Technical Report 574

METHODS OF EVALUATING TANK PLATOON BATTLE RUN PERFORMANCE: A PERSPECTIVE

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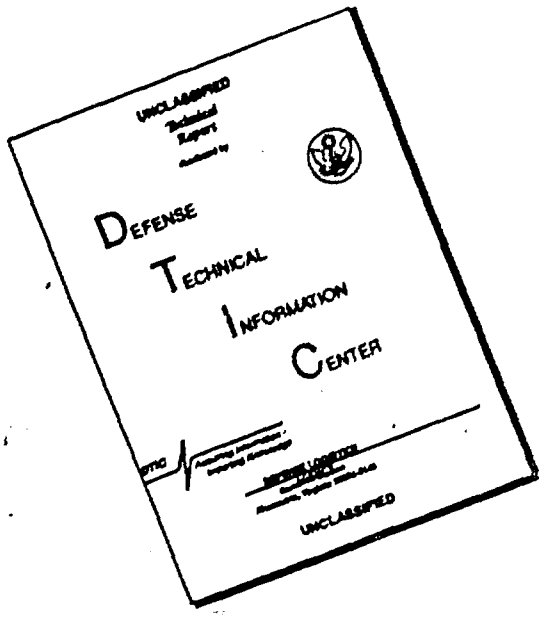

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This report raises and discusses a number of longstanding problems and issues that have arisen during attempts to develop guidance for the design, implementation, and conduct of platoon battle runs. Chief among these issues are the content and purpose of battle runs, the role of live fire, and the degree of control that must be exercised over the test setting to generate useful performance data. Recommendations are given for a restructured gunnery program that → cont'd

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provides for training and qualification on gunnery and tactics. These two tracks culminate in MILES-based platoon battle runs during which qualified platoons conduct simulated missions against a controlled OPFOR.

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FOREWORD

The US Army Research Institute for the Behavioral and Social Sciences (ARI) performs research and development to improve the training and evaluation of military units. Because of the high costs associated with use of live main gun ammunition, tank platoon gunnery performance is an area of special interest.

The gunnery program for armor units culminates with a series of platoon battle runs, in which the individual crews comprising the platoon function as a coordinated unit. These exercises require the platoon to control and distribute fire against a variety of multiple target arrays while maneuvering tactically. Battle runs may be dry fired, simulation fired, or fired using live main gun ammunition depending upon the specific purpose to be served.

This report addresses a number of issues that must be considered to develop guidance for the design and conduct of platoon battle runs. Chief among these issues are the content and purpose of battle runs, the method of firing to be used, and the degree of control over the exercises that should be exerted to obtain useful performance data.

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Methods of Evaluating Tank Platoon Battle Run Performance: A Perspective

BRIEF

Requirement:

To raise and discuss a number of longstanding issues and problems that have arisen repeatedly during attempts to develop guidance for the design, implementation, and conduct of platoon battle runs. The ways in which these issues are eventually resolved will shape the nature and role of future generations of platoon evaluation exercises.

Procedure:

Four major issues are examined and discussed that have significant implications for the tank platoon gunnery program. These include the content of battle runs, the method of main gun firing, performance measurement, and purpose. They are treated individually and then collectively.

Findings:

The conclusions and recommendations fall into three categories. These include: a restructuring of the tank platoon gunnery and tactical program; the specification of new and additional types of battle runs that are necessary and sufficient to support that program; and the consideration of alternative ways of packaging those battle runs. Collectively, the recommendations are for an expanded program of training that differentiates as clearly between evaluation and acclimation exercises as available resources permit.

Utilization of Findings:

Adoption of the recommended battle runs will provide for improved evaluation of tank platoon gunnery and tactical skills. Consideration of the issues that are raised will help designers of future battle runs to make explicit decisions about a number of design options.

TABLE OF CONTENTS

LIST OF TABLES

I. INTRODUCTION

As described in current Army doctrine, the tank gunnery training, qualification, and sustainment program proceeds in three distinct but logically sequenced phases. The first or pregunnery phase is designed to develop and test the proficiency of individual armor crewmen who perform a basic set of enabling tasks unique to their crew positions. This first phase concludes when each crewman (i.e., driver, loader, gunner, and tank commander) qualifies for his position by exhibiting a satisfactory level of proficiency on portions of the Tank Crew Gunnery Skills Test (c.f., FM 17-12, 1977; Draft FM 17-12-1, 1979 [1,2]).

In the second or tank gunnery phase, the focus shifts to the training and evaluation of crews, as opposed to individual armor crewmen. The manner in which this phase is implemented differs as a function of weapon system.

For crews using the M60 series tank weapon system, eight sets of intensive exercises known as "gunnery tables" are used to train, test, and sustain crew proficiency. The gunnery tables are graduated in difficulty. The first three involve zeroing, manipulation, range card, and adjustment-of-fire exercises with laser or subcaliber devices on scaled ranges. The fourth and fifth, which are also implemented on scaled ranges with subcaliber devices, provide practice in engaging static and moving targets from a stationary or moving tank. The sixth and seventh tables provide similar practice but on full-scale ranges with main gun ammunition. Upon completion of Tables I-VII, M60 tank crews are required to qualify on Table VIII, the Tank Combat Course, by demonstrating a prescribed level of proficiency in tank gunnery/marksmanship (c.f., Draft 17-12-2, Change 2, 1978; Wheaton, et al. [3,4]).

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[1]U.S. Army Headquarters, Department of the Army. Tank gunnery. FM 17-12. Washington, DC: Author, 1977.

[2]U.S. Army Headquarters, U.S. Army Armor Center. Tank gunnery for XM1 main battle tank. FM 17-12-1 (Draft). Washington, DC: Author, June 1979.

[3]U.S. Army Armor School. Tank gunnery. FM 17-12-2, Change 2 (Draft). Fort Knox, KY: Author, 1978.

[4]Wheaton, G. R., Finge man, P. W. (American Institutes for Research) & Boyce , G. G ARI). Development of a model tank gunnery test. Tecn al Report 78-A24. Alexandria, VA: US Army Research Institute for the Behavioral and Social Sciences, August 1978. (AD A061 153)

The training of XM1 crews in tank gunnery follows a different course. Certain kinds of basic gunnery skills such as zeroing and manipulation (i.e., acquisition and tracking) are folded into the earlier, pregunnery phase. Rather than structuring the crew gunnery per se into the traditional eight tables, it is organized into three components. First, the crew participates in Crew Drills where it must demonstrate mastery of moving-target, multiple-target, and simultaneous-target engagements. Having passed this hurdle the crew then fires a series of subcaliber exercises while stationary and on the move. Once these exercises are mastered, the crew fires the Crew Combat Evaluation Exercise (CCEE) with main gun ammunition. This sequential program is described in Draft FM 17-12-1[5].

In the third and final phase of the gunnery program the focus widens again, from the single crew manning an individual weapon system, to the coordinated actions of the five crews comprising a tank platoon. The platoon practices use of platoon fire commands and patterns of fire when engaging a variety of static and moving targets (for example, in exercises such as subcaliber Table VP). As the culmination to this third phase, platoons are required to qualify by demonstrating a prescribed level of proficiency on Table IX, or the Platoon Qualification Exercise (PQE). These exercises are built around platoon battle runs which represent challenging, small-unit firing courses in which the tactical application of gunnery skills is combined with tactical maneuver and decision making. Quick target hits on multiple targets, teamwork in getting those hits, the ability of the platoon to shift, distribute, and control its fires, tactical movement, and maneuvering to take advantage of the terrain are all emphasized. Qualified platoons presumably possess the types and levels of proficiency that will enable them to participate in and contribute to tactical missions undertaken by higher echelons such as the combined arms company team or battalion task force.

Given the overwhelming importance of effective tank gunnery to success on the battlefield, and the high costs associated with the development and assessment of such skills, the U.S. Army Research Institute has been investigating ways of improving the evaluation of gunnery performance at both crew and platoon levels. In an earlier effort, live-fire and simulated versions of a prototypic crew gunnery/marksmanship test

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[5] U.S. Army Headquarters, U.S. Army Armor Center, Op. cit.

were developed (e.g., Wheaton, et al.; Fingerman, et al.[6,7]). The test was designed to determine the qualification of crews and to diagnose potential training deficiencies related to enabling behaviors associated with operation of the weapon system per se.

In a subsequent effort, improved ways of evaluating tank platoon gunnery have been investigated. Based upon an extensive analysis of previous battle runs (e.g., Wheaton, et al.[8]), guidelines have been prepared for the development and conduct of platoon battle runs for training diagnosis and qualification (e.g., Allen, et al.[9]).

Like the two reports cited immediately above, this one is concerned with techniques and procedures for the evaluation of tank platoons participating in battle runs (i.e., in Table IX or in the Platoon Qualification Exercise). But its perspective is much broader, nearly philosophical. It raises and discusses a number of longstanding problems and issues that have arisen repeatedly during our attempts to develop guidance for the design, implementation, and conduct of platoon battle runs. The ways in which the Army eventually resolves them will shape the nature and role of future generations of platoon evaluation exercises.

Before turning to these specific issues, a more general caveat is in order. Over the past several years the "recommended tank gunnery program" has remained static only for brief periods of time. The program is in a constant state of change and will continue to be so because of the pressure to reduce main gun ammunition costs and to increase the use of miniaturized ranges or gunnery simulators. Aspects of the

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[6]Wheaton, G. R, Gingerman, P. W. & Boycan, G. G. Op. cit.

[7]Fingerman, P. W., Wheaton, G. R., (American Institutes for Research) & Boycan, G. G. (ARI). Simulation of a model tank gunnery test. Technical Report 79-A6. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, March 1979. (AD A072 336)

[8]Wheaton, G. R., Allen, T. W., Johnson, E., III, (American Institutes for Research), Drucker, E. H., Ford, P., Campbell, R. C., (HumRRO), & Boycan, G. G., (ARI). Methods of evaluating tank platoon battle run performance. Technical Report 457. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, May 1980. (AD A096 369)

[9]Allen, T. W., Johnson, E., III, Wheaton, G. R., (American Institutes for Research), Knerr, C. M. (HumRRO), & Boycan, G. G., (ARI). Methods of evaluating tank platoon battle run performance: Design Guidelines. Technical Report 569. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1982. (AD A131 969)

three-tiered program summarized above are likely to be outdated by the time this report is published. Indeed, new programs are likely to be recommended and perhaps tested as a result of efforts such as the TRADOC Weapons Crew Training Study. These pressures for change make it all the more important to look at the basic issues of how the entire gunnery program should be put together. While this report focuses on platoon gunnery, we must not lose sight of the fact that the design and implementation of this component must occur in concert with the design and implementation of the overall program.

II. ISSUES

The specification of future generations of cost-effective platoon battle runs requires the resolution of two major issues: the content of the battle run, and its purpose. Each of these issues gives rise, in turn, to a number of subsidiary concerns including the role, if any, of live fire, the appropriateness of mission outcome measures of performance, and the degree of control that must be exercised over the test setting in order to generate useful performance data. Each of these issues is exceedingly complex. The resolution of any or all of them is further complicated by the fact that they are highly interdependent.

THE CONTENT OF BATTLE RUNS

The three-tiered gunnery program described and discussed in current gunnery manuals and supplements (e.g., FM 17-12; Draft FM 17-12-1 [10,11]) consists largely of firing exercises that "have been designed and developed to qualify . . . (a) tank platoon on gunnery skills against realistically behaving targets" (Draft FM 17-12-1[12]). To accomplish this objective, the *firing exercises are explicitly sequenced* along two dimensions which represent increasingly complex and challenging types of engagement situations. First, the engagements increase in difficulty as a function of variations in the number and types of targets in an array, and in the motion of the targets and firing tanks. Second, each increment entails more complex coordination and teamwork. The initial focus is on coordination among crew members and between weapons within a tank when engaging multiple or simultaneous targets. Eventually it expands to encompass teamwork among all of the platoon's tanks. Gunnery skills at this final level consists of the cooperative actions that the platoon must take, when in an offensive or defensive posture, to neutralize large numbers of multiple targets.

Ostensibly, the objective in having crews and platoons progress through this entire sequence of exercises is to promote high levels of gunnery skills. The content of the program consists of teaching them how to "shoot." Crews and platoons are to become proficient at "placing steel on target,"

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[10] U.S. Army Headquarters, Department of the Army, Op. cit.

[11] U.S. Army Headquarters, U.S. Army Armor Center, Op. cit.

[12] Ibid., p. 69.

and doing so quickly. When described in this light, it is clear that the quintessential ingredients of the program are crew marksmanship (i.e., operation of the tank weapon system under diverse conditions) and platoon gunnery (i.e., control and coordination of fires).

In keeping with this portrayal, crew marksmanship is clearly emphasized in the content of the first several training exercises (e.g., Tables I-VI, Crew Subcaliber Exercise). But curiously, in later exercises (e.g., Tables VII-IX, CCEE, PQE) the emphasis on basic gunnery skills changes in subtle but important ways. For reasons that have not been articulated clearly, tactical realism is stressed in these later crew and/or platoon qualification exercises. The result is that the presumed evaluation of basic crew marksmanship (e.g., Tables VII, VIII; CCEE) and platoon gunnery (e.g., Table IX, PQE) is submerged within and made subordinate to a larger tactical context or mission scenario. Indeed, the crew or platoon actually participates in Movement to Contact/Hasty Attack and/or Defend Battle Position mission scenarios (c.f., ARTEP 71-2, 1977[13]) in which the remainder of the (crew's) platoon or the (platoon's) company team is simulated. The labels given to these exercises reflect their increased tactical flavor: Crew Combat Evaluation Exercise (Draft FM 17-12-1[14]), Tank Combat Course (Draft FM 17-12, Change 2, 1978[15]) and, of course, Platoon Battle Runs.

The consequences of the intrusion of tactics, particularly into the platoon gunnery qualification exercises, are two-fold. First, it obviously broadens the kinds of performance in terms of which a platoon may potentially be evaluated. Accordingly, given a larger performance domain within which to sample, one might continue to focus the content of the evaluation on platoon gunnery per se, or one might select content dealing with tactics or with tactical gunnery (i.e., behaviors reflecting the interaction of tactics with gunnery). Second, and perhaps not so obviously, the tactical context makes it much more difficult to conduct a qualification exercise based on the rigorous evaluation of important enabling behaviors, be they aspects of platoon gunnery (e.g., distribution of fire) or platoon tactics (e.g., movement technique). As will be discussed shortly, the free-play and flexibility associated

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[13]U.S. Army Headquarters, Department of the Army. Army training and evaluation program for mechanized infantry/ tank task force. ARTEP 71-2. Washington, DC: Author, 1977.

[14]U.S. Army Headquarters, U.S. Army Armor Center, Op. cit.

[15]U.S. Army Armor School. Tank gunnery. FM 17-12, Change 2 (Draft). Fort Knox, KY: Author, 1978.

with a realistic tactical scenario often conflict sharply with the high degree of orchestration and control needed to evaluate a platoon on a specific set of behaviors (i.e., test items). Explicit steps must be taken to resolve this conflict.

Since its inception six years ago the platoon battle run has gone through a series of revisions characterized by vacillation over the degree to which the tactical context should be permitted to intrude (c.f., Wheaton, et al.[16]). An initial emphasis on platoon (and section) gunnery, as the logical sequel to Tables I-VIII, gave way in large measure to evaluation of the platoon's conduct of a tactical mission (e.g., Draft FM 17-12-2, Change 2, 1978[17]). The platoon was evaluated not only in terms of its ability to shoot, but also in terms of its proficiency in moving, communicating, etc. At the same time, the high degree of control needed to support rigorous evaluation for platoon qualification was largely traded off in favor of the (presumably) greater training benefits associated with use of a realistic tactical scenario.

Recent events indicate that this trend is being reversed. For example, the most recent battle runs constituting the XMI Platoon Qualification Exercise concentrate on evaluation of platoon gunnery behaviors. Although the evaluation does occur against the backdrop of a tactical scenario, the tactics themselves are largely down-played. Similarly, recent guidelines for the design of platoon battle runs (e.g., Allen, et al.[18]) call for the evaluation of platoon-level gunnery, under highly controlled conditions, while providing for an assessment of selected tactical behaviors to the extent that these are of interest. Evaluation data of the first type are used to support qualification decisions. Data of the second type are used to diagnose training deficiencies.

In the long run, the Army must develop a gunnery training, qualification, and sustainment program that deals systematically with marksmanship, tactics, and tactical gunnery at both crew and platoon levels. Recommendations toward this end (see Chapter III) assume that the current program will have to undergo significant restructuring in order to deal with the gaps that may now exist in the coverage of these different kinds of performance.

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[16] Wheaton, G.R., Allen, T.W., Johnson, E. III, Drucker, E.H., Ford, P., Campbell, R.C. & Boycan, G.G., Op. cit.

[17] U.S. Army Armor School, Op. cit.

[18] Allen, T.W., Johnson, E. III, Wheaton, G.R., Knerr, C.M. & Boycan, G.G., Op. cit.

The discussion has concentrated so far on the content of platoon qualification exercises. Given the eventual resolution of this issue, two closely related concerns will remain involving decisions about how best to implement such exercises. To what extent should they require the firing of live as opposed to simulated main gun ammunition? To what extent should platoon performance be characterized in terms of a specified set of enabling behaviors as opposed to more terminal mission outcome measures? Each of these issues is discussed in turn.

LIVE FIRE VS. SIMULATED FIRE

Since 1975 when battle runs first came into existence, platoons have been required to fire these exercises using live, main gun (i.e., 105mm), training ammunition. The same requirement exists today, whether platoons participate in the most recent version of Table IX or in the corresponding XM1 Platoon Qualification Exercise. For example, XM1 platoons are to fire the PQE twice a year, once for qualification and once for sustainment. A total of 104 main gun rounds is allocated for each episode. (And there are indications that the use of main gun ammunition to support collective training and evaluation is likely to become even more pronounced in the future. Plans call for reallocating ammunition now fired in crew marksmanship exercises to permit live main gun firing of company and battalion battle runs [c.f., Draft FM 17-12, Change 2, 1978[19]]).

The expense associated with using main gun ammunition to conduct platoon battle runs is substantial. The average main gun training round costs in the neighborhood of $130. When applied to the XM1 example cited above, this per round expenditure translates into an annual outlay of roughly $250,000 for one battalion to qualify and sustain its nine platoons. To exacerbate the problem, the required ammunition is also in relatively short supply.

These facts place a premium on maximizing the training and evaluation benefits that result whenever main gun ammunition is fired. Indeed, attempts to maximize the cost-effectiveness of main gun firing have led directly to the Army's widespread dictum that whatever can be live-fired should be subcaliber-fired first, and that whatever can be subcaliber-fired should be dry-fired first. By sequencing main gun firing in this progression it is hoped that, ". . . crews can meet course standards before firing expensive and limited main gun ammunition." (Draft FM

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[19]U.S. Army Armor School, Op. cit.

17-12-1[20]). In practice, however, this ideal is rarely achieved. In the platoon battle runs we have observed, for example, POL and other resource constraints have drastically curtailed the numbers and types of exercises that could be undertaken prior to the live-fire qualification run. As a consequence, platoon battle runs, having had to forego dry-firing and subcaliber-firing, use live main gun ammunition almost exclusively.

The above realities notwithstanding, the main gun live-fire issue can best be framed by assuming that cost is no object and that an unlimited supply of main gun ammunition is available for the platoon battle run. Under such circumstances, what plausible reasons might one give for firing main gun instead of subcaliber or simulated main gun ammunition? What logic lies behind the prevalent (and in some circles strongly held) view that platoon battle runs must be live-fired?

The argument proponents advance most frequently on behalf of live-fire battle runs is that they introduce much needed realism (i.e., a high degree of fidelity) into the evaluation setting. A high degree of fidelity is held to be reasonable inasmuch as platoon battle runs represent the culmination of the gunnery program. As such it is only fitting that the firing and ballistics' characteristics be highly realistic as should the ambient battle stimuli -- noise, gun flashes, recoil effects, obscuration, etc. -- that accompany each engagement. Most realistic of all is the heightened sense of danger that permeates a live-fire run. A miscalculation or lapse on the part of one crew can jeopardize the safety of the rest of the platoon. Proponents of live-fire main gun exercises describe the resulting ambiance as having a high "pucker factor." Green troops presumably need to be exposed to it, while seasoned crews look forward to operating in this "real" mission environment.

This line of reasoning makes good sense. Exposure to live main gun firing (and to artillery fire, chemical agents, electronic warfare, etc.), during crew and platoon phases of gunnery training, is one way of providing a taste of the "dirty" battlefield and helping crewmen to overcome the "pucker factor." For training purposes, therefore, some amount of main gun firing seems highly desirable. Whether qualification purposes are served equally well by live main gun firing, especially at the platoon level, remains to be seen. Four concerns are discussed below that raise doubts about the utility (for platoon qualification) of live-fire battle runs.

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[20]U.S. Army Headquarters, U.S. Army Armor Center, Op. cit., p. 126.

As described previously, the current tank gunnery program consists of a series of hurdles, each of which must be negotiated before the next higher phase can begin. Crewmen have to demonstrate their proficiency before participating in crew gunnery/marksmanship exercises. Similarly, each crew must demonstrate a specified level of marksmanship, indicated by "placing steel on target," before participating in platoon exercises. Given that such a demonstration is prerequisite to participation in platoon battle runs, some might ask why we should then continue to evaluate gunnery performance (measured as engagement time and target hits) during these subsequent exercises. The outcome of each tank's engagement of a target is, after all, predetermined. The gunnery program, when conducted as designed, demands and ensures that Table VIII or CCEE graduates will hit whatever targets they aim at, whether during a platoon battle run or any other exercise.

Advocates of this position would proceed to argue that platoon battle runs provide an unique opportunity to evaluate coordination among crews when servicing multiple targets. Accordingly, platoons are to qualify by demonstrating proficiency in such collective gunnery skills as issuance of and response to platoon fire commands, prioritization of fire, distribution of fire, use of appropriate fire patterns, etc. In essence, an evaluator would monitor the patterning and sequencing of gun tube orientations. He would simply need to determine which tanks aim at which targets over time. Such behavior could be represented more than adequately by subcaliber or simulated main gun firing. The use of live main gun ammunition for this purpose would be unnecessary.

Assume for the moment that we are unconvinced by the preceding argument and continue to insist on the use of live main gun ammunition during platoon gunnery qualification testing. A second consideration now arises. What error of measurement is likely to be associated with this procedure? Even if target holes are "counted and pasted" by a target detail, can the resulting live-fire engagement scores serve as adequate measures for platoon qualification? The answer depends on the severity of main gun dispersion effects.

These effects may be characterized most simply by noting that all too frequently a main gun round does not go where it is aimed. As a consequence, the number of targets neutralized in a particular engagement is not completely determined by the platoon's gunnery proficiency. Sometimes target hits will be obtained when they should not have been. On other occasions perfect gunnery technique will yield a miss. Both outcomes are indicative of error in the measurement system. If this error is severe enough, as it may be for certain types of main gun

training ammunition (c.f., Fingerman[21]), then the resulting qualification decisions, predicated as they are on gunnery scores, will be of dubious value. Therefore, during platoon qualification runs, when greater precision of measurement is required, it may be necessary to forego live-fire exercises in favor of alternative approaches that simulate main gun firing, but provide more accurate "strike-of-the-round" data.

A third consideration when contemplating live-fire battle runs is that the desire to evaluate certain important kinds of platoon gunnery skills must be reconciled with safety. The trade-off is almost always made by steering away from those skills that cannot be evaluated safely. Perhaps the best example of this dilemma is delivery of direct suppressive fires by an overwatching tank section while the bounding section moves to cover. Smooth execution of this tactic is essential when the platoon makes contact with an OPFOR. Yet it is sufficiently dangerous that range safety personnel will not permit these types of engagements to be live-fired. Consequently, if one insists on live-fire battle runs, essential platoon skills of this type can be neither practiced nor evaluated during platoon qualification.

The fourth consideration is that live-fire battle runs essentially preclude the evaluation of platoon tactics from the *OPFOR's point of view.* Yet, during some battle runs it may be extremely fruitful to evaluate the effectiveness of the platoon from such a vantage point. On these occasions a simulated OPFOR unit would confront the platoon at specified points during its "mission," observe and evaluate selected aspects of its performance, and inflict simulated casualties upon it. Obviously, the use of live-fire exercises makes it difficult if not impossible to implement this evaluation procedure.

When considered jointly, the preceding concerns lead to a straightforward proposition. Arguments for or against battle runs in which live main gun ammunition is fired exclusively miss the point. The most effective gunnery program will integrate live-fire battle runs with similar exercises in which main gun firing is simulated. The objective is to be more discriminating in deciding which approach to use, when, for what ends. One such program is described in the next chapter. It differs from more traditional gunnery programs in that less live ammunition is required. Those rounds that are expended are used during training rather than qualification runs. Such an approach has the potential advantage of accomplishing

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[21]Fingerman, P. W. (American Institutes for Research). A preliminary investigation of weapon-system dispersion and crew marksmanship. Technical Report 78-B5. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, July 1978. (AD A077 992)

training and evaluation objectives in spite of predicted budget restrictions and ammunition constraints.

THE MEASUREMENT OF BATTLE RUN PERFORMANCE

There are options about whether and how to incorporate live main gun firing into Table IX or PQE battle runs, and about the appropriate substantive content of these exercises. Therefore, given flexibility in these areas, it is not surprising that rather different approaches to the measurement of platoon performance have also been considered. Among these, three options predominate.

In the first and traditional approach, platoon performance is evaluated in terms of selected tasks and skills. These are specified in the form of basic, underlying training objectives that contain a statement of the task to be performed, a description of the conditions under which performance is to occur, and an indication of the "level" of performance which the platoon, at a minimum, must exhibit.

The focus is on how well the platoon performs selected aspects of its "mission," as indicated by measures of underlying processes, procedures, enabling behaviors and intermediate outcomes. The purposes in obtaining such detailed information are two-fold. It can provide a basis for qualification as well as permitting diagnosis of those aspects of performance that represent platoon strengths and those that may indicate potential training deficiencies. For example, in the PQE (Draft FM 17-12-1[22]) the platoon must "employ direct fire (multiple engagement)" against "one moving tank at 1000-1200 meters and one stationary BMP at 1200-1400 meters" in order to obtain at least "one target hit within 8 seconds of being exposed." These same types of gunnery skills are evaluated on Table IX (c.f., Draft FM 17-12-2, Change 2[23]), together with other basic enabling behaviors such as control of fire, movement techniques, use of terrain, command and control, and reporting procedures. Allen, et al.[24], provide comprehensive lists of similar kinds of training objectives that reflect platoon performance during the course of offensive and defensive "missions."

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[22]U.S. Army Headquarters, U.S. Army Armor Center, Op. cit.

[23]U.S. Army Armor School, Op. cit.

[24]Allen, T.W., Johnson, E. III, Wheaton, G.R., Knerr, C.M. & Boycan, G.G., Op. cit.

A second way of evaluating platoon performance is in terms of more global and summary measures. This approach is a plausible alternative whenever Table IX or the PQE is couched within a larger tactical mission scenario. In these cases it is possible to shift the focus of the evaluation away from component skills and enabling behaviors, concentrating instead on more holistic, terminal, mission outcome measures. The ultimate consequences of platoon behavior are emphasized rather than the component behaviors themselves. It is possible to examine the "prices" the platoon is forced "to pay" for lapses in gunnery and tactical performance. (As will be discussed shortly, whether or not one should adopt this approach is an entirely different matter. Its utility will vary with the stated purpose of the evaluation.)

Examples of candidate measures include the seizure (or holding) of a designated objective, the amount of time taken to complete the "mission," as well as indications of casualties inflicted and casualties sustained. The latter kind of information, expressed as some form of casualty exchange ratio, has long been sought (c.f., primary evaluation criteria, ARTEP 71-2[25]). But until recently it has been difficult if not impossible to quantify such measures. Now, however, with the advent of equipment like the Multiple Integrated Laser Engagement System (MILES) a high fidelity, point-fire, weapon effect simulation is available for use in evaluating tank platoons. With the aid of MILES, platoon battle runs can be conducted as simulated, two-sided, controlled combat exercises; and the actual outcomes of each "mission" can be specified and used to evaluate platoon performance.

The third major approach to the measurement of platoon battle run performance is a hybrid, that merges the two alternatives discussed above. As before, much of the evaluation concentrates on selected skills, and enabling behaviors underlying platoon gunnery and/or tactical performance. And attention is also given to outcome measures of platoon performance such as casualty exchange ratios.

But there are differences as well. Whereas the second approach provides for the measurement of terminal mission outcomes on a cumulative basis (e.g., the platoon sustained two simulated casualties), the hybrid approach focuses on intermediate and episodic outcomes. For example, interest lies in ascertaining the simulated casualties inflicted and sustained during a particular multiple engagement, or the consequences of moving across a specific and delimited piece of terrain using a particular movement technique. These measures are not aggregated on a cumulative basis. Rather, the outcome of a particular

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[25] U.S. Army Headquarters, Department of the Army, Op. cit.

episode is recorded (e.g., platoon neutralized two OPFOR tanks but lost its own heavy section), the platoon is in essence reconstituted (if necessary), and the battle run is continued.

The choice among the three major options described above is an important and substantive measurement issue. There also are others, however, which are more methodological in nature. Among these are domain-referenced testing to insure generalizability of the performance indicants, and aggregation of performance data to permit evaluation of the appropriate entity.

Whether diagnostic or summary performance measures or some mix of the two is chosen, a relatively small sample of behaviors and conditions is typically used during platoon evaluation. Such is the case since resource constraints preclude testing of every conceivable facet of performance. Yet, no mechanism is available to guarantee that the platoons could perform adequately on aspects of performance on which they were not tested or under any altered conditions. In the future, the platoon evaluation methodology should deal explicitly with the generalizability of measures over the domain of potential proficiency. Toward this end consideration should be given to the domain sampling techniques to be used. Such techniques already have been used successfully to specify crew gunnery exercises (i.e., Wheaton, et al.[26]).

Some consideration also should be given as to whether or not the entity to be evaluated has been properly identified. Is the objective to evaluate the proficiency of individual crews and platoons, or the average level of proficiency of the companies and battalions to which they belong? Many problems might be resolved if crews and platoons were to continue to be the objects of training and companies and battalions were to become the focus of the evaluation. For example, using matrix sampling techniques, each crew and platoon could fire a different series of engagements in Tables VIII and IX. The overall results would permit estimates of the battalion's proficiency referenced to a large and objectively defined domain of gunnery and tactical behavior.

THE PURPOSE OF BATTLE RUNS

The content, method-of-firing, and performance-measurement issues discussed to this point indicate the different ways in which a platoon evaluation exercise can be designed and conducted. For example, the content can focus on platoon

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[26]Wheaton, G.R., Fingerman, P.W. & Boycan, G.G., Op. cit.

gunnery skills, on tactical skills, or on a mixture of these. The exercise can be live-fired, fired with simulated ammunition and target effects, or dry-fired. The platoon's performance can be evaluated in terms of basic skills or enabling behaviors, mission outcomes, or a mixture of these two.

The last topic in this section cuts across the preceding issues. One's purpose in conducting a platoon battle run is an important consideration. It will dictate the degree to which the exercise must be controlled and standardized.

The three principal purposes that platoon battle runs are often asked to serve have been alluded to throughout the preceding discussions. The first is for acclimation: to season and harden the platoon by exposing it to the realities and rigors of (simulated) combat. The platoon gains experience in coping with the stresses involved in conducting a tactically realistic mission. Realism is enhanced by employing live main gun ammunition, by having the platoon contest an OPFOR unit, or through a variety of other techniques. The flavor is that of a platoon-level, ARTEP field exercise, particularly as these are to be implemented at the Army's National Training Center.

The second is for diagnosis: to identify deficiencies in platoon performance, so that its performance can be improved. Ideally, the results of each run will shape the nature of subsequent platoon training. *The section and platoon battle runs* first proposed in TC 17-12-5[27] were designed with this purpose in mind. They were viewed as follow-on training activities to be conducted once individual crews had demonstrated their ability to shoot, by qualifying on Table VIII.

The third purpose is for qualification: to grade the platoon on a specific set of operations, tasks, behaviors, and/or performance objectives. In essence, this is a "licensing" function, or guarantee of performance capabilities. Virtually all battle runs, whether versions of Table IX or the PQE, are now conducted, at least ostensibly, for this purpose[28].

Each purpose is best served by a battle run designed specifically for it. The differences among the desired battle run characteristics for each purpose are explored below.

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[27] U.S. Army Armor School. Tank gunnery training. TC 17-12-5. Fort Knox, KY: Author, 1975.

[28] This emphasis is actually so recent that the Army is still in the process of developing a formal, Army-wide awards system for recognizing qualified platoons.

Acclimation battle runs are characterized by freedom of platoon action (within specified safety restrictions) during the conduct of highly realistic missions. The battle run is designed as a "scrimmage." One of several mission scenarios is selected (e.g., Movement to Contact/Hasty Attack); the platoon is ordered to carry it out. It endeavors to do so by making necessary preparations, developing plans, and then executing those plans. The platoon is free to do whatever it believes to be necessary in order to accomplish its mission (again, within broad constraints). Its behavior emerges in response to the momentary dictates of the tactical situation. As a consequence, on any given mission, the platoon will manifest only a portion of all of the behaviors in its repertoire. The particular sample will vary from one battle run to the next, and from platoon to platoon. The training cadre essentially "stands on the sidelines," monitoring and commenting upon the platoon's performance as it unfolds. The facets of performance which become available for scrutiny are in no way predetermined. The platoon's success in dealing with contingencies arising during the course of the battle run is discussed in "after-action reviews." But this is secondary to seasoning of the platoon.

By way of contrast, diagnostic battle runs are often designed as "drills." This approach is more focused and leaves less to chance. The specific types of platoon performance to be evaluated diagnostically are targeted and selected prior to the battle run. Instead of letting the platoon scrimmage, the evaluators require it to execute specific "plays" or drills (e.g., traveling overwatch, platoon fire commands, patterns of fire, etc.) that are of high priority in the training program of the moment. Freedom of platoon action is carefully constrained and controlled in order to generate the sample of compulsory behaviors that the evaluators are interested in. The focus is on practice, and identification of skills requiring additional practice.

Differences between diagnostic and qualification battle runs, if any exist, are a matter of degree. The "drills" may be even more sharply focused for qualification. As we have seen, the qualification exercise is tantamount to a licensing examination. Therefore, selection of the "test items" which are to constitute it must not be treated on a laissez-faire, haphazard or ad lib basis. As suggested in the guidelines developed by Allen, et al.[29], the content of this performance test needs to be stated unequivocally and specified prior to the evaluation. For the examination to be fair and meaningful, the examiners can not afford to let its content fluctuate

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[29] Allen, T.W., Johnson, E. III, Wheaton, G.R., Knerr, C.M. & Boycan, G.G., Op. cit.

randomly from run to run or from platoon to platoon. Insofar as possible, the kinds of performance that are to be evaluated, the conditions under which the examination will be given, and the standards that will be applied should all be standardized. This requirement is formidable inasmuch as it may be difficult, if not impossible, to exercise the degree of control required to administer the indicated test items within a realistic, mission-oriented, platoon battle run.

The difference in what constitutes the "best" battle run for each purpose points to the central theme of this paper. It is difficult if not impossible to accomplish all three purposes equally well within the course of a single battle run, at least as these are currently designed and implemented. In particular, the issue is whether the characteristics of a battle run conducted for the purpose of acclimation may be incompatible with those that prevail when the emphasis is on diagnosis or qualification. The characteristics promoting the one (i.e., the free-wheeling scrimmage format) appear to be at odds with those contributing to the other two (i.e., tight control to support evaluation of compulsory behaviors).

Under ideal circumstances such incompatibilities would not surface. Appropriate and sufficient resources would be available to conduct separate battle runs, each of which is carefully tailored to its purpose. One would be used to acclimatize platoons. The other would permit sound evaluation of specified behaviors for diagnosis and/or qualification. This two-stage scheme has many parallels in other domains of performance.

Because of present circumstances, however, the current gunnery program provides for a very limited number of battle runs. As a natural consequence, the Army tries to get as much as possible out of these limited opportunities by combining purposes. The approach that we have frequently observed is to attempt evaluation of platoon performance (usually for qualification rather than diagnosis) within a highly realistic, mission-oriented battle run. This is seldom satisfactory and leads to the search for other strategies as summarized in the next section.

SUMMARY: ALTERNATIVE BATTLE RUNS

In the preceding sections we have considered four major issues associated with the design, implementation and conduct of platoon battle runs: content, method of firing, performance measurement, and purpose. While there may be other issues as well, the ones discussed have significant design implications. They are significant because each of them can affect the quality of evaluative information obtained from a battle run.

It is important, therefore, that each option be resolved on the basis of a conscious and explicit decision-making process. This process must consider the interrelationships among the four issues, particularly because the most appropriate combinations of the first three may vary as a function of purpose.

Table 1 characterizes conceivable platoon battle run design options in terms of various combinations of three sets of factors: type of content, method of firing, and kind of performance measure. To recapitulate, the content of a platoon battle run can be specified to consist entirely of platoon gunnery skills (PG), or of platoon nongunnery techniques and tactics (PT), or of a mixture of these two in which elements of platoon gunnery and various tactics are integrated (PG&T). The battle run can be live-fired (LF), simulation-fired (SF), or dry-fired (DF). Performance can be measured in terms of enabling behaviors and intermediate outcomes (EB), terminal mission outcomes (MO), or a combination of these (EB&MO). The 27 cells in Table 1 represent all possible combinations of the three factors considered jointly.

We may begin an examination of these combinations by eliminating 14 cells from Table 1. In our opinion these cells are combinations that do not represent meaningful, logically defensible, or viable platoon battle run design options. For example, it would be difficult, if not impossible, to generate terminal mission outcome measures (specifically, casualty exchange ratios) if battle runs were live-fired (e.g., because of the extremely hazardous position in which the OPFOR would find itself) or dry-fired (e.g., because of the platoon's inability to inflict casualties or achieve target hits). This consideration eliminates 12 combinations consisting of cells involving live-firing (LF) or dry-firing (DF) and terminal mission outcome (MO) or enabling behavior plus terminal mission outcome (EB&MO) measures. (The 12 excluded cells are denoted by an "a" in Table 1.) Similarly, it would not be possible to evaluate platoon gunnery skills (PG) or platoon tactical skills (PT) if terminal mission outcome (MO) measures were the only measures recorded. Such measures, by themselves, have little if any diagnostic utility with respect to enabling behaviors and are of doubtful value as qualification criteria. This consideration rules out two more combinations, consisting of platoon gunnery (PG) and platoon tactics (PT) cells in which performance is evaluated exclusively in terms of terminal mission outcome (MO) measures (i.e., "b" in Table 1).

This initial culling leaves 13 combinations that represent potentially viable platoon battle run design options. These candidate battle runs are represented in Table 2 by means of numbers in the appropriate cells. Some of the relative advantages and disadvantages of these are discussed below, taking the different purposes of battle runs into account. The discussion

TABLE 1

Platoon Battle Run Design Options

Measures of Performance	Content: Platoon Gunnery Skills (PG) Firing			Platoon Tactics (PT) Firing			Platoon Gunnery & Tactics (PG&T) Firing		
	(LF)	(SF)	(DF)	(LF)	(SF)	(DF)	(LF)	(SF)	(DF)
Enabling Behaviors (EB)									
Mission Outcomes (MO)	a	b	a	a	b	a	a		a
Enabling Behaviors & Mission Outcomes (EB&MO)	a		a	a		a	a		a

"a" = battle runs involving live-firing or dry-firing and complete or partial reliance on mission outcomes measures; deleted from further consideration.

"b" = battle runs in which gunnery and tactical skills are measured solely in terms of mission outcome measures; deleted from further consideration.

TABLE 2

Alternative Platoon Battle Runs

Measures of Performance		Content: Platoon Gunnery Skills (PG) Firing			Platoon Tactics (PT) Firing			Platoon Gunnery & Tactics (PG&T) Firing		
		(LF)	(SF)	(DF)	(LF)	(SF)	(DF)	(LF)	(SF)	(DF)
	Enabling Behaviors (EB)	1	2	3	4	5	6	7	8	9
	Mission Outcomes (MO)								10	
	Enabling Behaviors & Mission Outcomes (EB&MO)		11			12			13	

is organized around the three types of content which may be of interest.

Platoon gunnery. Four alternatives exist for the evaluation of platoon gunnery skills, whether the resulting performance data are used for diagnosis of training deficiencies or for platoon qualification. In #1, live main gun ammunition is fired and platoon performance is measured in terms of basic enabling behaviors and skills. This version is essentially the same as the latest one prescribed for the XM1 PQE. This approach has no obvious advantages for evaluation. Its disadvantages are two-fold. Assuming that crews are already qualified in gunnery/marksmanship, then it is inefficient to continue demonstrating their mastery of this skill domain, particularly with expensive main gun ammunition. Platoon gunnery involves different kinds of skills that can be evaluated without firing. Moreover, even if strike-of-the-round data were desirable, various simulations are available that can provide such information with greater precision and reliability. Accordingly, if platoon gunnery is to be evaluated in terms of enabling behaviors, either #2 (simulated-fire) or even #3 (dry-fire) seems preferable to the first (live-fire). Given reasonable costs, the use of simulated-firing is better than dry-firing because its target effects can serve a motivational function as well as supplying strike-of-the-round information.

Moreover, the simulated-fire version (i.e., #2) can be used to supplement measures of enabling behaviors with certain intermediate outcome measures of performance. These can be related to the more basic gunnery measures in ways that help to clarify the possible mission impact of the diagnostic information and some of the trade-offs among enabling behaviors. For example, short engagement times combined with low hit probabilities may lead to high ammunition expenditures that would reduce the average number of targets destroyed before resupply, and thus reduce the probability of mission accomplishment. Measuring ammunition expenditure and estimating statistics such as hits per unit of time in contact or expected hits per ammunition load might help to establish the optimal balance between firing rate and hit probability.

Given an emphasis on the evaluation of platoon gunnery skills per se, either in support of platoon gunnery diagnostic evaluations or qualification exercises, option #2 or #3 is superior to #11. Option #11 represents a case where the realistic "scrimmage" approach, involving an explicit platoon mission, is needed in order to permit measurement of terminal mission outcomes. But such an approach would be in conflict with the highly controlled drills needed to measure platoon gunnery. Consequently, neither measures of the enabling gunnery behaviors, nor of the terminal mission outcomes would be par-

ticularly meaningful. Each would be constrained by the exercise conditions (e.g., control or free play) needed to support the other type of measurement.

For purposes of acclimatizing platoons to the stresses of combat, the same four battle runs assume a very different order. The first, particularly when fired within the context of an offensive mission scenario, provides superior exposure to the "pucker factor." The PQE fulfills this role by providing for offensive and defensive missions conducted during the day and at night. Perhaps the same qualitative experience could be provided, however, with the expenditure of fewer rounds. For example, an offensive day and a defensive night mission would cut the expenditure from 104 to 40 rounds. The #2, #3 and #11 alternatives are not realistic enough to acclimate the platoon to live-firing.

Platoon tactics. As indicated in Table 2, there are four options for the design of battle runs that conceivably could be used to evaluate platoon, nongunnery, tactical skills. Three of the four (i.e., #4, #5, #12) require the platoon to live-fire or simulate the firing of its weapons, even though the platoon tactical behaviors which are under scrutiny (e.g., signalling with flags, bounding overwatch, occupation of defensive positions) do not involve firing[30]. As a consequence, option #4 is not particularly appealing inasmuch as live ammunition would be expended for no apparent evaluative purpose. Option #12 is not attractive because, as was discussed earlier for option #11, it confounds the requirement for a scrimmage with the need for tactical drills. Even though firing of the platoon's weapons is not necessary, the simulated-firing in option #5 may represent a viable alternative, especially to the extent that it serves a motivational function. In our view, #6 appears most desirable for purposes of diagnostic evaluation or qualification. Its advantage lies in its relative cost-effectiveness and it has no obvious disadvantages.

Although not formally represented in Table 2, there also are variations of #5 and #6 that have possibilities for evaluating platoon tactics. In essence, the "drills" constituting #5 or #6 would be conducted, but they would be performed under the simulated fire of an OPFOR unit that attempted to inflict casualties on the platoon. Although the resulting supplemental, episodic outcome data (i.e., casualties sustained) might enhance the diagnosis of tactical weaknesses, it is unlikely that they could be used to support qualification decisions.

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[30] We recognize the fact that tactical and gunnery behaviors are not always clearly distinguishable. We have provided for simultaneous evaluation of such behaviors in several viable PG&T cells (see Table 2).

The acclimating of platoons is not likely to be accomplished particularly well by any of these design options. They are concerned exclusively with tactics. They do not represent a high degree of realism. The battle runs that appear best suited to acclimating platoons involve either live-fire or a scrimmage situation in which an OPFOR is returning the platoon's fire under free-play conditions.

Platoon gunnery and tactics. The content of the final set of five battle runs involves an amalgamation of platoon gunnery and tactical behaviors within the same exercise. Alternative #7 (see Table 2) is similar to #1, in that main gun ammunition is fired in both cases. It is not surprising, therefore, that #7 is very similar to the latest version of the M60 series Table IX in which gunnery and tactical skills are examined simultaneously.

From an evaluation perspective, either to diagnose deficiencies in platoon gunnery and tactical skills or to qualify platoons, the disadvantages of #7 are the same ones that characterized #1. It is not at all clear that target effects are necessary in order to measure these platoon behaviors. If they are, there are simulation approaches which may provide more reliable data. Therefore, alternatives #8 or #9 would appear to be more cost-effective. Again, for motivational purposes, one might use #8 in which firing of the platoon's weapons was simulated.

Alternatives #10 and #13 provide for an OPFOR that will attempt to inflict casualties on the platoon while it goes through its gunnery and tactical drills. The disadvantage of #10 is that it only provides for measurement of terminal mission outcomes. This would be a definite drawback were one attempting to isolate training deficiencies that require an evaluation of enabling behaviors. Similarly, qualification decisions made exclusively in terms of mission outcomes are problemmatic for a number of reasons, not the least of which is the specification of appropriate performance standards. Although #13 provides for measures of enabling behaviors to supplement the mission outcome data, it is not an attractive candidate for the purposes of qualification or diagnostic evaluation. This alternative probably cannot be readily formatted as a "drill," but must instead be conducted as a fairly free-wheeling scrimmage.

However, either alternative #10 or #13, when cast into the scrimmage mold, would appear to be a strong candidate for acclimating platoons. Although live-firing is not involved, these battle runs would still be stressful. The platoon has to conduct an offensive or defensive mission against a simulated OPFOR equipped to return fire. Either mission would require the platoon to apply its various gunnery and tactical skills in

order to survive. Option #7 can be used to acclimate the platoon to the realities of main gun firing, as currently is done in Table IX.

III. CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations resulting from the preceding discussion and appraisal of alternative battle runs fall into three categories. These include: a restructuring of the tank platoon gunnery and tactical program; the specification of new and additional types of battle runs that are necessary and sufficient to support that program; and the consideration of alternative ways of packaging those battle runs. Collectively, the recommendations are for an expanded program of training that differentiates as clearly between evaluation (for diagnosis or qualification) and acclimation exercises as available resources permit.

PLATOON TACTICAL GUNNERY PROGRAM

The fundamental concept in the current tank gunnery program is its hierarchical nature. Qualification at any one level is prerequisite for training and qualification at the next level. The focus systematically shifts from crewmen, to crews, to platoons. Within each level, training objectives are sequenced in difficulty.

The present paper addresses the last stage of this program. It begins as soon as a crew has qualified on Table VIII or the CCEE and culminates when the five crews constituting the platoon qualify as a unit on Table IX or the PQE. However, this terminal phase of the program is not conducted in the thorough and methodical manner that characterizes earlier segments. In particular, there are gaps in the types of platoon skills that are covered. For instance, at present the only chance a platoon has to acquire gunnery skills, outside of the context of Table IX, is on Table VP. And that table covers a very limited set of gunnery behaviors. Worse, the platoon has virtually no opportunity, prior to Table IX, to acquire and practice a wide variety of tactical skills. These gaps become even more significant when one realizes that current platoon battle runs (Table IX or PQE) are presumably final examinations, not diagnostic evaluation exercises. The successive-hurdles approach seen in the earlier stages of the program is also missing. Crews presumably go directly to the platoon qualification battle run, in essence bypassing a series of intermediate training and evaluation exercises.

Given this situation, the platoon gunnery program needs to be expanded in order to progressively train and chart the progress of platoons as they become proficient in gunnery and tactical skills. This may simply be a matter of making objectives of the present program more distinct and explicit. Six program objectives are suggested for this purpose, as follows:

1. Train tank platoons in basic platoon gunnery skills, give them an opportunity to practice those skills, and diagnostically evaluate their performance.

2. Certify the platoon's newly acquired skills by means of a platoon gunnery qualification exercise.

3. Train tank platoons in basic platoon tactical skills, give them an opportunity to practice those skills, and diagnostically evaluate their performance.

4. Certify the platoon's newly acquired skills by means of a platoon tactical qualification exercise.

5. Acclimate the platoon to the stresses involved in engaging the OPFOR on the modern, dirty battlefield.

6. Acclimate the platoon to the hazards involved in main gun firing under realistic mission conditions where gunnery and tactical skills are integrated.

BATTLE RUNS

Much of this paper has been devoted to a discussion and analysis of issues having significant implications for the design and implementation of platoon battle runs. When various combinations of design alternatives were considered, 13 battle run configurations were identified that vary in their presumed cost-effectiveness and suitability for different applications. Two of these, in fact, represent battle runs that are used by the Army in its current platoon gunnery program (Table 2, alternatives #1 and #7).

Given a platoon gunnery program that consists of the six objectives outlined above, which of the 13 battle runs previously discussed appear to be best suited for each application? Recommendations are given in Table 3.

Assuming that sufficient resources are available, six different and unique battle runs are suggested to accomplish platoon diagnostic evaluation in the course of practice exercises, qualification, and acclimation. Collectively, they represent the following emphases: The content consists of specific sets of component (i.e., gunnery and tactics) skills.

TABLE 3

Battle Runs Recommended to Accomplish Platoon Tactical Gunnery Program

Program Objectives	Recommended Battle Runs	Content	Battle Run Characteristics			
			Format	Firing	OPFOR	Measurement
1. Train & Diagnostically Evaluate Gunnery Skills	3.*	Gunnery Skills	Drill	Dry	None	Enabling Behaviors
	or 2.	Gunnery Skills	Drill	Simulated	None	Enabling Behaviors
2. Platoon Gunnery Qualification	2.	Gunnery Skills	Drill	Simulated	None	Enabling Behaviors
3. Train and Diagnostically Evaluate Tactical Skills	6.	Tactical Skills	Drill	Dry	None	Enabling Behaviors
	or 6v.**	Tactical Skills	Drill	Dry	Yes; MILES	Enabling Behaviors & Casualties Sustained
4. Platoon Tactics Qualification	6v.	Tactical Skills	Drill	Dry	Yes; MILES	Enabling Behaviors
5. Acclimatize the Platoon to Tactics	13.	Gunnery & Tactical Skills	Scrimmage	Simulated MILES	Yes; MILES	Enabling Behaviors & Mission Outcomes (After Action Review)
6. Acclimatize the Platoon to Gunnery	7.	Gunnery & Tactical Skills	Scrimmage	Live	None	Enabling Behaviors (After Action Review)

* Numbers refer to configurations in Table 2.

** 6v is a variant of 6 in which an OPFOR tries to inflict casualties on the platoon.

These are practiced and tested during separate drills and are then fused in the course of more realistic scrimmages. The program maximizes use of dry-fire and simulated-fire while concentrating primarily on measures of behaviors and processes instead of mission outcomes.

Platoon gunnery skills would be acquired and practiced in drills that are dry-fired or fired with simulated main gun ammunition (e.g., laser, Telfare, etc.). Target prioritization, distribution of fire, fire commands, fire patterns, overwatching fire, etc., would be practiced in offensive and defensive postures against multiple-target arrays. These skills would be certified by having the platoon qualify on a subsequent drill involving simulated firing of the main gun.

Platoon tactical skills would be practiced and evaluated in a dry-fire drill. Preparations, mission planning, movement techniques, visual signalling, reporting procedures, occupation of positions, etc., would be practiced in offensive and defensive drills. To drive home the consequences of improper use of the terrain, for example, an OPFOR could engage the platoon during specific drills, using MILES. The resulting feedback would be dramatic. Tactical skills would be examined during a subsequent dry-fire, qualification drill in which a MILES-equipped OPFOR participated.

Once a platoon was certified in both gunnery and tactics, it would be acclimated to carrying out an offensive and/or defensive mission against a controlled OPFOR[31]. MILES simulation would drive this scrimmage. The integration of platoon gunnery and tactical skills would be monitored, and the outcomes of various engagements would be recorded (reconstituting the platoon each time or not) to provide input to an after-action review or debriefing. Such missions would be conducted under realistic, dirty battlefield conditions.

The culmination of the program would be a live-fire battle run in which the platoon carried out an offensive and/or defensive mission against a hypothetical OPFOR. Again, performance during this scrimmage would be monitored to provide topics for discussion in an after-action review.

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[31]Given ample resources, the platoon could practice and qualify on battle runs designed to integrate tactical and gunnery skills prior to combining them in a scrimmage. These two additional battle runs would immediately precede the fifth stage of the program. Candidates would consist of PG&T drills as in alternatives #9 or #8 (see Table 2).

TRADE-OFFS

We realize that the recommended program and its constituent battle runs are ambitious undertakings. They represent one opinion about the kind of platoon training and evaluation that is needed and about the best means of providing it. Most importantly, these suggestions have been offered without taking into account the exact nature and severity of current or future constraints on resources. We have assumed the ideal, undoubtedly unrealistic. Compromises and trade-offs will be required in order to implement the program described above.

However, in making adjustments to accomodate the program to available resources, one of its features must remain uncompromised. The performance evaluation function must continue to be clearly differentiated from others that may be of interest as well. The implication of this requirement is straightforward and inescapable. Whenever one wants to evaluate the platoon's performance, by measuring its proficiency during training or grading its capabilities for qualification, the standardized drill format must be followed. Given this single restriction, the program and its separate battle runs can be packaged in an almost endless variety of ways to cope with diminished resources. For example, it may be possible to embed evaluation exercises within the mission scenarios. In essence, the scrimmage is interrupted periodically to introduce selected test items. Creative packaging of this type may permit training and evaluation of the same content in fewer battle runs.