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PROJECT NO. 7 - NIGHT VISION FROM TANKS

Report On

Sub-Project No. 7-5, Establishment of Criteria and Methods for the
Selection of Crews for Night Operations.

SUBJECT: A PROGRAM FOR THE IMPROVEMENT OF THE NIGHT-
SEEING-ABILITY OF GROUND TROOPS

Project No. 7-5

INFORMATION COPY

31 May 1944

ARMORED MEDICAL RESEARCH LABORATORY
Fort Knox, Kentucky

Project No. 7-5
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31 May 1944

A PROGRAM FOR THE IMPROVEMENT OF THE
NIGHT-SEEING-ABILITY OF GROUND TROOPS

1. PROJECT: No. 7 - Night Vision from Tanks; Report on Sub-Project 7-5 - Establishment of Criteria and Methods for the Selection of Crews for Night Operations.

a. Authority: Letter, Commanding General, Headquarters Armored Force, Fort Knox, Kentucky, 400.112/6 GNOHD, dated September 24, 1942.

b. Purpose: To establish a practical, usable program which will make possible better seeing for men engaged in ground night operations.

2. DISCUSSION:

The offensive and defensive tactical advantages to be gained from night operations are apparent and have been partially exploited in certain theaters. In order to further exploit the potentialities and to increase the effectiveness of night operations it will be necessary to improve the night-seeing ability of the men so employed. This can be done by selection, education and training of troops and by supplying them with night visual aids. These three aspects must be integrated to achieve the end desired.

a. Selection - The success of night operations, whether essentially simple, as night sentry duty, or complicated, as a night attack in strength, depends primarily upon the ability of the men involved to see well at night. Men vary greatly in this respect and, since the success or failure of a night operation may be greatly influenced by the night-seeing ability of key men, it is desirable that the relative capacities of men in a command to see at night be known, so that the superior men can be chosen for the key positions during the operation or, conversely, the men with poor vision be given jobs of lesser responsibility not requiring superior night vision.

b. Education and Training - Night-seeing ability can be developed and spectacular improvement obtained with simple explanations and minimal training. Elaborate equipment is not required and the training fits in naturally with regular night tactical training. Not only does the program of training and education improve night seeing ability as such, but it also implants confidence in place of the feeling of strangeness and confusion commonly associated with night operations. This laboratory is investigating the more subtle aspects of training and use of educational aids for improvement of night-seeing but it is felt that sufficient knowledge is now at hand

to justify the adoption of a simple training and education program as part of the regular night tactical indoctrination program which will substantially improve night combat efficiency.

c. Night Vision Aids - Red lighting for tanks and other vehicles, red filters for flashlights and red goggles are essential to maintenance of dark adaptation which is essential to the best night-seeing ability and should be made available to men engaged in night operations. Sights and sighting equipment should be designated with night operations in mind. Reference is made to reports from this Laboratory--Sub-Project No. 7-2 and 7-3 "Interior Lighting of M4 Tanks" for further details of these aids.

3. CONCLUSIONS:

a. Soldiers properly selected for their superior night-seeing ability, who have been thoroughly trained in the use of the eyes at night and who are equipped with effective aids to preserve dark adaptation, will be able to accomplish many night missions which are now considered excessively difficult or impossible.

b. Selection of men on basis of night-seeing ability is possible and practical.

c. Education and training to improve night-seeing ability is possible, practical and relatively simple.

d. Night visual aids are necessary for efficient night operations.

e. A program to supply the benefits of selection, education and training, and night visual aids to ground troops in all theaters should be inaugurated.

4. RECOMMENDATIONS:

a. That an organization with authority and personnel to select, train and educate men in the United States and overseas in the practical aspects of night-seeing be set up.

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(Appendix)

APPENDIX

It is recommended that an organization be established with authority and sufficient personnel to select, train and educate men in the U. S. and overseas in the practical aspects of night seeing. The magnitude of this proposal is fully realized but we are convinced that the recommended program is necessary to increase the efficiency of night operations as now carried out and that it is the essential key to the successful exploitation of the potentialities of night tactical operations. The following facts are basic to an understanding of the problem and for an appraisal of the present position:

1. Men vary greatly in their ability to see at night
2. The night seeing ability of all men can be improved by education and training.
3. Night visual aids are necessary to preserve dark adaptation when it is necessary to use light for map reading, etc.

At present, because of lack of preselection, men with deficient night vision are driving tanks and vehicles during blackout, being sent on night reconnaissance, assigned important night sentry duty or assigned as night lookouts. In many cases they occupy key positions in offensive and defensive night tactical operations. Selection by commanding officers through observation of inability of certain men to carry out their tasks is the only method now available for correction of the situation. Clearly a method of preselection on the basis of night seeing ability is badly needed.

Night seeing calls for full utilization of the capacity of the eye to see at low light levels. This capacity is not generally instinctively used and requires education and training for full utilization. The considerable experience now accumulated demonstrates clearly that marked improvement in this respect comes from proper training. Any improvement results directly in more efficient operation. Few men now in the Army have previously in civilian life had occasion to develop fully their night seeing ability. Woodsmen, guides and professional hunters have had the opportunity and generally do have superior night seeing ability but they are of course in the minority in the Army. Any commander who has attempted night operations will welcome the information that his men through education and training can be made to see better at night. Given better overall seeing ability he will be able to expand his night operations with confidence. Without selection and training he is definitely limited in the scope and dependability of such operations.

It is understandable why, during night operations, so many vehicles are run off the roads, why men easily become lost, and why enemy infiltration is possible through apparently well guarded lines. It is also understandable why night tactical operations are as limited as they are and why commanders are reluctant to employ night operations more extensively in spite of the advantage of surprise which is associated with all night operations and which is of such prime importance in all tactical operations. It is not suggested that

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after selection, education and training and supplying all necessary visual aids that no vehicles will be run off the roads or that men will not become lost or that complicated tactical operations will be uniformly successful. It can be stated however, that with selection, education and training and use of night visual aids more efficient performance of operations will be possible and should be expected. Further, it should be apparent that it is impossible to know how far night tactics can be developed until the men have been selected, have necessary night visual aids and have received education and training in the practical aspects of night seeing. In short, these are prerequisites to further development of night tactics as physical fitness is a prerequisite to combat efficiency.

Night operations are an essential part of modern warfare, the tactical importance of which is well recognized but which has never been fully exploited. Obviously, the problem of supplying the benefits of selection, education and training and supplying necessary night visual aids is an integrated one requiring careful coordination and prompt action to be of maximum use. Any program should be set up to provide all units with the required service as soon as possible and thereafter to be made an integral part of Ground Force training. To accomplish this, we specifically suggest:

1. That one (1) medical and one (1) training officer be assigned as a central group to act together with responsibility and authority to establish procurement of necessary equipment and to coordinate and expedite the inauguration and firm establishment of the program of selection, education and training and use of visual aids in all ground training centers in the U. S. and overseas. This minimum talent is necessary for an overall understanding of the problem and its translation into a workable program. If, in addition, an experienced tactical officer is included with facilities for experimentation the group would provide a unit which could substantially increase our knowledge of night tactics, its limitations and best employment.

2. Assign one (1) qualified officer with responsibility and authority to design and install necessary visual aids in armored vehicles and other weapons as needed. This officer would work in cooperation with the above group. The basic data are available for this work and such aids are now being installed in the M4 tank. The work should include the application of known principles to other vehicles.

3. Select and begin the training of teams to be sent to training centers in the U. S. and overseas to inaugurate the program. As visualized, these teams would be under the supervision of the central group and each team would be comprised of two officers whose mission would be to instruct, demonstrate and supervise the inauguration of the program in the various theaters of operation. One or two teams per theater would be sufficient. We feel that the teams are necessary to explain the objectives of the program and to obtain uniformity of training best adapted to the theaters. The reports from the teams will also serve to better the type of training literature and instruction emanating from the central group.

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4. Procure luminous plaques for selection tests* on initial basis of one per combat regiment. These plaques are standardized, simple and easily procurable.

5. Prepare and distribute training aids and literature and lecture material on basis to be recommended by central group. Sample training literature, lectures, etc. are available and will only require editing and putting into standard training literature form.

All information is available to put the program into immediate effect once the organization has been established. The program should be self-sustaining within each regiment after it is set up. It is suggested that regimental medical officer personnel make the selection tests and give education lectures and that line officers supervise the training.

* See Project 7-8 - Comparison and Evaluation of Field and Laboratory Methods of Measuring Night Visual Acuity dated 1 May 1944.

Chul

