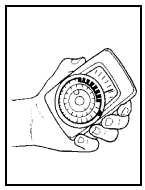

You will find it helpful to have your hand-held light meter, 35mm camera and their respective manuals available as you study this module.

You studied film speed in the module, *Photographic Emulsions*. Film speed plays an important role in exposure. If you need to review film speed, you will find it in both course text books. Consult your manuals for setting film speed on hand-held and built-in meters.

You became acquainted with shutters and apertures in the module on *Camera Controls.* Now, we will look at their relationship and how we make use of it. This may be an oversimplification but you might think of the aperture as the control over depth-of-field and shutter speed as the control over image movement. If depth-of-field is not a concern, as in the case of a two dimensional subject, then any aperture could be used with the appropriate shutter speed for correct exposure. If the subject is moving, consider first, the shutter speed (select one which is sufficiently fast to stop the action) then choose an aperture which, combined with the shutter speed, will provide proper exposure. Where neither the subject nor photographer are moving, then faster shutter speeds are irrelevant.

Camera stability is required during the time of exposure. For hand-held photography, where the subject is motionless, the rule of thumb is the shutter speed should not be slower than one over the focal length of the lens. The slowest shutter speed recommended for hand-held photography using a 60mm lens then is $^{1}/60$ second. For a 400mm lens it is $^{1}/400$ second, practically, the closest shutter speed is $^{1}/500$ second. For slower shutter speeds a camera should be mounted on a solid support. If the subject is in motion, you still need to use faster shutter speeds to eliminate blur of subject movement. Some people delight in telling others about how they do hand-held photography at very slow shutter speeds. This is bravado. The point is that irrespective of muscle control, things like wind and even the blood pulsing through your arteries may be enough to blur an image at very slow shutter speeds. Slight camera movement may be hardly discernible when examining a negative but the greater the enlargement, the more pronounced the blurring becomes.

Aperture, which also controls the intensity of light striking the film, and shutter speed, affect exposure and therefore both are considered in the equation:
Exposure **= I**ntensity **x T**ime.

Study pages 91-96, *Introduction to Photography* and complete Activity One.

Aesthetics have little or no place in forensic photography but there are challenges and skills shared by the artistic and the forensic photographer. Whether you are photographing a subject in colour or in black-and-white, to obtain the exposure best suited for its intended purpose, it is helpful to develop the ability to previsualize a subject's monotone rendition; see the subject for its range of brightness not colours. The exposure meter cannot distinguish colours. It is sensitive to light! It is not always easy to transpose mentally a colour to a brightness value. It will take some practice. This will be one of our challenges.

Why do we concern ourselves with a subject's brightness range when we have cameras with built-in automatic systems? The short answer is, the point-and-shoot method may produce results acceptable to friends and family of the weekend photographer but evidence photography often requires the photographer to make critical choices based on knowledge and experience. The intent of this module and others to follow is to guide you to sources of knowledge and provide you with a means to gain experience. To start, we will ignore the automatic features on your camera. You will use a hand-held meter and the built-in meter on your camera in manual mode. Learning the manual method will enable you to recognize the pitfalls of the automatic system.

Now, study pages 100-105, *Introduction to Photography.*

Near the end of page 103, the author speaks of the subject's range of brightness and a film's exposure latitude. Films vary in their exposure tolerances but many are capable of recording, with detail, a subject that ranges in brightness as much as seven ƒ-stops from its darkest to brightest areas. Anything darker or brighter will not record with detail.

A scene or subject with such a brightness range would occupy the entire straight-line of the characteristic curve. Therefore, precise exposure is required to locate mid-tones midway on the straight-line and the brightest area below the shoulder and the darkest above the toe. Not all subjects exhibit a brightness range as great as seven stops. This leaves a portion of the straight-line unused. Some shifting of the exposure up or down the straight-line is then possible. In other words, it will accommodate some over or underexposure while it may still produce an acceptable print. Negative film may be overexposed as much as three stops and produce acceptable results. The film is less forgiving for underexposure, however, and the results are generally unsatisfactory beyond one stop of underexposure. Colour positive (slide) film has the narrowest exposure latitude of not more than ±½ ƒ-stop.

Recognizing that a film has some exposure latitude, does this mean that we need not be precise in calculating exposure? No! Consideration for the brightness range within the scene and what the important elements are within that scene determine how we calculate exposure to obtain negative densities that will reproduce what we have previsualized.

When you have finished studying the text book selection, complete Activity Two.

All light meters, incident and reflected, hand-held and built-in, are designed to provide an adequate exposure of a subject of average brightness, i.e., having 18% reflectance. The photographic gray card is such a subject. This standard works extremely well if the subject to be photographed is of average brightness. If the subject is not of average brightness, then we may have to make corrections to the indicated exposure.

Study pages 105-112, *Introduction to Photography*.

If it had cognitive powers, an incident light meter would know nothing about the brightness of the subject because it is pointing away from it in the direction of the camera to measure light incident on the scene. If the subject is of average brightness (reflecting 18% on average), the indicated exposure will be satisfactory. If the subject is brighter or darker than average, the indicated exposure will reproduce it brighter or darker than average.

A reflected light meter is pointed at the subject and aligned with the camera lens axis. It measures the light reflected from the subject and *assumes* it is of average brightness. The exposure it indicates will reproduce the subject with average brightness whether the subject is of average brightness, very dark or extremely bright. If the scene were of bright snow-covered mountains or a bright sandy beach, your scene will be reproduced as mid-tone, greatly underexposed. The exposure requires correction for the fact that the reflected light being read by the meter is brighter than average. How would you correct it? Read on, and see if you can answer this yourself.

We are not going to study the Zone System in this module but let's look at page 393 in *Introduction to Photography.* There is some material here that may help us. Middle gray is represented by the Roman numeral V. The table above the pictures describes the brightness values for each zone. You will notice that each zone is separated, from the one adjacent, by one *f* stop.

Pictures A and C differ greatly in their *range of brightness* but, on average, each probably reflects 18% of the incident light. If true, then all of the following methods would produce the results we see illustrated:

- *incident* metering method, page 104
- *average/overall* metering method, page 105
- *range-of-brightness* metering method, page 110
- *exposing for highlights* metering method, page 110
- *gray card* metering method, page 111

Obviously, the *exposing for shadows* method would not produce the result in picture C.

Complete Activity Three.

NOTES