HumRRO

Research By-Product

CRITICAL COMBAT PERFORMANCES, KNOWLEDGES, AND SKILLS REQUIRED OF THE INFANTRY RIFLE SQUAD LEADER

Grenade Launcher, 40-mm, M79

by
George J. Magner

December 1968

The George Washington University
HUMAN RESOURCES RESEARCH OFFICE

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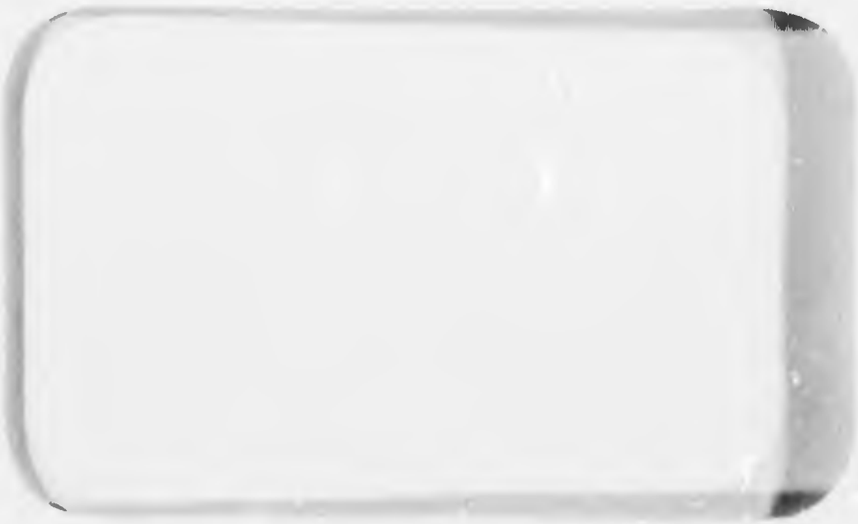

The Human Resources Research Office is a nongovernmental agency of The George Washington University. HumRRO's mission in work performed for the Department of the Army (DA Contract 44-188-ARO-2) is to conduct research in the fields of training, motivation, and leadership.

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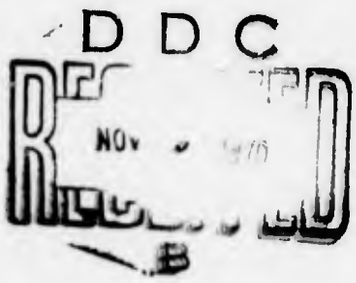

Technical Advisory Service

HumRRO Division No. 4
(Infantry)

The George Washington University
HUMAN RESOURCES RESEARCH OFFICE
operating under contract with
THE DEPARTMENT OF THE ARMY

FOREWORD

In response to a request from the United States Army Infantry School (USAIS), HumRRO Division No. 4 (Infantry) initiated a Technical Advisory Service research project to identify and record the critical combat performances, knowledges, and skills required of the Infantry Rifle Squad Leader (IRSL) and the Infantry Fire Team Leader (IFTL).

The requirements imposed upon the IRSL and IFTL are essentially the same, except that the former is responsible for the control of the men and fires of both fire teams in a rifle squad, rather than only one. The senior IFTL within each squad must be prepared to assume effective leadership of the squad immediately if the IRSL becomes a casualty, completes a prescribed combat tour, or is absent for any reason. Since it is common practice to provide the same training for candidates for both positions of leadership and to employ the outstanding candidates in the higher position, each paper in this series will set forth the critical requirements imposed upon the IRSL and, therein, those imposed upon the IFTL as well.

Under Work Unit LEAD, Work Sub-Unit I, the critical combat performances, knowledges, and skills of the Infantry Rifle Platoon Leader were published in a series of 41 papers covering a like number of subject areas. Each paper was published with prior review and concurrence by the USAIS Instructional Departments concerned. These papers are being used as the primary source of data in completing a parallel series of papers for the Infantry Rifle Squad Leader and the Infantry Fire Team Leader. This document details the requirements of the grenade launcher, 40-mm, M79.

This Technical Advisory Service research is being performed at HumRRO Division No. 4 (Infantry), Fort Benning, Georgia. The present Director of Research is Dr. T. O. Jacobs.

Military support for the study is being provided by the U.S. Army Infantry Human Research Unit, Fort Benning, Georgia. LTC Chester I. Christie, Jr. is the present Unit Chief.

HumRRO research is conducted under Army Contract DA 44-188-ARO-2 and under Army Project 2J024701A712 01, Training, Motivation and Leadership Research.

Meredith P. Crawford
Director
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GRENADE LAUNCHER, 40-MM, M79

General Considerations

Introduction

The increasing emphasis on independent and semi-independent action makes it imperative that the IRSL has sufficient firepower immediately available to hold off the enemy until supporting fires can be brought to bear. A continuing need also exists for a weapon that can cover the area between hand-grenade-throwing range and the closest mortar and artillery fire. The M79 Grenade Launcher is the answer to both problems and is often called the squad leader's "artillery." The M79 gives the IRSL the capability of delivering close-in fire in dense vegetation using the canister round; direct fire against point targets out to 150 meters and area targets out to 350 meters using an HE (high explosive) round with an effective bursting radius of five meters; and indirect fire out to 400 meters using the HE round. The M79 can be used effectively in the assault and plays a key role in the squad's defensive fires. It is particularly effective against enemy crew-served weapons and snipers located in trees. In addition to the standard HE round, other types of ammunition available for use with the M79 are the practice, canister, smoke marking, star cluster signal, parachute signal, CS and variations of the HE round.

The light weight of this weapon and its ammunition plus its versatility give the IRSL a highly effective weapon which increases his squad's firepower considerably. It also increases the IRSL's capability for independent action with less dependence on supporting fire.

Scope

This paper outlines the knowledges, skills, and performances required of the IRSL to use and supervise the use of the 40-mm, M79 Grenade Launcher. It presents information on the Grenade Launcher's capabilities, the delivery of accurate direct and indirect fire, the employment in tactical situations, safety procedures, maintenance, and destruction to prevent capture. An assumption is made that if the IRSL masters the knowledges, skills, and performances of his men, he can instruct them and supervise their activities to ensure an acceptable performance. Target detection is covered in this paper on Observation, Combat Intelligence, and Reporting. Closely related material is presented in Offensive Operations; Defensive Operations; Retrograde Operations; and Technique of Fire of the Rifle Squad.

Materiel

Grenade Launcher, 40-mm, M79, and ammunition.

Night sights.

Pistol, Caliber .45, M1911A1.

Necessary cleaning materials.

Battlefield Cues

Orders and instructions from commanders requiring the use of the grenade launcher.

Necessity to assume an appropriate firing position.

Detection of targets for engagement.

Need to estimate ranges accurately.

Necessity for reloading.

Requirement for use with night sights.

Periods of limited visibility.

Need for cleaning and maintenance.

Performances, Knowledges, and Skills

1. THE IRSL WILL MAKE MAXIMUM USE OF THE M79 GRENADE LAUNCHER'S CAPABILITIES UNDER ALL CONDITIONS OF VISIBILITY.

He will	: know that the 40-mm Grenade Launcher is a single shot, break-open, breech-loaded, shoulder-fired weapon weighing approximately six pounds that fires fixed-type ammunition weighing approximately eight ounces.	1
	: know that the M79's 14-inch aluminum barrel is rifled to impart a spin to the round which stabilizes and assists in arming it.	2
	: effectively engage point targets (windows, caves, apertures of bunkers) at ranges up to 150 meters and area targets (troops in open, open weapon emplacements) at ranges up to 350 meters with the M79 at a maximum rate of five to seven rounds per minute using the HE round.	3
	: use indirect fire procedures to effectively engage targets during periods of limited visibility at not less than 200 meters or more than 400 meters with the M79 using the HE round.	4
	: know that the standard 40-mm HE round has an effective casualty radius of five meters and an impact detonated fuze (M551) which is armed by a spin and setback action and must travel between 14 and 28 meters before being armed; also, that there is a fuze (M552) used with a currently non-standard HE round which is armed by spin action alone 1.8 to 3 meters from the muzzle; and that the identification markings for these rounds are printed on the cartridge case.	5
	: know that the minimum safe firing range for the M79 using the HE round is 80 meters in training and 31 meters in combat.	6
	: effectively engage targets within 31 meters or in heavy brush with the canister (shotgun) round.	7
	: know that in addition to the standard 40-mm HE and practice rounds, the following non-standard types of ammunition are currently available for use with the M79: canister rounds (shotgun type); smoke marking round (yellow); star parachute signal and star cluster signal (white, green, red); CS riot control gas; practice (red smoke) rounds; high velocity HE (arms 14 to 28m); HE (arms 1.8 to 3m); and HE (arms 14 to 28m) with an auxiliary booster which provides for an air burst.	8

: know that two M79's are organic to each rifle squad and that the grenadier is also armed with a cal .45 pistol for his close-in protection. 9

: know that the grenadier carries a recommended basic load of 18 rounds of 40-mm ammunition. 10

: know that the functioning of the M79 is very simple and takes place in the following sequence: 11

a. the barrel locking latch lever is moved all the way to the right which disengages the barrel locking lug from the receiver and pushes the safety button to the rear placing the weapon on safe.

b. the barrel is rotated into the loading position cocking the weapon as it rotates.

c. a round is placed into the breech manually and the barrel is closed.

d. the safety button is pushed all the way forward.

e. the weapon is then fired by squeezing the trigger to the rear.

f. to unload, the barrel locking latch lever is rotated all the way to the right, the barrel is pivoted downward, the cartridge is extracted 1/4 inch by the extractor and then removed manually.

: know that the trigger guard will swing away either to the right or the left allowing the operator to fire while wearing gloves or mittens. 12

2. THE IRSL WILL MASTER THE BASIC FUNDAMENTALS OF DELIVERING ACCURATE DIRECT AND INDIRECT FIRE WITH THE M79 GRENADE LAUNCHER.

He will : know that the M79 has a blade-type front sight and a folding leaf rear sight that is adjustable for both windage and elevation. 13

a. the windage scale can be moved 42 clicks left or right of center with each click moving the impact of the grenade approximately five inches for each 100 meters of range.

b. the elevation scale is graduated in 25 meter increments from 75 to 375 meters and the elevating screw wheel is used for minor adjustments when zeroing with one click moving the impact of the grenade 2 1/2 meters at 200 meters.

: know that a fixed notch-type sight is used with the rear sight in the down position for targets out to a range of 100 meters. 14

: know that sight alignment is a critical element in sighting and aiming the M79 because of the short distance between the rear sight and front sight, and the grenadier must concentrate on it as the first and last steps in aiming. 15

: fire the grenade launcher from basically the same positions as the service rifle with minor modifications due to the sights and recoil; assume the most stable position that the situation allows; and utilize available cover and concealment. 16

: lower the butt of the launcher from his shoulder when firing at ranges beyond 150 meters in order to maintain sight alignment. 17

: know that the pointing technique is used in situations where a high rate of fire rather than accuracy is required such as in the assault. 18

: use a supported firing position whenever possible with the arm being supported, not the weapon. 19

: sense the impact of the round in relation to the target to the nearest five meters and rapidly adjust his fire by: 20

a. using an adjusted aiming point (hold-off) if the impact of the round is less than 25 meters from the target.

b. making a sight change if the round hits more than 25 meters from the target (sight changes are made in 25-meter increments).

c. adjusting for deviation (usually small) by using an adjusted aiming point.

: know that accurate range determination is a critical element in obtaining first round hits as well as in the adjusting and shifting of fires. 21

: employ indirect fire against appropriate targets at ranges of not less than 200 nor more than 400 meters. 22

: obtain effective fire using indirect fire procedures with the M79 by: 23

a. assuming a kneeling or sitting position.

b. estimating the range and elevating the barrel to the proper angle for the range (69 degrees for 200 meters; 58 degrees for 300 meters; 41 degrees for 400 meters).

c. sighting over the barrel at the target.

d. adjusting the fire by moving the barrel slightly for elevation or deflection corrections to bring succeeding rounds closer to the target.

e. firing for effect with three to five rounds depending on the target.

: know that for increased accuracy when using indirect fire procedures, if time permits, a string or straight stick may be laid on the ground, aimed at the target, and the edge of the barrel then aligned with the string or stick. 24

: know that indirect fire accuracy may also be improved by using five different methods: 25

a. the marked sling method. (The grenadier fires from a kneeling position placing his foot on the marked locations on the sling which indicate predetermined ranges.)

b. the aiming stake method. (Stakes are driven into the ground under or around the weapon to serve as deflection and elevation controls.)

c. the plumb bob method. (A string tied to the trigger guard serves as an elevation guide, e.g., a 12-inch string just touching the ground would indicate an angle of elevation for 200 meters.)

d. the upright pole method. (The M79 is leaned against an upright pole and after firing a couple of rounds the pole is marked for range where the base of the rear sights come in contact with it.)

e. the M15 Rifle Grenade Launcher Sight. (The sight is mounted on the left side of the M79 stock and after firing a number of rounds, various elevations are marked on the sight for easy reference for future use.)

3. THE IRSL WILL DIRECT PERSONNEL ARMED WITH THE M79 GRENADE LAUNCHER TO ENGAGE SUITABLE ENEMY TARGETS ON ORDER OR AS DEMANDED BY THE SITUATION.

He must : know that appropriate targets to be engaged by the M79 Grenade Launcher are enemy personnel in the open or in concealed positions, crew-served weapons emplacements, openings in buildings or fortifications occupied by the enemy, snipers, unarmored vehicles, personnel riding on armored vehicles, and similar targets. 26

: know that depending on the situation and terrain, grenadiers in the attack may accompany the assaulting elements or support the assault with fire from positions to the rear or flank of the assaulting elements. 27

: when moving with or supporting the attacking elements, distribute fire in both width and depth at known and suspected enemy positions within the objective area. 28

: when participating in the assault, use pointing fire techniques; upon reaching the distance where it is not safe to use the HE round (31 meters in combat) use either the canister round, if available, or the grenadier's secondary weapon (.45 cal pistol) or continue to support the attack with HE overhead fire from positions to the rear of the assault elements. 29

: know that because of its firing characteristics, the M79 can continue to provide attacking forces close-in support after mortar and artillery fires have been forced to lift or shift. 30

: know that one or both of the squad's grenadiers may be assigned to the base-of-fire element to support a maneuver element. 31

: employ grenadiers to deliver fire on withdrawing enemy elements after the objective is taken. 32

: use brush, walls, terrain irregularities, etc., to detonate the HE round within lethal proximity of located enemy who are partially covered or in defilade. 33

: know that the M79 Grenade Launcher is extremely effective against snipers located in trees because of its range and the area coverage of its HE projectile. 34

: know that the M79 canister round has good penetrating power out to 35 meters and is particularly appropriate for use in areas of heavy vegetation, for close-in offensive or defensive fighting, and for fleeting-type targets at night at short ranges. 35

: employ grenadiers in the defense to cover areas of dead space in the final protective fires of other weapons, and engage other appropriate targets in their squad's sector, with particular attention to enemy automatic weapons that may appear. 36

: prior to firing the HE round, either select a location without intervening objects that would mask the M79's fire or clear fields of fire to avoid premature detonation which might endanger friendly troops. 37

: employ "hold-off" techniques, when possible, after firing the first round in order to deliver follow-up fire more rapidly and achieve target coverage. 38

: reload rapidly to avoid lulls in firing (by feel during periods of limited visibility or when continuing to search for enemy targets). 39

: apply the most effective methods of fire against various types of enemy targets by: 40

a. first firing on enemy automatic weapons (primary targets).

b. when above requirement does not exist, engaging the following targets as appropriate:

(1) linear target--initial fire on part of target presenting greatest threat and then distributing fire across the fire team's portion of the target after main threat is eliminated.

(2) area target--similar to linear target except that fire is distributed in depth as well as in width.

(3) point target--deliver fire out to 150 meters against covered target and 350 meters against exposed target.

(4) column target--initial fire on center of column then on that portion corresponding to position in the squad when the enemy disperses.

: fire on infantry accompanying tanks to disperse the infantry and cause the tanks to "button up" thereby becoming more vulnerable to antitank fire and tank killer teams. 41

: employ the M79 smoke-marking round to: 42

a. identify targets in inaccessible areas.

b. mark targets for aerial rocket artillery or tactical air strikes.

c. mark landing zones for heliborne assaults or evacuations.

d. mark enemy emplacements for indirect fire support.

e. mark friendly lines and positions.

: gain accuracy of fire during periods of limited visibility by selecting anticipated targets, and planning and registering M79 fire during daylight hours using field-expedient means (stakes or forked tree limbs) to form a rest. 43

: increase accuracy during periods of limited visibility by placing luminous material on the backs of the front and rear sights, facing the firer, to aid in properly aligning the weapon with the target. 44

: know that the firer's location is difficult to detect during limited visibility because of the low muzzle report and minimum flash. 45

: employ the M79 signal round in conjunction with night offensive and defensive operations. 46

: employ night vision devices to locate enemy targets which can then be engaged by grenadiers using predetermined reference points. 47

: employ the pointing fire technique against assaulting enemy personnel during periods of limited visibility. 48

: deliver overhead fire to cover the withdrawal of elements of the squad when breaking contact with the enemy. 49

: know that the M79 can be employed effectively using indirect fire techniques against enemy targets that are screened by vegetation, in defilade, or hidden behind a ledge or similar vertical obstruction. 50

4. THE IRSL WILL OBSERVE APPROPRIATE SAFETY PROCEDURES AND MAINTAIN AND SAFEGUARD THE M79 AND ITS AMMUNITION.

He must : know that the minimum safe range for firing the M79's HE round is 80 meters in training and 31 meters in combat due to the fragmentation effects of the projectile. 51

: know that the safety is automatically engaged when the barrel locking latch is operated to open the breech and that the letter "S" is then visible forward of the safety; the safety must be pushed forward to expose the letter "F" before the M79 can be fired. 52

: know that the two currently standard M79 rounds may be identified by the color of paint on the ogive or windshield, silver for the practice round and gold for the HE round. 53

: know that all new selected munitions (new type HE ammunition) can be identified by yellow marks on the cartridge case. The three rounds of this type in the Army inventory are the M386 and M397, which have an arming distance of 14-28 meters, and the M441, which is armed at a distance of 1.5 to 3 meters. 54

: ensure that weapons are "cleared" except when in contact, moving to contact, manning a security position, or test firing in an authorized area. 55

: know that in immediate action with the M79, the round is initially treated as a hangfire and then checked further to see if it is a misfire. 56

: take appropriate safety precautions when misfires or hangfires occur. 57

: ensure that all ammunition is kept clean, dry, and out of direct sunlight. (Plastic bags [radio battery covers] can be used to wrap the portions of basic load not kept ready for immediate use.) 58

: maintain the launcher in a clean, operating condition at all times; when cleaning the launcher after firing, remove deposits of primer fouling, powder ash, carbon, and metal fouling. 59

: maintain cleanliness by wrapping launcher in covering when immediate use is not expected; during rain, dust, or sandstorms; and when air assaulting into sandy areas where rotor blast fills the air with dirt or dust. 60

: know that stoppages during critical situations can cause loss of life and that stoppages can be prevented through proper maintenance procedures, periodic inspection, and adequate supervision. 61

: mark all dud rounds, when the situation permits, and report them to explosive ordnance disposal for destruction or destroy them. (M79 HE rounds are used as boobytraps by guerrillas.) 62

: destroy the M79 and its ammunition when subject to enemy capture or abandonment by the following means, as appropriate; mechanical, burning, gunfire, demolition or disposal (swamps, rivers, etc.). 63