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WOODS HOLE OCEANOGRAPHIC INSTITUTION

TECHNICAL MEMORANDUM NO. 10-70

EVALUATION OF MOVIE LIGHTS FOR
USE ON D.S.R.V. ALVIN

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WOODS HOLE, MASSACHUSETTS

WHOI Tech.
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Woods Hole, Massachusetts

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EVALUATION OF MOVIE LIGHTS FOR
USE ON D.S.R.V. ALVIN

by

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Woods Hole Oceanographic Institution

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I

P R O B L E M

Evaluate and compare the color reproducing ability of the new Hydro Products 400 watt dysprosium-thallium quartz iodide lamp, (D.T.I.) and the standard 750 watt E.G. & G. quartz iodide lamp which has been used on the D.S.R.V. ALVIN. Also, determine, whether the flat white parabolic reflector used by Hydro Products is an improvement over the silvered conical reflector which has been used on Alvin.

II

P R O C E D U R E

A light test frame was constructed by attaching legs to a twenty foot section of aluminium tubing. The tubing was then calibrated by painting one foot sections alternately black and white. See fig. #1. The light stand holding the test lamp was positioned three feet to the left and five feet above the aluminium bar. The lamp was then aimed at a point about seven feet down the black and white bar.

Mounted on the aluminium tubing, was a white placard with red, yellow and blue color patches painted on it. The placard could be clamped anywhere along the bar and was placed at three foot intervals for each lamp test. The distances used in the test were from a close setting of three feet to a far setting of twelve feet. Two Nikonos underwater cameras were used during the test. One loaded with Kodak Plus-X black and white film (ASA 160) and the other with High Speed Ektachrome color reversed film (ASA 160). All the pic-

tures shown here were taken at a shutter speed of 1/60 second and a diaphragm setting of f2.5. The B&W film was then processed and enlargements were made. (Fig. #2). All of the B&W prints were made at the same enlargement and were exposed and developed for the same amount of time. The color was sent to Kodak for standard machine processing.

I feel I should preface the results with an explanation for using a 400 watt lamp and a 750 watt lamp. The main purpose of this test, as stated before, was color rendition. It was the color of the light produced and the colors seen by the film which mattered.

III

R E S U L T S

The results of the color test showed that for best rendition, the quartz iodide lamp in a flat white parabolic reflector gave the best color quality. The quartz iodide lamp in a conical silvered reflector was next and then the D.T.I. lamp in its standard flat white parabolic reflector. All three color patches, red, yellow and blue, showed up clearly at nine feet using the quartz iodide lamp in either reflector. The wider angle coverage and lack of a "hotspot" with the flat white reflector made it an easy first choice. This reflector seemed to help cut backscatter also. The D.T.I. lamp, even at three feet, turned the red patch a dark brownish red. The yellow patch had a green tinge, and the blue went very dark and muddy. Color slide dupes are available to interested parties.

In the B&W test the D.T.I. lamp produced excellent grey tones and had the greatest penetration. Next, and very close to the D.T.I. lamp was the quartz iodide in the flat white reflector. The silvered cone reflector produces a spotlight effect which for our motion picture purposes is unsatisfactory.

A side note here which I feel I should mention is that, to me, as a diver, the D.T.I. lamp seemed to put out a light of excellent quality and all colors looked "right", even the red. The film just did not see it that way.

IV

R E C O M M E N D A T I O N S

1. For accuracy of color and even light output, the quartz iodide lamp in a flat white parabolic reflector should be used. It is my opinion that two of these lamps mounted near the observers port on Alvin will give good results for color movies, out to at least fifteen feet, maybe more.
2. Where color accuracy is not a prime requisite, two D.T.I. lamps could be used. These lights could also be used in conjunction with B&W movies or a TV system.
3. Where just B&W work is being done, film or tape, or where just observing is being done, two D.T.I. lamps would provide good results. Better results could be gotten from the thallium iodide lamp which was not included in this test, but which I have seen in operation. It is, in my opinion, the best TV and B&W movie lamp available at this time.

I would like to thank the Alvin Group in general and George Broderson, George Gibson, William Page and Warren Webert in particular for their encouragement and assistance during this test.

Fig. 1. Underwater Test Frame

3 FT

6 FT

9 FT

12 FT

DYSPROSIUM THALLIUM IODINE

3 FT

6 FT

9 FT

12 FT

QUARTZ IODIDE, NEW REFLECTOR

3 FT

6 FT

9 FT

12 FT

QUARTZ IODIDE, OLD REFLECTOR

Fig. 2. Black & White Photo Results