Sound and Image Design
Year 2, Semester 1
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DIGITAL VIDEO PRODUCTION

TECHNICAL RESEARCH SEMINAR ASSIGNMENT:
ACCOMPANYING REPORT (1158 words).

Chosen subject:

DEPTH OF FIELD

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Contents Page.

Page 1 : BRIEF

INTRODUCTION

AIMS AND OBJECTIVES

Page 2 : WHAT IS DEPTH OF FIELD?

THE RELATIONSHIP BETWEEN DEPTH OF FIELD, APERTURE AND SHUTTER-SPEED

-aperture / depth of field priority

Page 3 : -shutter-speed priority

Page 4 : DIGITAL VIDEO RECORDING

FOCAL DISTANCE AND FOCAL LENGTH

Page 5 : BIBLIOGRAPHY

APPENDIX

Brief.

1. To research my chosen subject of depth of field and prepare a five-minute seminar presentation for the class. I should include diagrams, illustrations and handouts to aid my presentation.

2. To present my research in a 1000 word accompanying report. I should hand in my report in A4 printed form through the use of Adobe 'Indesign'. In the report I should include diagrams and images to illustrate the points I make.

Introduction.

Within any form of photography, exposure quality and indeed the appropriateness of your desired exposure has to be considered foremost. The physical variables that can affect this (beyond your decision of film/resolution and development) are choice of lens, focus setting, lighting, shutter-speed setting and aperture setting. Depth of field is an element of image creation that is dependant on all the values of the variables mentioned above.

Depth of field is an essential consideration in any type of photography, be it still or motion photography. It can be used to draw focus upon a subject, essentially isolating what the viewer is looking at and consequently concentrating on. It can alternatively be used for such compositions as an establishing shot, where the photographer would wish the viewer to see a whole scene in detail.

Aims and Objectives.

Activities.

My report and presentation will follow a logical learning path, leading to an in-depth understanding of depth of field, how it is achieved, and how it can be applied through all forms of photography. I shall initially explain the application and adjustment of depth of field from a still photography point of view (be it film-loaded or digital). This explanation has relevance when considering that it is a good basis for an understanding of photography techniques on a whole, and also helpful in expressing the limitations for the application of depth of field within motion photography.

Exclusions.

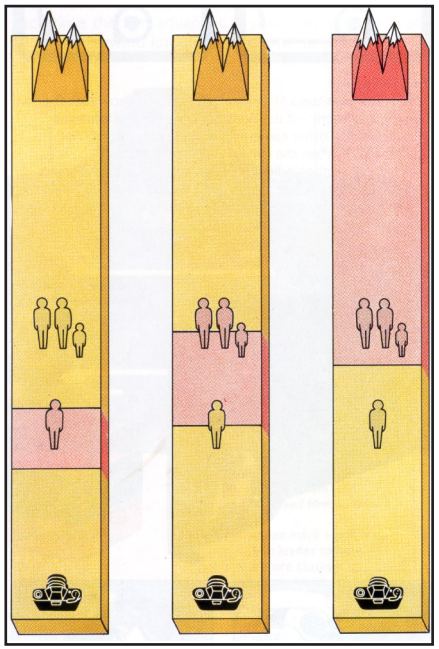
Within my presentation I have not included digital video examples of my chosen subject due to lack of hardware resources. I have, however, included examples of depth of field through still photography to aid my presentation.

What is Depth of Field ?

Depth of field is the area between the furthest distance both in-front of and behind the true focal point, that is perceived as sharp and acceptably in-focus. Objects outside of the depth of field are out of focus. In most cases, the depth of field extends one-third of its distance in front of the focal point, and two-thirds its distance behind the focal point.

The extent of the depth of field within an image is dependant on:

Aperture setting of the lens;
The distance of the true-focus subject from the camera lens;
The focal length (zoom) of the lens;



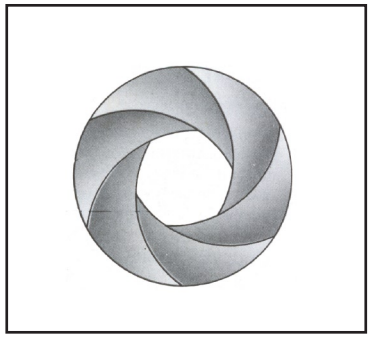
f2 f5.6 f16

The red band in this series of images depicts the depth of field achieved at a variety of aperture settings, responsive to a 50mm lens.

The relationship between depth of field, aperture and shutter-speed.

Aperture/Depth of Field priority.

When thinking about an aperture setting, the initial consideration is that the wider (more open) the aperture is (ex.f2), the shallower the resulting depth of field will be. Conversely, the smaller the aperture is (ex.f16), the greater the resulting depth of field.



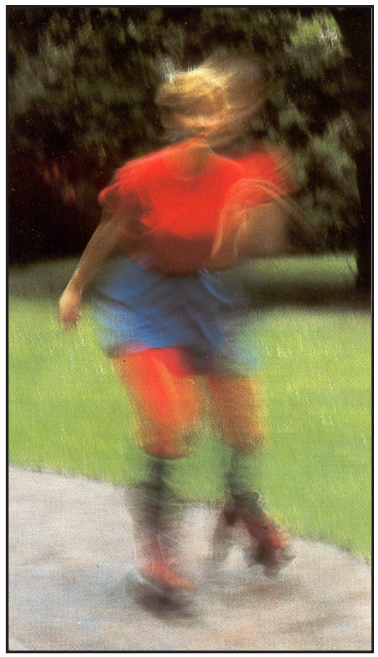
The aperture.

When accommodating a wide aperture, the shutter speed needs to be fast in relation to this to compensate for the increased amount of light that is being allowed into the lens (if it was not, the result would be over-exposure). The depth of field is shallow in this instant because the lens has had a very short amount of time to accept the light content of the image to the storage medium (be it directly to film), or the conversion device to tape. Hence the blurred, ‘out of focus’ areas that are outside the depth of field.

When accommodating a smaller aperture, the shutter speed needs to be slower to compensate for the reduced amount of light entering the lens. In terms of depth of field, the shutter gives the lens more time to accept the detail of light within the image, therefore creating a greater depth of field.

Shutter-release priority.

In terms of aesthetics, a fast shutter speed is used in still photography in order to capture sharp images of moving objects, whereas a slow shutter speed is used to create a blurred effect of moving objects. In this respect, the use of a fast shutter speed would require a large aperture to compensate for the reduced amount of light going into the lens (reducing the depth of field), and for slow shutter speed would need a smaller aperture to accommodate for the increased amount of light entering the lens (increasing the depth of field).



A slow shutter speed (1/30) creates a very blurred motion.

A medium shutter speed (1/125) creates a slightly sharper image, although the subject's hand and feet are still blurred .

A very fast shutter speed (1/500) captures a very sharp image.

Digital Video Recording.

When considering a digital video camera / camcorder, the principles are a little different because you are dealing with recording and recreating continuous motion images. In considering the advantages of a variable shutter-speed, there would be little reason to create the illusion of movement as achieved in still photography. In fact the idea of having a variable shutter speed on a camcorder becomes problematic because if you could adjust the shutter speed you would jeopardise the illusion of motion, and the established format; that of 25 or 30 fps. It is for this reason that most camcorders have a fixed shutter-speed of 1/50th sec, or faster (the shutter speed is faster than 25/30 fps to allow time for the image to be processed).

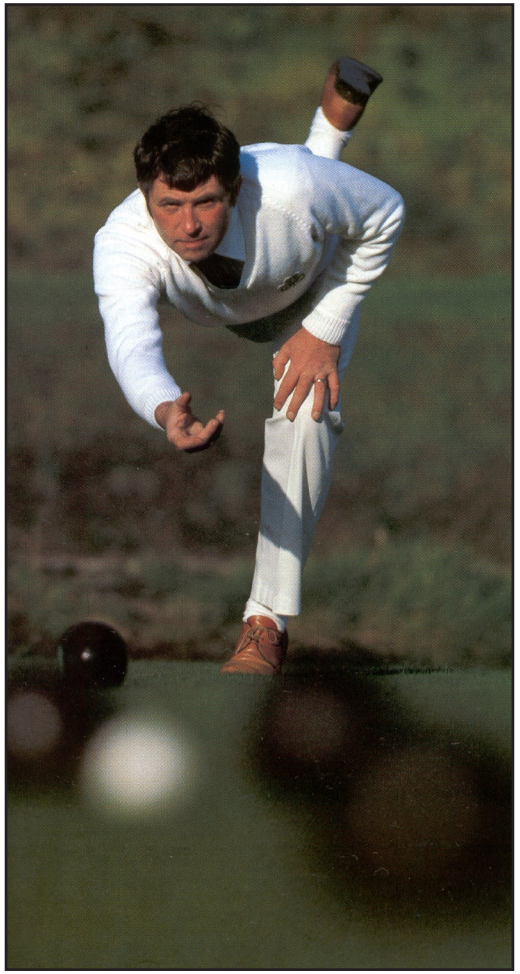
As most camcorders do not have a variable shutter release speed, the majority also do not include a variable aperture. This is because the exposure relationship does not apply to the aperture if there is no variation of shutter-speed. Also, if a traditional f-stop aperture were applied to the lens of a camcorder, a variation through recording would produce an obvious series of exposure differences. The effect of which would not fit into conventional camera work. Since the majority of camcorders do not have an aperture, the depth of field can only be controlled by your choice of focal distance and focal length setting.

Focal Distance and Focal Length.

The distinction of these factors is that the focal distance is the distance that your subject (within true focus) is from the video camera lens. Whereas the focal length is the focal setting (the amount of zoom-in) that has been applied to the lens.

The greater the focal distance (the farther away from the subject that you stand), the greater the focal length of the lens can be extended. This extension of the lens (the zoom) requires a larger aperture and therefore the combination of the two creates a shallow depth of field.

This function can be very useful if you are filming outside on a bright day and you need to achieve a shallow depth of field. However, it can become problematic if you need to record sound from your subject. Creating a large depth of field incorporating a large focal length is impossible unless you are using a special ‘Long-focus’ lens.



Right: An example of the use of a 200mm telephoto lens to produce a distant shallow depth of field.

Bibliography.

Books:

Hedgecoe, John. ***Complete Guide to Video***. London: Collins and Brown Ltd, 1992.
Hedgecoe, John. ***The Photographer's Handbook***. London: Ebury Press, 1992.
Lewis, Roland. ***Learn to Video in a Weekend***. London: Dorling Kindersley Ltd, 1993
Tresidder, Jack. Ed. ***The Complete Kodak Book of Photography.*** London: Mitchell Beazley International, 1994

Websites:

http://www.adamwilt.com/DV

Appendix.

Lighting.

Additional lighting sources will be required if you are filming indoors and require a large depth of field. Many video cameras include a 'gain' facility that can boost the apparent amount of light / exposure within an image. However, I strongly recommend avoiding this as this function results in a decrease in colour saturation and an overall degradation of image quality.

Macro Feature.

If you need to focus on anything closer than a 1m focal distance, you will need to use a macro lens feature (incorporated in most video cameras). However a macro feature incorporates a very shallow depth of field. Depending on the model of camera, you will probably need to manually focus your shot, as the auto-focus feature may not be possible with a function of this type.