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⑨ RESEARCH MEMORANDUM

⑥ IMPROVED SILHOUETTE TARGETS FOR MARKSMANSHIP TRAINING .

By

Staff, United States Army Infantry Human Research Unit
U.S. Continental Army Command

⑪ October, 1958,

⑫ 5 p.

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Approved:



PRESTON S. ABBOTT

Director of Research
US Army Infantry Human Research Unit

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Improved Silhouette Targets for Marksmanship Training

This report is the first of a series concerned with materiel developments incidental to the conduct of research by the Infantry Human Research Unit. On many occasions it is necessary to develop or modify training devices for the administration of experimental training or the measurement of its effects. This paper presents a discussion of the problems encountered as a result of utilization of silhouette targets for marksmanship training and the manner in which the targets were modified for research purposes.

Silhouette targets have been employed by the Army for the technique of fire training of squads and as pistol targets for many years. The standard Army issue silhouette target is constructed of cardboard with the shape of a human target in a prone or a kneeling position. The experimental training which was developed utilized silhouette targets for the individual and squad training under day and night firing.

During the conduct of Tasks TRAINFIRE and MOONLIGHT, years 1956 and 1957, a continual effort was made to improve the cardboard silhouette targets for use on Punchy Pete prototypes of the TRAINFIRE M13 target device. It was necessary to obtain a target silhouette figure for the TRAINFIRE I marksmanship and TRAINFIRE II technique of fire which was more resistant to the effects of weather

and, in addition, more durable under conditions of bullet strike. In the short range firing required in Task MOONLIGHT and the assault fire phases of TRAINFIRE II, it was essential to develop silhouette figures which would not register sympathetic hits by falling due to concussion or nearby bullet strike.

In the conduct of research on TRAINFIRE and MOONLIGHT XII, silhouette targets constructed of different types of material were used on the TRAINFIRE target devices. Targets constructed of fiberglass were employed in the administration of the TRAINFIRE program and targets constructed of hardware cloth were employed during the administration of the MOONLIGHT XII revised program in November, 1957.

As the targets are placed at very close distances on the MOONLIGHT range (17 to 70 yards), the usual E-type cardboard silhouettes could not be used. The muzzle blast of the rifle, within a range of 40 yards, against the cardboard target resulted in the activation of the target mechanism and the registration of a false hit. As a result, all targets were constructed of 16 gauge 1/4-inch mesh galvanized cloth. This material was cut to the standard E-type shape and dimension and covered with target cloth, painted a mottled black to dull the shine.

During the conduct of research, thirty fiberglass targets and ten 1/4-inch mesh targets have been employed. The relative

characteristics, as found by this Unit, for these two target types as compared with the standard cardboard are given below.

	<u>CARDBOARD</u>	<u>FIBERGLASS</u>	<u>1/4-INCH MESH</u>
Number Used	N/A	30	10
IHRU Cost	\$0.17	\$2.80 (limited production)	\$2.00 (limited production)
Durability against:			
(1) Nr Rounds	150 (in good weather)	+500 (without patching)	300-400 (without re-covering)
(2) Weather	Rapid deterioration with moisture	No effects	No effects
Repair	Non-repairable	Patch with liquid fiberglass	Re-cover with target cloth
Repair time		10 min/target	15 min/target

The prices quoted in the table may bear little relation to final production costs, as they reflect the costs for development at this Unit. Production costs may vary considerably higher as a result of manufacturers' charges. However, mass production of the targets may lower costs somewhat.

It can be seen from the above comparison that the relative initial cost for production of these two target types at this Unit was higher than that of the standard cardboard target, however, the durability of the fiberglass and the 1/4-inch mesh target in

terms of weather conditions and number of hits is correspondingly high, relative to the standard cardboard type.

The fiberglass and the 1/4-inch mesh target can endure considerably more bullet strikes than the cardboard targets. In addition, both the fiberglass and the 1/4-inch mesh targets are repairable in a matter of minutes whereas no repair can be made with the standard cardboard type target. The hardware cloth is repaired by patching it as if it were screen wire. The fiberglass target is repaired by patching with liquid fiberglass. Repaired fiberglass targets are as durable as the new targets.

In contrast to the cardboard targets, silhouette targets constructed of either fiberglass or hardware cloth can withstand any degree of wetness without separating or gaining excess weight through water absorption, and will not bend over under a breeze.

The hardware cloth silhouettes proved to be highly effective for utilization on automatic targets with remote scoring in the MOONLIGHT XII program. This type of target was found to be the only material which was effective for close firing because the muzzle blast does not result in registration of sympathetic hits.

Thus, it is felt that while the initial cost of either the fiberglass or the 1/4-inch mesh silhouette target is higher than the standard cardboard type, more satisfactory operation and durability can be obtained by substituting either of these

materials for the cardboard which is currently the standard Army issue for silhouette targets. These results have been informally reported to representatives of the US Army Infantry School, US Army Infantry Board, and Army Section, US Naval Training Devices Center. Possibly, additional information as to the relative merits of these target types will be obtained by these groups. As a result of coordination with this Unit, the Canadian Army is also currently experimenting with the fiberglass target type.