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A STUDY OF THE DURABILITY OF GLASSES, SUN, N-1, CONTRACT NUMBER--ETC(U)

AUG 45 S ROSS, C G MUELLER

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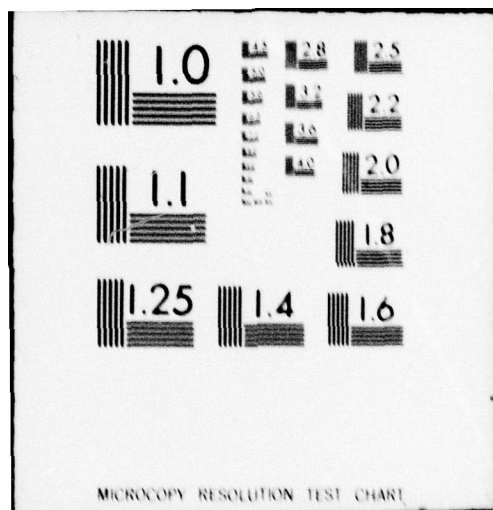
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A STUDY OF THE DURABILITY OF GLASSES, SUN,  
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M & S Research Project X-583 (Av-301-p),

Number

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OBJECT

To study the durability of Glasses, Sun, N-1, Contract No. NXaX-66844.

SUMMARY

↘ Ninety-six pairs of sunglasses were issued to enlisted Marine Corps personnel for general field use at Camp Lejeune, N. C. The men were instructed to wear the glasses as much as possible while they carried on their regular training activities in bivouac areas.

The glasses were examined every week. The scratches on the plastic filters were rated, breaks and fractures noted, and the comments of the subjects recorded.

After seven weeks of use 48 percent of the glasses issued were rejected for further use because of the extensive damage. Rejection was determined by a double criterion: (1) unwillingness of the subject to wear them longer, and (2) rejection rating by the experimenters. No pair of glasses was rejected unless it met both of these criteria. Twenty-three percent of the glasses were still in use, although 91 percent of these were severely scratched. Twenty-one percent had been lost, and eight percent were on hand. ↗



Two types of damage to the lens were observed. These were damages resulting from contact between (1) the lens and the temple bend and (2) the lens and sand which was forced against the lens (due to the flexibility of the case).

### CONCLUSIONS

1. Major damage to the glasses results from relatively short periods of use. The most noticeable types of damage were: (a) scratching of the plastic lenses and (b) spreading of the temple pieces due to loss of curvature of the brow piece.

2. Damage appears to result primarily from insufficient protection for the glasses while in the case.

3. If this experimental test is comparable in severity to field use of the glasses, then it would appear that the replacement rate for seven weeks of use would be about 70%.

### METHODS & MATERIALS

#### Test Procedure

Sunglasses (N-1, Contract NXsX-66844) were issued to 96 men in training at Tent Camp, Camp Lejeune, N. C. The instructions enclosed in each case were emphasized verbally.

The subjects were told to wear the glasses as much as possible and to estimate the number of hours of use.

Figure 1 shows the data sheet used for recording the condition of each pair of glasses. The lenses of the glasses were divided into ten areas to aid in localizing the damage. The glasses were inspected every week, at which time each area was rated as to scratches. The three rating values used corresponded to the following conditions as judged by the experimenters.

<u>Rating</u>	<u>Condition</u>
1	Good condition
2	Moderately to badly scratched
3	Severely scratched, almost opaque

All gross changes such as fractures, discoloration and breakage were recorded. The subjects were encouraged to comment and to express their opinions of the glasses.

### RESULTS

Marked changes in the glasses result from fairly short periods of use. Photographs in the Appendix show the extent of these changes in several representative glasses. At the end of seven weeks, the study was terminated. Of the 96 pairs of glasses issued:



1. 46 pairs had been rejected by the subjects because of scratches or discomfort or general dislike of the glasses and had been rated by the experimenters as not fit for reissue. Of these 46 rejected glasses, 20 were rated by the experimenters as badly scratched and unfit for reissue, while 25 were rated as severely scratched and beyond consideration for any use. The remaining pair was broken.

2. 20 pairs were lost.

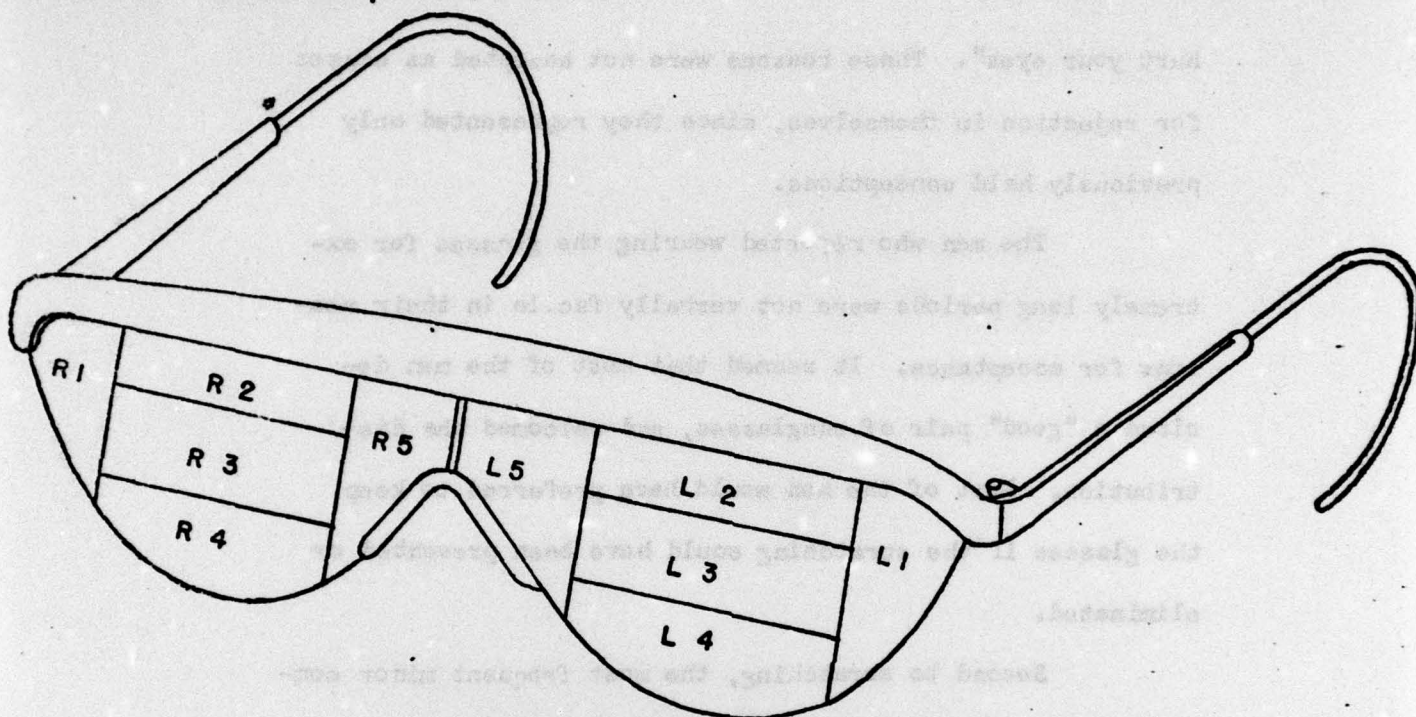
3. 22 pairs were still in use at the end of the test period of seven weeks. Of these 22 pairs, six had been rated by the experimenters as badly scratched, fourteen were rated as severely scratched. The remaining two pairs still in use were rated by the experimenters as in good condition.

4. Eight of the 96 pairs were on hand, having been rejected by the subjects the previous week or collected for other reasons, but rated by the experimenters as fit for reissue.

Although the major reason for rejection of the glasses was the scratching of the lenses with subsequent blurring of vision, several comments were made by the subjects. These comments included such statements as: "I don't like to wear any glasses"; "Can't see so good with them"; and "Sunglasses

NAME OF SUBJECT; \_\_\_\_\_

GLASSES NO. \_\_\_\_\_



### RATING OF SCRATCHES

WEEK	1	2	3	4	5	6	7
HRS. WORN							
R1							
R2							
R3							
R4							
R5							
L1							
L2							
L3							
L4							
L5							

SCRATCH—Sc. FRACTURE—Fr. DISCOLORATION—DI.	COMMENTS;	RATE SCALE 1.GOOD CONDITION 2.MODERATELY TO BADLY SCRATCHED.. 3.SEVERELY SCRATCHED
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FIGURE 1.



hurt your eyes". These reasons were not accepted as causes for rejection in themselves, since they represented only previously held conceptions.

The men who reported wearing the glasses for extremely long periods were not verbally facile in their reasons for acceptance. It seemed that most of the men desired a "good" pair of sunglasses, and welcomed the distribution. Most of the men would have preferred to keep the glasses if the scratching could have been prevented or eliminated.

Second to scratching, the most frequent minor complaint was that of perspiration. This complaint was directed mainly at the "brow rest" which presented the greatest area of contact between the frame and the skin.

Although none of the subjects reported any difficulty with the flattening of the bridge (resulting in the spreading of the temple pieces), this characteristic was evident in most of the glasses examined.

#### DISCUSSION

The characteristics of the case seemed to be the most important single cause of damage. In normal use, the case collects sufficient amounts of sand to result in scratch-



ing of the lenses while the glasses are in the case. This abrasion is enhanced by the flexibility of the case. At the beginning of the experiment one subject inserted a piece of tissue paper in the case to protect the lenses. This pair of glasses showed less damage than any other pair of glasses issued and except for one area of the lens was in good condition at the end of the test period.

The 46 glasses classified as rejected in the above list were those glasses which were rejected by the subject and also classified as not fit for reissue by the experimenters. One of these criteria alone was not sufficient to cause classification as rejected. If the rating system alone had been used as the determining factor many more of the glasses would have been rejected. At the end of seven weeks 88% of 73 glasses not lost were classified as badly scratched. This means that if we had used our rating as a criterion, in addition to the criteria of loss and breakage, 91% of the glasses issued would have been expended in the seven week period.

The flexibility of the case also contributed to the extensive scratching in the regions where the temple pieces were forced against the lenses.

From the results of this study it would appear that the case for these sunglasses should be modified to include:

1. Some provision for protecting the lenses against scratching by the temple pieces.

2. Added rigidity and added protection against ingress of foreign material such as sand in order to reduce lens-case abrasion.

3. Some means of clipping the case onto the regulation belt in an attempt to decrease the number lost and for convenience of carry.

In addition to the changes in the case proper, it seems advisable to apply a hard protective coating to the lenses. Some new coatings have been reported which may be more durable than the lenses themselves. If these coatings are effective and permanent, they should markedly reduce the scratching.

In order to minimize the flattening of the bridge with resultant spreading of the temple pieces, further strengthening of the "brow-rest" is necessary.

One subject reported that he would have preferred a smaller size pair of glasses, with a greater curvature. It may well be that for general service use, two or more sizes should be produced.



# APPENDIX

The following photographs show some representative glasses after seven weeks of use.

A030 - Severe fractures on both lenses. Severe scratching of lenses.

A049 - Fracture on right lens. Generalized scratching of lenses.

A050 - Severe scratching of lenses.

A095 - Minor scratching.



