



Research Report 1993

**An Examination of Tailored Training Offsets on
Core Mortarman Skills Acquisition**

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**United States Army Research Institute
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The authors are grateful to the Cadre and instructors who assisted us in collecting information on how 11C mortar training is conducted and in identifying possible means to enhance the training for new Soldiers. Most important, the success of this research relied on the experienced instructors who provided their insights and forthright comments concerning how mortar training could be improved.

AN EXAMINATION OF TAILORED TRAINING OFFSETS ON CORE MORTARMAN SKILL ACQUISITION

EXECUTIVE SUMMARY

Research Requirement:

Army course proponents and training developers work to adapt training to meet Soldiers' skill development needs and MOS training requirements. In developing and executing training, they are often faced with schedules that limit the number and depth of topics that can be covered in a given program of instruction (POI). Therefore, they must determine which topics and tasks need to be included in the POI, and which need to be excluded, in order to develop the skills Soldiers will require after graduation.

One way that this type of situation is addressed is through training offsets. Training offsets are techniques applied to counteract identified deficiencies in training time and/or resources (U.S. Army Training and Doctrine Command [TRADOC], 2011b). This research focused on the planning and execution of training offsets in 11C One Station Unit Training (OSUT) as it was undergoing a period of significant organizational realignment. The purpose of the research was to (a) identify generalizable principles and strategies for applying training offsets, (b) examine the impact of training offsets in 11C OSUT, and (c) provide guidance and tools for developing effective training offsets to enhance Soldiers' core skills proficiencies.

Procedure:

The researchers systematically observed portions of the current 11C Infantry OSUT course, interviewed key trainers and leaders, and captured performance data from multiple sources. Data collection began following the consolidation of 11C training into a single BN in late 2013 and continued through early 2015. The restructuring of 11C OSUT was in progress when the research concluded, therefore the researchers were unable to document all initiatives to fruition. However, much of the information gathered in this research was fed back into working groups to support revisions to the current 11C POI and to develop metrics.

Findings:

The findings presented in the research report concern both recommendations to 11C OSUT and more general recommendations concerning selection and application of training offsets. They include both best practices and lessons learned during the research period. The most prevalent training offset used in 11C OSUT was concurrent training. Concurrent training is typically a planned and resourced training activity that co-occurs with a primary training event. Findings suggest that training offsets should focus on skills that are transferable to the primary tasks targeted by a course POI. This maintains a link between the topics specified for in-depth training in a POI with the offset training provided as a primer, supplemental, or integrative learning experience. This may be accomplished by focusing offset training on simpler, generalizable skills that support later learning of more in-depth tasks. Offset training should focus on subject matter that does not introduce too many unfamiliar concepts, builds on what

Soldiers already know, anticipates what will be trained in-depth at a later time, and focuses on what can be learned in a brief time using available resources. Ongoing periodic, informal assessments may help to identify skills that should be addressed by offset training. In the weeks immediately preceding more intensive training on a task, Soldiers may benefit from receiving offset training on related topics to familiarize them with the general subject area. Finally, concurrent training used to offset gaps in primary training should focus on skills for which the training can be properly resourced by the unit. While concurrent training may not be always conducted to the standard specified in doctrine, it may still provide support for later training that will bring Soldiers up to the standard.

Utilization and Dissemination of Findings:

The research was sponsored by the leadership of the 198th Infantry (IN) Brigade (BDE) at Fort Benning, GA. The results of this research were briefed to leaders and trainers within the 198th IN BDE in October and November of 2014. The researchers also worked with the Mortar Training Committee to develop a Mortars Knowledge Test and a Mortars Application Test to support the evaluation of offset training received prior to the concentrated mortars training period and to support assessment following the mortar training period. These tests and recommendations for their use were provided to the Mortars Training Committee in February and March of 2015.

AN EXAMINATION OF TAILORED TRAINING OFFSETS ON CORE MORTARMAN SKILLS ACQUISITION

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An Examination of Tailored Training Offsets on Core Mortarman Skills Acquisition

Introduction

Army course proponents and training developers work to adapt training to meet Soldiers' skill development needs and specific MOS training requirements. In developing and executing training, they are often faced with tight schedules that limit the number and depth of topics that can be covered in a given program of instruction (POI). Therefore, they must determine which topics and tasks need to be included in the POI, and which need to be excluded, in order to develop the skills Soldiers will require after graduation.

To address potential gaps, training offsets are often applied. Training offsets are techniques intended to counteract deficiencies due to limited training time and/or resources (U.S. Army Training and Doctrine Command [TRADOC], 2011b). Training offsets typically include concurrent training and hip-pocket training. Concurrent training is executed as a secondary training event co-occurring with a primary training event (Department of the Army, 2013). It is planned in the unit training schedule, and includes coordinating the necessary supporting resources (e.g., time, equipment, trainers). Hip-pocket training (also called opportunity training) is usually not planned, coordinated, and specified on a training schedule (Combined Arms Center, 2013). Hip-pocket training uses on-hand resources and is executed when unplanned free time becomes available during or between training events.

This research focused on the planning and execution of training offsets in Mortarman (11C) One Station Unit Training (OSUT) as it was undergoing a period of significant organizational realignment. The purpose of the research was to (a) identify generalizable principles and strategies for applying training offsets, (b) examine the impact of training offsets in 11C OSUT, and (c) provide guidance and tools for developing effective training offsets to enhance Soldiers' core skills proficiencies.¹

Mortarman Training

Although the intent of institutional mortar training has been consistent over the past 30 years, the method of conducting it has varied. In the early 1980s, Infantry OSUT Companies (COs) selected Soldiers from within their OSUT units to undergo 11C training for a portion of OSUT. The remaining OSUT Soldiers continued training on Infantry (11B) skills (Fusha, Renn, & Thompson, 1984). In more recent years, some Infantry OSUT Soldiers remained at Fort Benning to participate in 11C skills training after completing 11B skills training.

At the start of this research in November 2013, the process had changed to designating an entire CO of Infantry OSUT for 11C training. These OSUT COs conducted 11B skills training during the initial weeks of OSUT, then all assigned Soldiers participated in a two-week

¹ This research was sponsored by the 198th Infantry (IN) Brigade (BDE) at Fort Benning, GA., to support the realignment and consolidation of Mortarman (11C) OSUT, which began in late 2013 and was ongoing when this research concluded in 2015.

concentrated mortar training period. The final portion of the course was designed to integrate both 11B and 11C skills during a field training exercise (FTX).²

Additionally, in 2013, all institutional mortar training assets were consolidated into a single Battalion (BN). Three COs within this BN were designated to conduct either 11B or 11C OSUT, depending on whichever they were assigned for a particular training cycle. All 11C OSUT courses were to be conducted by these three COs. The Mortar CO was assigned to the same BN as the COs responsible for conducting 11C OSUT. The Mortar CO conducted the two-week concentrated mortar training period discussed earlier. The expressed intent of this action was to consolidate all mortar training responsibilities and assets into a single organization to facilitate coordination and make better use of available training capabilities.

Training Offsets Research Problem

11C training has faced a consistent challenge across these different organizational alignments and training strategies. Soldiers selected to be trained as 11Cs must also be trained in many 11B skills. In spite of this need, the length of OSUT courses for both 11Bs and 11Cs is currently the same. Whatever MOS-specific training 11Cs receive is time in which they will not be learning 11B skills. One way this issue has been addressed is to concentrate 11B skills primarily in the first weeks of 11C OSUT, with 11C skills provided as offset training during that period. The prevailing training offset used in 11C OSUT was concurrent training. Concurrent training involves training multiple tasks simultaneously, with Soldiers moving between a primary training event (e.g., grouping and zeroing a rifle on a range) and a secondary training event (e.g., dime and washer drills). The secondary event is designated as concurrent training, since it is being executed at the same time as primary training events as time and resources permit.

The 198th IN BDE Lesson Plan Book (version 3), which serves as a training reference for unit leaders, specifically addresses concurrent training in Appendix G (see Neumann & Evans, 2012). The Lesson Plan Book prescribes that concurrent training should be conducted at every training event. It mandates that trainees should ‘not be relegated to sitting in bleachers waiting their turn to conduct the primary training event.’ The general idea is that concurrent training events provide a way to allocate training time that could be potentially lost toward learning new skills and practicing tasks. Concurrent training in this context is intended to provide repetition for critical tasks or to ramp up Soldiers in preparation for future events (TRADOC, 2013).

When determining what skills should be trained as primary training events and which should be trained concurrently, decisions are often made with the understanding that excluding one topic in favor of including or expanding on another may lead to some domains being more or less emphasized in Soldiers’ essential knowledge and skills following graduation. Even given the important role that training offsets play in addressing Soldiers’ training needs, little research has addressed how topics are selected for offset training as well as how and when they should be trained in order to support a viable training outcome for Soldiers. This research is intended to be a starting point in addressing these concerns.

² During this research effort, the 11C POI was being revised. This information is based on discussions with the Infantry OSUT leaders, the draft Course Map available at the time, and researcher training observations.

Method

A variety of qualitative and quantitative data collection techniques were used to focus the research on specific training offsets applied in 11C OSUT as well as to derive generalizable principles (Creswell, 1998). These techniques included observation of working groups, individual and focus group interviews, training observations, and analyses of unit data archives to track developments in mortar training. Much of the information gathered in this research was provided to key leaders to help inform their decision making processes during revision of the current 11C OSUT POI (i.e., action research; see Kemmis & McTaggart, 2000).

To gather background information on 11C OSUT at the outset of the research, the researchers observed mortar unit leaders during a planning workgroup that discussed the current state of mortar training and identified potential modifications. This meeting provided context to enable the researchers to plan for later observations and data collections. The researchers then observed OSUT units conducting training and during their FTXs to identify and document any training offsets that were being applied. At the conclusion of each training cycle, the researchers interviewed Drill Sergeants (DSs) and unit leaders concerning the training offsets their units employed, and other issues they noted during execution of training. Researchers also observed six iterations of the concentrated two-week mortar training period at various points in time, gathered Soldier performance data on the Gunner's exam completed at the end of each mortar training period, and interviewed Mortar Training Committee Cadre. Findings from an analysis of this data were provided to unit leaders during planning meetings to inform decisions on revisions to the 11C POI. Finally, two tests of mortar knowledge and mortar applications were developed and administered to assist mortar training Cadre in determining their Soldiers' level of mortar knowledge when beginning their two-week period of concentrated 11C training, and to assess Soldiers following the concentrated 11C training. The details and findings for each of these data collections are provided in the Results section of this report.

Participants

Data were collected from a range of personnel responsible for mortar training. Due to the limited number of participants, some were interviewed more than once at various points in the research process. For example, several of the 30 personnel who participated in the initial planning workgroup also provided information at various other points during the research effort. A general summary of research participants is presented here to reduce repetition in later sections of the report and to acknowledge the breadth of personnel who contributed to the data.

Mortar Training Committee. In the units we observed, a group of approximately 20 Noncommissioned Officers (NCOs) are assigned to a committee responsible for conducting a two-week 11C concentrated mortars-specific training period. This two-week period constitutes the entirety of formal mortar training for Soldiers during Infantry OSUT. All Cadre members were graduates of the Infantry Mortar Leaders Course³ and their experience ranged from a few days as an instructor to more than three years. Researchers observed the Cadre conducting

³ The Infantry Mortar Leaders Course is intended to prepare early-career commissioned officers and mid-career NCOs to serve as leaders of mortar platoons. The course is required for cadre who serve on the Mortar Training Committee.

training, participated in informal discussions with most Cadre members to gain an understanding of mortars training in OSUT, and also conducted a formal interview with about 90% of them (see Table 1).

Company Trainers and Leaders. As described earlier, under the newly aligned organization, three COs within the BN are responsible for conducting Infantry OSUT for 11C Soldiers. These unit leaders, consisting of CO Commanders and First Sergeants, participated in our interviews. Due to personnel turnover during the research period, members of the CO Command Teams ranged from less than two months in the unit to almost three years. In addition to the unit leaders, DSs in each CO were key contributors. They provided data and informal comments throughout the training period, while also participating in an interview session at the end of their training cycle. The DSs’ experience ranged from less than one month to two years. None of the DSs in the newly aligned organization had previously executed an Infantry OSUT 11C training cycle.

In addition to the personnel in the newly aligned battalion, DSs from a different CO participated in interviews. This CO was the last unit to conduct an 11C OSUT training cycle prior to the consolidation of 11C OSUT into a single battalion. Table 1 presents the distribution of all CO interview participants.

Table 1
Number of Personnel by Organization

Company Interviews		
Organization	Leaders	DSs / Trainers
Unit #1	2	8
Unit #2	2	8
Unit #3	2	6
Unit #4	--	12
Total	6	34

Results

The following sections review the outcomes from analyses of each of the data collections. The sections focus respectively on the planning workgroup, interviews and focus groups, documentation of training offsets, field training exercises, the Gunner’s Exam, and finally, on two tests developed to assess concurrent training Soldiers received prior to the two-week concentrated mortars training, and again following the two-week mortars training.

Planning Workgroup

Since consolidating all mortar training assets within a single BN began at the outset of this research, the BN commander convened subordinate leaders and trainers to discuss how the 11C consolidation could be structured to optimize training for Soldiers. This gathering provided the research team with a number of insights into aspects of the current mortar training program, helping to target our later observations concerning training offsets.

Method. The commander organized workshop participants into four working groups. Each group was assigned a focus area with questions and topics for discussion. The intent was to identify potential deficiencies in the current mortar training program and explore ways to improve it. The discussion groups focused on the following topics:

- standards for 11C leader development and certification required for the COs within the BN, including the newly assigned Mortar Training CO,
- the effectiveness of the two-week concentrated mortar training period, and the level of mortar support needed for the end-of-course FTX,
- whether the 11C skills aligned to the proper skill level, including alignment of the 11C Course Map with the Brigade Lesson Plan Book,
- synchronizing training and available assets to most effectively train new 11Cs, and determining how mortar training records should be maintained.

Each of the four discussion groups contained CO leaders (Commander, First Sergeant, senior DS), members from the Mortar Training CO, and DSs from the units responsible for conducting mortar training. Groups discussed topics within assigned focus areas, captured suggestions and key issues, and then developed recommendations. A different research team member observed each group and assisted the group leader in consolidating outcomes from the discussions. At the end of the day, all participants reconvened so each group could provide a summary of its discussions and conclusions.

Results. The researchers noted that there appeared to be some overlap between the discussions and recommendations of the groups. The following summarizes the points we took away from the session which were relevant to planning and execution of training offsets.

Only a portion of the DSs who were assigned to the training units were 11C NCOs, the remainder were 11Bs. To ensure all DSs in the unit were prepared to assist with 11C training, both to augment the Mortar Training Committee during the two-week concentrated training period as well as to conduct offset training throughout the cycle, a certification process was recommended. An option for accomplishing this certification included having the Mortar Training CO establish a program to refresh or train 11C Skill Level 1 tasks to all DSs during the break between training cycles. In concert with this recommendation was the suggestion for ensuring all leaders were familiar with 11C training tasks and standards. This was intended to allow leaders to spot-check training events to ensure adherence to task standards.

Participants recognized that training time in 11C OSUT was limited and was often consumed by mandatory tasks. The challenge was to identify what 11C tasks could benefit from additional training and when this training could be conducted. One recommendation was to determine what 11C tasks should be taught as concurrent training, when they should be taught, and by whom. One suggestion was to document concurrent training in the 11C POI so the training events could be planned for and any necessary training support coordinated. Additional discussion concerned what 11C tasks should be integrated into the culminating FTX. Potential

tasks and training events were discussed with the recommendation to determine a standard set of tasks and events to include in the FTX for consistency across training COs and to ensure adequate resources could be provided.

The researchers noted the following training offsets related recommendations emerging from the working group:

- Update the Brigade Lesson Plan Book to reflect the 11C training tasks. Suggested offset training events could be designated throughout the lessons to ensure that the appropriate 11C tasks are trained and the Mortar Training CO can plan its support for these events. This was intended to ensure mortar training would be integrated throughout all phases of the 11C OSUT course.
- Revise training support packages (TSPs) so 11C-specific training would be included and the most current POI lessons are captured. This was targeted at ensuring squad tactical training included mortar-specific topics were included.
- Compile and distribute a Mortar Handbook with technical data and information that could be studied by all Soldiers. This would mainly extract relevant Skill Level 1 information from the doctrinal manuals for easier Soldier reference during OSUT. Soldiers could also take the Handbook with them after graduating. This would be effective in engaging Soldiers in self-study prior to the two-week concentrated mortar training. However, such a strategy could become cost prohibitive due to expenses required for publication and distribution.
- Draw mortar equipment to be used in the training cycle, for both primary and offset mortar training, with ample time to inspect all items for serviceability. Identify equipment in need of repair and get it replaced or repaired so Soldiers have the necessary mortar systems to support training.

Summary Discussion. The researchers used the findings from the planning workgroup to guide our data collection plans and observations. The recommendations we documented in the planning workgroup are reviewed in greater detail in the Discussion section of this report.

Interviews with Mortar Training Cadre, Unit Leaders, and DSs

Members of the researcher team conducted interviews and focus groups to capture additional first-hand information from those who were directly involved in planning, scheduling, and conducting 11C OSUT training. These groups included the Mortar Training Committee personnel, 11C OSUT DSs, and 11C OSUT CO Commanders. These interviews allowed us to capture data relevant to their perspectives on execution of primary and offset mortars training.

Method. Following the 11C concentrated two-week training period, 17 Mortar Committee personnel were interviewed in small groups. Interview sessions generally lasted 1 to 1.5 hours, with three to six participants in each group. The interview protocol for these sessions is provided at Appendix A. Each session started by asking about any mortar-specific training

Soldiers received prior to the two-week concentrated period conducted by the Mortar Committee. The purpose was to identify 11C tasks or subjects that DSs intended to prepare the Soldiers for the two-week concentrated mortars training period. When Cadre noted any use of offset training, questions centered on what tasks, how it might have impacted the Mortar Committee training period, and which units excelled at providing 11C-focused offset training. In addition, interviewers solicited ideas for what tasks to delete from or add to the current two-week concentrated mortar training period to identify recommendations for topics to be covered in offset training.

In addition to the Mortar Training Committee, unit leaders and DSs responsible for conducting primary and offset training events, as well as planning and executing the end-of-course FTX, were interviewed. Following the completion of a CO training cycle, researchers interviewed the CO leaders and DSs using the appropriate sections of the protocol at Appendix A. Interview sessions were conducted in small groups. CO leaders, usually the Commander and First Sergeant, were interviewed together, while DSs participated in groups of three to six personnel, with sessions generally lasting 1 to 1.5 hours. Questions addressed the 11C training planned and conducted by the unit prior to and after the concentrated mortars period, the resources available for conducting 11C training, and any lessons learned they might have identified from conducting the recent 11C OSUT training cycles. Themes that were consistent across interviews with each of the three groups of participants are presented below.

Results from Mortar Training Committee. The Cadre believed that CO DSs were capable of providing mortar training to Soldiers as offset training, but at times did not have the necessary equipment. The Cadre believed that unit DSs could introduce mortar tasks, such as emplacing the mortar, reading sight data, positioning aiming posts using hand and arm signals, and adjusting the sight for small deflections. However, limited resources reduced DSs' ability to train Soldiers to standard prior to their arrival at the two-week concentrated training period. Often Cadre reported that they needed to work to improve Soldiers' performance of referring and realigning the aiming posts and properly slipping the scale on the sight, which they believed were not typically trained to conform to the doctrinal procedures in offset training (Department of the Army, 2014).

All Cadre agreed that some COs better prepare their Soldiers on mortar tasks, and a number of Soldiers arrive at the Mortar Training Committee site with a strong knowledge base. The Cadre uses the more knowledgeable Soldiers to assist with training. Despite offset training conducted by units, the majority of the mortar Cadre maintained that the full two-week concentrated training period was absolutely necessary to train Soldiers to the required standards.

Results from Drill Sergeants (DSs). Each of the COs had between five and 10 11C DSs assigned, with their time as a DS varying from newly arrived to 21 months. All DSs reported a variety of 11C offset training events and activities scheduled and conducted prior to the two-week concentrated mortar training period, by a mix of Mortar Committee Cadre and unit DSs. Tasks varied between the COs but generally included reviewing characteristics of the mortar systems, placing the mortar into operation, and practicing adjusting the mortar system for deflection changes. Each CO used the assigned 60mm and 81mm mortar systems to execute the training offsets and did not use any other training aids or devices.

While some DSs indicated they attended a two-hour familiarization class during a cycle break, none of the DSs had completed or been required to complete an 11C certification program. All knew that 11C TSPs and associated training materials were available to them. They also said they could easily talk with Mortar Committee Cadre if they had questions about 11C training. All the DSs we interviewed emphasized that they could conduct all required 11C task training, if they had the necessary resources (e.g., more mortar systems, more time, more trained 11C DSs).

The only mortar tactical training Soldiers received was conducted during the FTX and was taught by the DSs. This generally included construction of a mortar firing pit, hasty occupation of a firing position for a hip shoot, and moving tactically while carrying the mortar systems. The DSs suggested that more FTX time should be devoted to 11C training.

The recommendation was made for a Soldier Handbook containing basic mortar information that would be helpful to facilitate training, support self-study, and serve as a useful reference once Soldiers graduate from OSUT. Contents of this handbook could include characteristics of all mortar systems and ammunition, step-by-step procedures for passing the Gunner's Exam, responsibilities of each member of the mortar crew and of mortar platoon organizations. This handbook could also serve as a condensed version of the doctrinal manual.

Results from Company Leaders. While the CO leaders we interviewed stated they did not plan any 11C training on their schedule, all indicated that they did conduct offset training on placing the mortar into action, and one also provided some training on mortar ammunition. The 11C offset training was generally conducted by a mix of Mortar Committee Cadre and the 11C DSs assigned to the units. None of the 11C DSs in the COs had attended a task certification program, but they did have access to the 11C instructional material and had direct access to the Mortar Committee Cadre, if desired.

Each of the COs used actual 60mm and 81mm mortar systems for their offset training, but did not use any other training devices. These leaders generally agreed that more 11C tasks could be taught as offset training by the unit DSs, if they received the necessary resources (e.g., more time, more mortars, more DSs).

To increase Soldier training on 11C tactics and operations, these leaders suggested that the FTX could be modified to provide more emphasis on mortar-specific subjects. One group recommended that two days of urban operations training could be replaced by small unit 11B tactical training that is currently covered in the FTX, so those two days of the FTX could be used to focus on 11C tactical training.

Summary Discussion. All groups generally agreed that unit DSs possessed the knowledge, skills, and abilities to train Soldiers in 11C tasks. However, resources (e.g., time, equipment, sufficient Cadre) limited the scope and effectiveness of the offset training they could provide. Given that 11C offset training in the unit was often concurrent training, and conducted with reduced resources, it could not be conducted to the same standard as the training Soldiers received in the concentrated two-week training with the Mortar Training Committee.

Interviewees suggested that Soldiers would benefit from increased mortar tactical training. They offered potential improvements that closely aligned with recommendations from the Planning Workgroup. These ideas included integrating mortar tactical training into unit concurrent training plans, modifying the two-week concentrated mortar training period to present more tactical subjects, and revising the unit FTX to make it more 11C-focused.

Offset Training: Topics and Timing

Researchers collected data on the type of mortar tasks trained and the amount of time devoted to this type of training in 11C OSUT prior to the two-week mortar training period. Given that the researchers were unable to observe all training during the cycles covered by this research, each week we asked unit DSs to complete checklists on the offset training provided.

Method. Prior to the two-week 11C concentrated training period, there was no 11C-specific block of training identified on unit training schedules, even though DSs and leaders indicated they conducted 11C training offsets at various points in the training cycle. During five 11C OSUT training cycles, a member of the research team met with unit DSs weekly to capture information on 11C-focused training that had been conducted during the week. This process continued until the unit began its two-week training period with the Mortar Training Committee. Information provided by the DSs included such details as tasks trained, how the training was conducted, amount of time spent training, and location of training. A synopsis of the data collection form is in Appendix B.

Results. Even though researchers attempted to distinguish between mortar training that the unit might have planned for as a concurrent training event and mortar training that was conducted in a hip-pocket opportunity, participants did not make this distinction. Therefore, the data were combined to represent 11C training offsets overall.

While higher-level units might provide guidance, offset training events generally can be for any subject selected by the unit leaders and DSs. For this research, we did not attempt to determine all offset training events conducted by the unit, but rather to capture information for 11C-specific events leading up to the concentrated mortar training period.

It is worth noting that offset training events can be conducted by the unit Cadre, or any other external sources, if arranged by the unit leaders. In the case of 11C mortar training, some of the unit DSs and the Mortar Training Committee instructors were available to conduct mortar offset training. To support mortar offset training, units received three complete 60mm and 81mm mortar systems during the third week of 11C OSUT.

Researchers captured data on the 11C mortar-focused training conducted by three units, as each unit conducted two 11C OSUT cycles. Researchers were able to observe selected offset training events; the overall data presented in the following tables was provided by the training Cadre. Table 2 provides a brief summary of 11C focused offset training timing and duration.

As seen in Table 2, units varied concerning how much and when offset training was conducted. Each unit spent a different amount of time conducting 11C training offsets, between units and training cycles.

Table 2
Summary of 11C-Focused Offset Training Timing and Duration

Unit	Offset Training Hours	OSUT Week									
		2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	
1-1	--	--	--	--	--	--	--	MTC			
2-1	24h										MTC
3-1	18h										MTC
1-2	31h							MTC			
2-2	32h										MTC
3-2	14h										MTC

Note: Unit 1-1 means first unit, first training cycle; 3-2 means third unit, second training cycle. MTC indicates start of concentrated mortars training with Mortar Training Committee. No data were available for Unit 1-1.

Because of time constraints and limited training resources only selected mortar tasks could be included in offset training events. Table 3 identifies the tasks units reported training along with when they were trained and the amount of time spent.

Table 3
Mortar Tasks Included in Offset Training

Task	Unit 2-1		Unit 3-1		Unit 1-2		Unit 2-2		Unit 3-2	
	Week	Hours	Week	Hours	Week	Hours	Week	Hours	Week	Hours
60-mm Mortar										
Maintain mortar	7	1	--	--	--	--	6	2	8	2
Place mortar into action (handheld)	8	2	--	--	3	4	--	--	--	--
Lay a mortar	8	2	8	3	--	--	--	--	--	--
Perform mortar safety checks	--	--	--	--	3, 6	4	--	--	--	--
Place into action	7	1	8, 9	3	3, 6	4	6, 9	4	8	2
Take out of action	7	1	8	2	3, 6	4	6, 9	4	8	2
81-mm Mortar										
Maintain mortar	7	1	--	--	--	--	6, 7	4	--	--
Lay a mortar	8	2	8	3	--	--	--	--	--	--
Perform mortar safety checks	9	1	--	--	3	1	--	--	--	--
Prepare ammunition for firing	9	2	--	--	--	--	--	--	--	--
Place into action	7 - 9	5	8, 9	4	3, 6, 7	7	6 - 9	8	8, 9	4
Take out of action	7, 9	5	8	3	3, 6, 7	7	6 - 9	8	8, 9	4

Table 3

Mortar Tasks Included in Offset Training (Continued)

Task	Unit 2-1		Unit 3-1		Unit 1-2		Unit 2-2		Unit 3-2	
	Week	Hours	Week	Hours	Week	Hours	Week	Hours	Week	Hours
120-mm Mortar	No training documented									
Mortar Tactics										
Emplace aiming posts	7	1	--	--	--	--	6	2	--	--
Totals	7 - 9	24	8, 9	18	3, 6, 7	31	6 - 9	32	8, 9	14

Note: Unit 2-1 means second unit, first iteration. There were 3 units, each with 2 iterations. There was no data collected for Unit 1-1. Unit 1-1 was already in the two-week concentrated training period conducted by the Mortar Training Committee at the start of the research.

Of the 43 mortar tasks identified in the 11C OSUT POI (currently under revision), units identified 13 tasks for which offset training was conducted. No time was used for the 120mm mortar since the units did not have that system available. Two of the units concentrated on six or seven tasks while one unit included 12 tasks. Consistently across both units and training cycles, the preponderance of offset training was to place the mortar into and to take it out of action. One unit also conducted offset training for ammunition and emplacing aiming posts. Two units reported that Mortar Training Committee Cadre assisted with offset training events, but did not specify which tasks were trained, the amount of time spent, and the number of personnel who assisted. Since the Mortar Training Committee had become an available asset just a few months prior to the units conducting 11C OSUT, there was not yet an established routine for integrating this additional capability into offset training events.

Summary Discussion. As shown in Table 3, units varied in terms of tasks trained, the amount of time spent conducting offset training, and when the offset training occurred within the training cycle. This pattern held both between units and between successive cycles. Units were similar in focusing on placing into and taking out of action the 81mm mortar system.

One of the recommendations from the Planning Workgroup was that 11C offset training events should be designated for specific lessons in TSPs and throughout the training cycle. This would help ensure that the appropriate 11C tasks are trained and the Mortar Training CO could plan to support these events. While this strategy may be effective, the researchers observed that focusing offset training on tasks related to the Gunner's Exam in the weeks preceding the concentrated 11C training period did seem to yield benefits.

Field Training Exercise (FTX) Observations

Each 11C OSUT CO plans and conducts a five-day FTX as a major culminating event at the end of the OSUT training cycle. While training tasks are specified in the 11C OSUT POI, CO leaders determine what training events will be conducted and how they will be executed. The researchers collected data on the units' FTXs to document 11C-specific training that followed the concentrated mortars training.

Method. To ascertain the 11C focused training conducted during the FTX, a researcher conducted on-site observations following the mortar training period. An observer spent about two hours per day on-site during each CO FTX for three different COs. Based on observations

and information provided by the CO trainers, details were documented concerning what 11C events were conducted, how the training was executed, the amount of time spent on each training event, and other general information about the training.

Results. For all COs, four of the five days consisted of tactical training events, with the platoons rotating between the major events. Generally, each platoon spent two days focused on mortar training. Each of the two days followed the same general sequence. This included moving cross-country carrying mortar systems, occupying a mortar firing position on a live fire range, and allowing each Soldier to fire live mortar rounds. Due to limited mortar systems, only a small portion of the Soldiers experienced carrying components of the mortar systems while moving cross country. During movement, Soldiers were instructed to halt movement to emplace the mortar system to provide quick-response mortar fire in support of a friendly unit. Only selected Soldiers had this opportunity. Upon arrival at the mortar firing range, Soldiers emplaced their mortar systems in an area adjacent to the firing range. All personnel then moved to the firing area where mortars were already set-up and ready to fire. Each Soldier then had the opportunity to fire approximately four live rounds each day, depending on available ammunition. Once all Soldiers had an opportunity to fire live mortar rounds, the unit recovered its mortar systems and conducted a cross-country movement back to the FTX site. The tactical movement to and from the live fire range was executed under DS supervision while the live fire range was executed by the Mortar Committee Cadre.

During the other two days of the FTX, while waiting to conduct various tactical events, Soldiers participated in digging and constructing a mortar firing pit. Typically, a squad of 15 Soldiers would work for an assigned period of time, then a different squad would continue with the effort as squads moved on to other tactical events. Mortar pits varied significantly between the units (e.g., depth of the hole, or amount of sand bag protection).

While the two days of mortar-focused training were generally the same for all COs, each CO conducted somewhat different mortar training during the remaining two days of the FTX period. Table 4 summarizes the additional mortar-focused training conducted by each CO.

Table 4
Differences in Mortar Training Conducted During FTX

Unit	Mortar-Focused Training
Co 1	<ul style="list-style-type: none"> • Used a Mortar Training Committee Cadre member to assist during FTX • Under mortar Cadre supervision, Soldiers acted as a fire direction center (FDC) to provide firing commands to mortar crews • Mortar crews conducted dry fire responding to FDC commands
Co 2	<ul style="list-style-type: none"> • Constructed multiple mortar pits • Ensured mortar pit included an area to protect ammunition • Practiced reciprocal lay of mortar and emplacing aiming posts • Mortar laying techniques at night • Besides mortar systems, also carried ammo canisters during cross-country movement
Co 3	<ul style="list-style-type: none"> • Constructed multiple mortar pits and connected them with a trench

Summary Discussion. While each CO planned and conducted its five-day FTX as desired, the general events and execution of the training were similar for all three COs. In addition, each CO included some 11C-specific training that varied from the others.

Similar to recommendations for offset training, the initial planning workgroup had recommended that a standard set of 11C tasks be identified and integrated into the culminating FTX. Doing this would likely provide for greater consistency across training COs and would ensure training support resources could be provided, including support from the Mortar Training Committee Cadre. Moreover, the FTX appeared to provide a means to integrate mortars tasks with other knowledge and skills required of Soldiers prior to graduation from 11C OSUT.

Concentrated Two-Week Mortar Training and Gunner’s Exam

The researchers also observed the primary training event for mortars training, the formal two-week training period. This training was conducted by the Mortar Training Committee Cadre. These observations as well as interviews with the Cadre assisted us in identifying potential recommendations for mortars-specific offset training in other periods of 11C OSUT. This training period includes the Gunner’s Exam, which is a graduation requirement for 11C OSUT. Observations of the primary mortars training enabled the researchers to establish an understanding of the training needs of 11C OSUT Soldiers and how this training relates to the additional training received in the first weeks of OSUT and the FTX.

Method. Two researchers observed the Mortar Training Committee conducting a two-week period of instruction. They observed different instructors teaching the same tasks during the same period to small groups of students. Researchers noted the method of instruction being used, the tasks that were taught, how the students were organized and tracked during the training, and the time spent on each task. Other researchers observed portions of the training period.

A significant portion of the training period focused on administering the Gunner’s Exam. Researchers observed a single iteration of the Gunner’s Exam⁴ and the retest for Soldiers who did not pass the initial exam. Historical Gunner’s Exam records were collected for a two-year period; only partial results for 2013 were available. Records collected for 2014 reflect Gunner’s Exams through September 2014. Table 5 provides the number of data records collected.

Table 5
Number of Gunner’s Examination Records Collected

Year	2012	2013	2014	Total
# Soldiers	2241	775	1122	4109

Results. A typical mortar crew consists of four personnel, one of whom is the gunner. Even though the gunner position in an operational unit is normally filled by an experienced Soldier, Soldiers in 11C OSUT are trained and tested on their ability to perform this role. The first week of the concentrated Mortar Training Committee instruction focuses on the five areas tested in the Gunner’s Exam: mounting the mortar, making a small deflection change, referring

⁴ Details explaining the Gunner’s Exam are available in Headquarters Department of the Army Training Circular (TC) 3-22.90 (Draft) dated August 2014.

the sight and realigning aiming posts, making large deflection and elevation changes, and reciprocally laying the mortar. Soldiers train and practice the skills for each of these areas repeatedly over a four-day period. Each Soldier, using assistants, is then tested on all five areas. All training and testing is conducted using the 81mm mortar system.⁵

For testing, each Soldier takes his turn serving as the gunner while a team of other Soldiers assists by adjusting the mortar mount, emplacing aiming stakes, etc. Each Soldier is tested on each of the five areas, completing two trials for each area. Typically, each Soldier in the team completes a single trial by rotating positions with other Soldiers, then each rotates back into the gunner position for a second trial. Once every Soldier completes both trials for an area, the group progresses to the next area and repeats the two-trial process on a rotational basis. Each trial for each of the five areas is worth a maximum of 10 points. Scores achieved for all 10 trials are summed to determine an overall proficiency score for each Soldier. Soldier proficiency ratings are awarded based on the scale shown in Table 6.

Table 6
Gunner Proficiency Ratings

Rating	Score Range
Expert	100 - 90
1 st Class	89 - 80
2 nd Class	79 - 70
Unqualified	69 or below

Soldier proficiency scores for three COs, each completing two cycles of 11C OSUT in 2014 were obtained ($N=1,122$). Table 7 shows the distribution of proficiency ratings. Each unit increased the percentage of “Experts” during its second OSUT cycle.

Table 7
Distribution of Gunner’s Exam Proficiency Ratings

OSUT Cycle	Unit	Gunner’s Exam Proficiency Ratings			
		Expert	1st Class	2nd Class	Unqualified
I	1	68%	23%	10%	0%
	2	77%	19%	4%	0%
	3	87%	11%	2%	0%
II	1	81%	13%	4%	1%
	2	84%	12%	4%	0%
	3	90%	7%	3%	0%

To examine if the 2014 performance was typical, data from the previous two years was obtained for comparison. Figure 1 shows the distribution of proficiency ratings. Fewer ratings were obtained for 2013 because only a portion of the yearly data was available. Overall, there appears to be consistent improvement in Gunner’s Exam scores across each cycle of 11C OSUT the researchers observed as well as improvement across years.

⁵ Chapter 10 of the Mortar TC (Department of the Army, 2014) provides details on conducting and scoring the Gunner’s Exam.

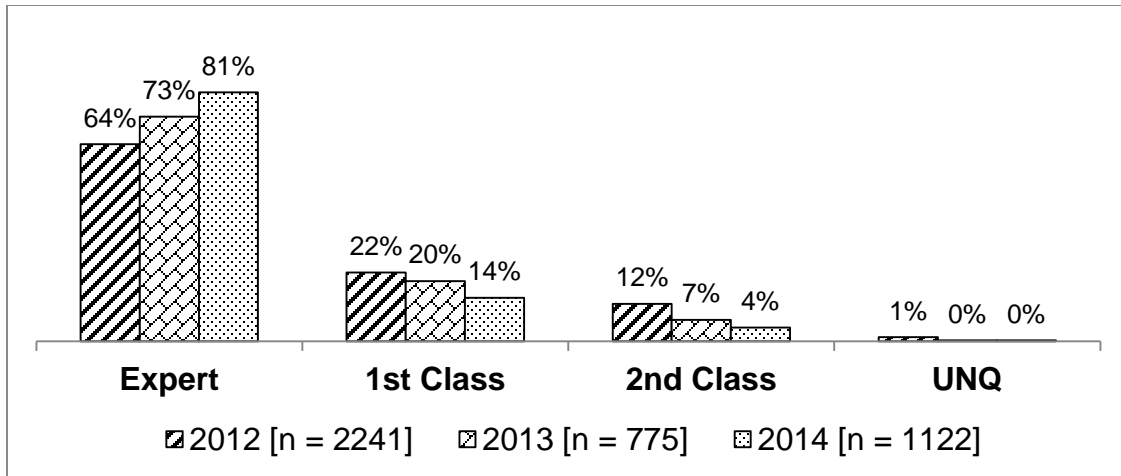


Figure 1. Gunner's Exam Proficiency Ratings.

After the Gunner's Exam was completed, the second week of the concentrated 11C training period provided information and hands-on live fire practice, but there were no graded events. Soldiers learned characteristics and capabilities of the other mortar systems (60mm and 120mm). They also received familiarization training with the mortar mounted in a Stryker vehicle. Each Soldier also had an opportunity to experience firing 60mm and 81mm live rounds, with some Soldiers firing 120mm live rounds.

Summary Discussion. As evidenced by the performance data in Table 4 and in Figure 1, the Gunner's Exam training is highly successful. Moreover, the increasing percentage of "Experts" clearly shows an upward trend following the consolidation, suggesting that the current structure of training with 11C-focused offset training leading up to concentrated mortars training is effective. As noted from the Planning Workgroup, there were some recommendations concerning adding more in-depth training on vehicle mounted mortars and the different mortar systems. Depending on the outcome of that investigation, the training tasks for the second week of the 11C concentrated training could be examined and modified, as appropriate.

Mortars Knowledge and Application Tests

During the course of the research, the BN was in the process of evolving its mortar training program. Based on emerging results from the research team, near the end of the research period, we assisted the Mortar Training Committee in developing instruments to assess Soldiers' basic mortar knowledge when beginning the two-week concentrated mortar training period and again at the end of the period. Using the most current doctrinal reference (Department of the Army, 2014), researchers worked with the Mortar Training Committee to develop two tests—one focused on basic knowledge and the other on applications of mortar knowledge—which were reviewed and approved by members of the Mortar Training Committee.

Method. Both tests were comprehensive, covering all of the Skill Level 1 material new 11C Soldiers were required to know. Since Soldiers were required to pass a hands-on test (i.e., the Gunner's Exam) to demonstrate their ability to perform selected 11C tasks, the written tests addressed knowledge areas beyond the hands-on manipulative skills covered by the Gunner's

Exam. The general areas covered by the questions were characteristics of the mortar systems, handling and maintenance of mortar systems which included some employment considerations, safety and correcting malfunctions, and information about the varied ammunition. These content areas were identified in meetings with the Mortar Training Cadre and unit First Sergeant.

Each test contained 40 questions including a mix of multiple choice, matching, and true–false. Tests were designed so questions on each version contained matched content. That is, the topic domain addressed by an item on the Knowledge Test and matched by an item on the Applications Test. The Knowledge Test contained simple knowledge recall questions and was administered to Soldiers when they arrived to begin their two-week concentrated mortar training period. The intent was to assess what Soldiers knew at the start of mortar training, reflecting the concurrent training on mortars they had received to that point. The Applications Test contained items that required applications of mortar knowledge and was administered near the end of the two-week training period, after all instructional material had been presented to Soldiers. While questions on this version of the test covered the same material as the Knowledge Test, questions were interlaced and sequenced with operational situations according to a typical scenario Soldiers could expect when employing mortars to support tactical missions. A copy of each test is provided at Appendix C (Knowledge Test) and Appendix D (Applications Test).

The Knowledge Test was administered at the Mortar Training Area preceding the start of the concentrated mortars training. The Applications Test was administered following the conclusion of mortars training. Testing required approximately 30 minutes.

Results. The forty questions on each test made for a challenging testing situation for Soldiers. In future testing scenarios, the researchers recommended the Mortar Training Cadre select a subset of the 40 questions for testing. This would reduce the time required for testing. A list of items and their associated content domain was provided to the Mortar Training Committee to facilitate item selection. In addition, the researchers provided data on which items were most psychometrically reliable for a reduced-item testing situation. The overall results of the tests are presented in Table 8.

Table 8
Mean Number of Items Correct on Mortars Knowledge and Application Tests

Test	Mean Number of Items Correct (Out of 40)				
	Overall	Characteristics	Handling	Safety/Malfunctions	Ammunition
	Mean	Mean	Mean	Mean	Mean
	(SD)	(SD)	(SD)	(SD)	(SD)
	Range	Range	Range	Range	Range
Mortars Knowledge Test (Administered Before Training) N = 174	18.0 (5.2) 6 – 29	17.6 (7.6) 0 – 37	19.6 (8.0) 0 – 37	20.8 (7.6) 0 – 36	13.2 (7.6) 0 – 33
Mortars Applications Test (Administered After Training) N = 155	21.6 (3.6) 13 – 30	12.8 (7.2) 0 – 32	27.6 (4.0) 13 – 36	29.2 (7.2) 12 – 40	7.6 (7.6) 0 – 32

Note: Test items were designed to measure across a broad range of knowledge levels, with some items intended to exceed the average mortars knowledge level of 11C OSUT Soldiers. This technique was used to avoid ceiling effects on the test, and to facilitate later item selection.

A correlational analysis was conducted to determine if the Knowledge and Applications Tests were associated with Soldiers' Gunner's Exam scores. The Knowledge Test, which was taken prior to training, was not associated with the Gunner's Exam, $r(146) = 0.08, p = 0.34$. However, the Applications Test, which was taken after training was completed, was significantly correlated with the Gunner's Exam, $r(146) = 0.23, p = 0.006$. The Knowledge Test and Application Test scores were also correlated, $r(146) = 0.49, p < 0.001$, reflecting their matched-item design. The pattern of results suggests that the concentrated mortars training was likely effective in increasing both the knowledge and skills associated with performance on the Gunner's Exam and the Applications Test. However, the correlation between the Applications Test and the Gunner's Exam was not so high as to indicate that the subject matter being tested on the two metrics was overly similar.

Summary Discussion. The results suggest that while offset training received prior to the concentrated mortar period does serve to provide Soldiers with some general knowledge of mortars, it was not sufficient enough to become correlated with Gunner's Exam scores. The effect of the training provided in the concentrated mortars period was reflected in the stronger association between Soldiers' Gunner's Exam scores and the post-training Applications Test. The tests developed as part of this research were intended to support potential training solutions by addressing Soldier knowledge acquired prior to the two-week concentrated mortar training. Other uses for the Knowledge and Applications Tests were presented to the Mortar Training Committee, such as using test results to support tailored training strategies (e.g., identifying highly-knowledgeable Soldiers to serve as peer-coaches), identifying Soldiers who may benefit from remedial training, and selecting topics to emphasize in training on which Soldiers had lower than expected scores. These tests can be used to inform selection of topics for concurrent training—e.g., increasing the emphasis on identifying types of ammunition—and to evaluate the offset training Soldiers have received prior to the two-week concentrated mortars period.

General Discussion

As Army course proponents and training developers adapt training to ongoing changes in Soldiers' skill development needs and MOS training requirements, they rely on training offset strategies to address tight schedules and resources. The primary type of offset observed in this research was concurrent training. Concurrent training is a technique in which two skills can be trained in the same setting, with one skill serving as the primary training event, and the other, a secondary event. Concurrent training is typically planned on unit schedules, and as an offset training technique, is intended to more efficiently use available training time and resources.

This research focused largely on the use of offset training in the context of 11C OSUT in order to address 11C Soldiers specific training needs. It further contributed two metrics designed to assess the effectiveness of offset training to assist in identifying topics for training prior to, and to facilitate tailoring within, the two-week concentrated mortar training period. The findings of the research are intended to contribute to (a) identifying generalizable principles and strategies for applying training offsets, (b) examining the impact of training offsets in 11C OSUT, and (c) providing guidance and tools for developing effective training offsets to enhance Soldiers' core skills proficiencies.

Since this research focused on a specific course in which training offsets were being applied, there are limits to the generalizability of its findings. Given that POI revisions and other initiatives were in progress at the time the research concluded, we were unable to track them all to a finished state in order to determine their potential impact on our findings and recommendations. That said, we were able to derive some general recommendations for best practices and lessons learned during the execution of this research in terms of the application of training offsets, particularly focusing on concurrent training applications.

Consolidate Resources to Support Training Offsets

Offset training is facilitated by the consolidated management of resources. In this research, the alignment of all mortar training assets under a single unit organization seemed to benefit 11C OSUT training, in general, and enhance units' ability to plan and execute training offsets, specifically. The Mortar Training Committee and training COs reported that this structure increased opportunities for collaboration and the potential for planning and resourcing mortar-specific training throughout an 11C OSUT course. It was also generally recognized, however, that, as in so many other areas of training, limited resources constrained unit DSs in what tasks they could train and to what standard. The sharing of resources and closer coordination between groups enabled by a consolidated organizational approach may continue to strengthen the training program.

Some installations and organizations periodically or regularly form special teams or committees of Soldiers to address a given training topic. When specialized training experts are identified, units should explore the possibility of obtaining their support for offset training. This could provide a training benefit to the Soldiers (e.g., gain proficiency in a task, be better prepared for participating in future blocks of training in this subject area).

Certify Trainers Responsible for Conducting Training Offsets

Training offsets in 11C OSUT were often executed by unit DSs. Many unit DSs had 11C backgrounds, but a few did not. That said, all personnel agreed that unit DSs as well as Mortar Training Committee Cadre were well prepared to conduct 11C training for new Soldiers. Each group of trainers had the ability to contribute to Soldiers' knowledge and abilities. That said, one potential area of improvement identified in the Planning Workgroup was to develop a certification program to ensure 11C OSUT DSs have the required knowledge and skills to conduct mortars-specific training offsets.

Narrow the Focus of Offset Training to Skills with General Applicability

Given the many possible candidate topics for primary and offset training, Soldiers may be best served by focusing offset training on a narrow subset of critical tasks with general applicability. For instance, mortar training should include the tactics that apply to all mortar systems, including firing point protection (pits) and dismounted movement as part of a tactical unit. Focusing on developing generally applicable skills will provide for better transfer of knowledge and skills learned the first 8 to 10 weeks of OSUT to the concentrated training period, FTX, and ultimately, receiving units.

Differentiate Between Primary and Offset Training Tasks

Once the tasks to be trained have been selected, a determination should be made as to which tasks will be trained as specified and scheduled POI events and which are best to be trained as recommended offset training events. Training tasks recommended for offset training should be documented in the POI and should be specified in lesson books and TSPs. The documentation should include what tasks are recommended for offset training and how they should be conducted. Further, the lesson books should specify which offset training tasks should be conducted in conjunction with which scheduled training periods, as well as who should be responsible for conducting the training (e.g., Mortar Committee Cadre, unit DSs). These offset training events should be included on the unit training schedule just as primary training events are scheduled. Thorough and accurate documentation can assist in ensuring that the necessary resources (e.g., trainers, equipment, time) are properly planned for and available. This type of documentation would also provide greater consistency and standardization in the training received by Soldiers.

Utilize Offset Training for Familiarization

Offset training should be scheduled in such a way as to prepare Soldiers for later, more in-depth, primary training. For instance, in 11C OSUT, concurrent training was used to familiarize Soldiers with general mortar skills and knowledge needed for success in the concentrated mortar training period. While this training largely familiarized Soldiers with tasks related to the Gunner's Exam, other broadly-applicable tasks could be integrated into training: tactical subjects, such as movement while carrying mortar systems, stopping enroute to provide fire support, and construction of a mortar firing position.

Deconstruct Tasks to Address through Offset Training

Although it may not be possible to train Soldiers to standard using only offset training, it is possible to prepare them for the training event that will bring them up to standard. Even if unit DSs cannot train all Gunner's Exam skills to the desired standard and level of proficiency due to limited resources, some benefit may be gained by providing familiarization training to improve Soldiers' performance during the concentrated mortar training period, as described above. One recommendation along these lines is to deconstruct tasks to allow for partial task training, which can be timed to occur across multiple days and can be supported with available resources. Partial task training as offset training could help build the essential skills needed for Soldiers to be trained to standard by a primary training event.

Establish Effective Timing for Offset Training Events

While offset training could be conducted any time during a training cycle, consideration should be given to which of the identified concurrent training tasks are best trained at what time. This can be accomplished by providing offset training events during the training period preceding the primary training which they are intended to support. For instance, results from this research indicated that units who conducted the Gunner's Exam focused training tasks as offset training during the two weeks immediately prior to the two-week concentrated mortar training

period appeared to have higher scores on the Gunner’s Exam (see Table 9). Unit 3, who conducted between 14 and 18 hours of mortars specific training in weeks 8 and 9 just prior to Mortar Committee Training in week 10, tended to have the highest percentage of experts on the Gunner’s Exam during both iterations observed of 11C OSUT. The objective of scheduling and planning offset training is to provide the right training to the Soldiers at the time that will best facilitate their acquisition of targeted knowledge and skills. The closer in time to the primary training event that the relevant offset training is provided, the more effective the offset training may be.

Table 9
Impact of 11C Offset Training on Gunner’s Exam Results

Unit	Gunner’s Exam Proficiency Ratings				11C Concurrent Training Reported		Week of Mortar Committee Training
	Expert	1 st Class	2 nd Class	Unqualified	Training Week	Total Hours Trained	
1	68%	23%	10%	0%	N/A	N/A	8
2	77%	19%	4%	0%	7 - 9	19	10
3	87%	11%	2%	0%	8 & 9	18	10
1	81%	13%	4%	1%	3 - 7	31	8
2	84%	12%	4%	0%	6 - 9	32	10
3	90%	7%	3%	0%	8 & 9	14	10

Use Assessments to Tailor Topics Selected for Offset Training

When identifying what tasks to train in offset training as well as the effectiveness of the training, testing Soldiers can provide key information. Given that Infantry OSUT should train Skill Level 1 tasks to the doctrinal standard, adherence to standards, knowledge and skill proficiency should be tested before a Soldier graduates. This is summative testing. However, Soldiers could be tested at critical points throughout their training in order to inform selection of training offsets, an approach to testing which is formative. The tests the researchers worked with the Mortar Training Committee to develop may assist in providing an additional means of assessment for 11C OSUT Soldiers prior to graduation (See Appendices C and D).

The Mortars Knowledge Test and Applications Test developed with the Mortars Training Committee may be used to evaluate the effectiveness of offset training provided prior to the two-week period of concentrated mortar training in 11C OSUT. This could enable Mortar Training Committee Cadre to identify topics and tasks on which to focus remediation and review. It could also be used to identify topics on which to place greater emphasis during 11C offset training.

Use Offset Training to Integrate Skills

Use offset training to revisit already learned skills and to integrate them with new skills. Just as identifying and determining 11C offset training tasks is important and beneficial for training prior to the concentrated 11C training period, the same consideration and planning for 11C tasks during the end-of-course FTX is vital. In 11C OSUT, the FTX represents an opportunity to integrate 11C skills with 11B skills. Documenting effective FTX offset training

opportunities and providing guidance to units will also increase consistency and standardization in the training received by 11C Soldiers.

Conclusion

In general terms, the findings from this research suggest that training offsets should focus on skills that are transferable to the primary tasks targeted by a course POI. This maintains a link between the topics specified for in-depth training in a POI with the offset training provided as a primer, supplemental, or integrative learning experience. This may be accomplished by focusing offset training on simpler, generalizable skills that support later learning of more in-depth tasks. Offset training should focus on subject matter that does not introduce too many unfamiliar concepts, builds on what Soldiers already know, anticipates what will be trained in-depth at a later time, and which can be learned in a brief time using available resources (Clarke, Ayres, & Sweller, 2005).

There are also existing processes in Army doctrine to support the development of training offsets. For instance, the Analysis, Design, Develop, Implement, Evaluate (ADDIE) instructional design process may be appropriate to determining which skills may be best trained as offsets and assist in planning for execution (TRADOC, 2011a). Applying ADDIE to our findings and the issue of training offsets indicates units should:

- Define what skills and knowledge are required of the Soldier upon graduating from the course. These will help define the critical tasks to be trained.
- Compare critical task requirements to the current training POI to determine training gaps.
- Use the identified training gaps to determine how the training program might be revised. If ample time is not available in the POI for Soldiers to satisfactorily acquire the desired level of proficiency, then determine the necessary training offsets to fill the gap.
- Plan the training offsets to allocate appropriate time and resources.
- Document the required concurrent training in the course TSPs so necessary resources and support are identified.
- Ensure offset training is included in the training schedule. This includes determining that the amount of time required and the training sequence is correct (i.e., concurrent training builds on knowledge (repetition) or introduces new knowledge.
- Coordinate to obtain resources for concurrent training as you would primary training events.

Training offsets such as concurrent training and hip-pocket training are common in the Army, suggesting that there may be significant benefit to these training practices. While there may be some concern about overloading Soldiers' learning capabilities by providing training that moves between multiple tasks, some research has suggested that using a concurrent training

strategy may be as effective as a serial training strategy, with additional benefit for generalization and transfer to novel problems (Stettner & Kotesky, 1965; Hard, Lozano, & Tversky, 2006). Our recommendations from this research suggest that ongoing periodic, informal assessments may help to identify skills that should be addressed by offset training. Moreover, in the weeks immediately preceding more intensive training on a task, Soldiers may benefit from receiving offset training on related topics. Finally, concurrent training should focus on skills for which the training can be properly resourced by the unit. While concurrent training may not be always conducted to the standard specified in doctrine, it may still provide support for later training that will bring Soldiers up to the standard. Additional research may benefit from looking more closely at how training offsets may be optimally timed in relation to primary training events. Some variability in optimal timing of training offsets may emerge in relation to the type of skills being trained—for instance, procedural versus cognitive skills—and the relative complexity of the skills being trained. This information would be useful for trainers, training developers, and course designers when planning and executing training offsets.

Limitations. Results of research are generalizable to the extent that they are not overly influenced by the unique circumstances under which the data are collected. As noted, this research was conducted during a period of significant realignment of the 11C Mortarman OSUT course. Leaders and course planners were still in the process of working to streamline and improve 11C OSUT at the time the research concluded. Due to this limitation, this report should not be taken as a complete or final representation concerning 11C OSUT or how the course is currently applying concurrent training strategies.

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Acronyms and Abbreviations

AIT	Advanced Individual Training
ATRRS	Army Training Requirements and Resources System
BCT	Basic Combat Training
BDE	Brigade
CO	Company
DS	Drill Sergeant
FDC	Fire Direction Center
FTX	Field Training Exercise
IET	Initial Entry Training
IMT	Initial Military Training
IN	Infantry
MOS	Military Occupational Specialty
NCO	Noncommissioned Officer
OSUT	One Station Unit Training
POI	Program of Instruction
TC	Training Circular
TRADOC	U.S. Army Training and Doctrine Command
TSP	Training Support Package

APPENDIX A

INTERVIEW PROTOCOL

The single document contained on the following pages consists of different sections for each of the three target groups for interviews: 11C unit leaders, DSs in the COs who conducted the 11C OSUT training, and members of the Mortar Training Committee. The questions served as a guide for soliciting information from the participants.

Unit Leaders, Drill Sergeants, Training Cadre Interview Protocol An Examination of Tailored Training Offsets on Core 11C Skills Acquisition

The purpose of this project is to determine the impact of tailored training offsets on core 11C skills acquisition and to provide guidance and tools for developing effective training offsets that enhance core 11C skills acquisition and proficiency. To accomplish this, we are interviewing Leaders, Drill Sergeants, and Mortar Training Cadre.

Leaders

How many 11C Drill Sergeants were assigned to your company during your last 11C OSUT cycle? Were they all assigned to the same platoon?

Approximately how many 11C OSUT Soldiers were in training during the last 11C OSUT cycle? Were they all assigned to the same platoon?

<i>Training Offsets</i>

During the last 11C training cycle did you schedule and resource any 11C POI classes prior to week 10-12 MTA training?

If yes, what subjects were taught?

Why were they taught?

What resources were used?

When were they taught – week of training?

How long were the classes – 30 minutes, 1 hour?

How were the classes conducted – lecture, demonstration, hands-on?

What was the Soldier payoff?

If no classes were scheduled, were any 11C tasks taught prior to week 10-12 MTA training?

If yes, what subjects were taught?

Why were they taught?

What resources were used?

When were they taught – concurrent or hip-pocket training?

How long were the classes – 30 minutes, 1 hour?

How were the classes conducted – lecture, demonstration, hands-on?

What was the Soldier payoff?

If yes to above questions, who trained the Soldiers?

Only 11C DSs?

Only 11B DSs?

Both 11C and 11B DSs?

MTA Cadre?

If your DSs taught the classes, have they attended a 11C task certification program?

What does the program consist of?

Are there published tasks, conditions, and standards for the 11C classes taught by the DS? If so, do the DS have access to them?

Do you, or the trainers, have direct access to the "11C MTA cadre" if questions arise during training?

Training Offset Resources

If the Leaders answered "Yes" to questions 3 or 4 above ask these resource questions. If they answered "No" skip to 11C core training questions.

Did the trainers use actual equipment or training aids while conducting training?

If actual equipment:

What was used?

60mm, 81mm, or 120mm mortar

M2 compass

M2 aiming circle

Other

Was the actual equipment available when needed? Entire cycle or only portions of the cycle?

Were all systems and components serviceable?

Where are the mortar systems kept and how does this affect their use?

If training aids:

What was used?

Mortar mock-ups

Compass mock-up

other

Are the training aids available when needed? Entire cycle or only portions of the cycle?

Who owns the 11C training aids Post/Bn/Co? Do you (can you) get enough training aids (in good working condition) to make the training worthwhile?

What 11C task specific training aids do you need more of? (unit of issue?)

11C Core Training (Week 10-12)

What 11C subjects give the Soldiers the most problems?

What do you or can you do to overcome those problem areas?

Are there any 11C subjects taught by the MTA cadre that you think could be taught by your DSs?

If Yes,

Which tasks?

Why?

When would the DSs teach them?

<i>Lessons Learned</i>

Do you have any lessons learned from executing 11C cycles that you would pass on to other companies executing the same training?

(C, D, & E 2/19 ONLY) You just completed your 1st 11C cycle under the new organization, what would you do differently for the next cycle?

Drill Sergeants # of 11C DS _____ # of 11B DS _____ How long DS 1___ 2___ 3___

Administer the Training Offset Summary sheet at the beginning of the interview session.

How many 11C Drill Sergeants were assigned to your company during your last 11C OSUT cycle? Were they all assigned to the same platoon?

Approximately how many 11C OSUT Soldiers were in training during the last 11C OSUT cycle? Were they all assigned to the same platoon?

Training Offsets

During the last 11C training cycle were any 11C POI classes scheduled and resourced prior to week 10-12 MTA training?

If yes, what subjects were taught?

Why were they taught?

What resources were used?

When were they taught – week of training?

How long were the classes – 30 minutes, 1 hour?

How did you conduct the classes – lecture, demonstration, hands-on?

What was the Soldier payoff?

Review the results of the Training Offset Summary sheet prior to asking questions 4-11.

You identified ... as being taught prior to week 10-12 MTA training?

Why was/were the task/s taught?

What resources were used?

How frequently was/were the task/s taught – once, daily, weekly?

What was the Soldier payoff?

Did you train any 11C tasks that were not in the POI?

If yes, what subjects were taught?

Why were they taught?

What resources were used?

When were they taught – concurrent or hip-pocket training?

What was the Soldier payoff?

If yes to above questions, who trained the Soldiers?

Only 11C DSs?

Only 11B DSs?

Both 11C and 11B DSs?

MTA Cadre?

Did you have to attend a 11C task certification program before you could teach the classes? Who conducted the certification program? What did it consist of?

Were you provided task, conditions, and standards for the 11C classes you taught?

Do you have direct access to the “11C MTA cadre” if questions arise during training?

Did anyone monitor the classes you taught? (Chain of Command, Training Developers, MTA Cadre)

Did you replace BCT refresher/concurrent training (e.g. 24 hour time, ID rank, 3 general orders, etc.) with 11C training?

What would the Soldiers have been doing if they weren't receiving 11C training?

What method of instruction (Co size, Plt, SGI) proved the best? For what classes? Why?

What method of instruction (Co size, Plt, SGI) proved the worst? For what classes? Why?

Training Offset Resources

If the Drill Sergeants answered “Yes” to questions 3, 4 or 5 above ask these resource questions. If they answered “No” skip to 11C core training questions.

Did you use actual equipment or training aids while conducting training?

If actual equipment:

What was used?

60mm, 81mm, or 120mm mortar

M2 compass

M2 aiming circle

Other

Was the actual equipment available when needed? Entire cycle or only portions of the cycle?

Were all systems and components serviceable?

Where are the mortar systems kept and how does this affect their use?

If training aids:

What was used?

Mortar mock-ups

Compass mock-up

other

Are the training aids available when needed? Entire cycle or only portions of the cycle?

Who owns the 11C training aids Post/Bn/Co? Do you (can you) get enough training aids (in good working condition) to make the training worthwhile?

What 11C task specific training aids do you need more of? (unit of issue?)

11C Core Training (Week 10-12)

What 11C subjects give the Soldiers the most problems?

What do you or can you do to overcome those problem areas?

What 11C training would you remove from the POI? Why?

Are there any 11C subjects taught by the MTA cadre that you think you could teach?

Which tasks?

Why?

When would you teach them?

11C Tactical Training

What 11C tactical tasks did you train?

When did you train them?

How did you train them?

Would you add or delete any tactical tasks?

Which Ones?

Why?

What would improve training?

Lessons Learned

Do you have any lessons learned from executing 11C cycles that you would pass on to other DSs executing the same training?

MTA Cadre

Pre-Training

Are the 11C Soldiers better prepared to receive 11C core training than they were prior to the DS pre-teaching the training? In what way?

Historically, have test scores improved since the DSs began pre-teaching? Which tests – written, hands-on?

Were there any “bad habits” the DS taught that you needed to re-teach? If so what were they? How do you recommend fixing them?

Do you feel that the DS time and efforts pre-training the Soldiers are worth the “cost”? If not what do you recommend changing?

What subjects/tasks should the DS spend their time pre-teaching to better prepare the Soldiers?

11C Core Training

If the Soldiers arrive well trained, is there a plan (or should there be) to pretest the Soldiers on some tasks and allow them to be “mentors”? OR create an accelerated group by teaching advance tasks to those Soldiers who pass the pretest?

Considering the DSs are “pre-training” the soldiers, in your opinion could the Soldier’s time with you be shortened? If so what training do you recommend shortening? Why?

What 11C subjects/tasks can be taught and learned to standard when DSs time available may only be two hours a day every other day? Why?

What 11C subjects/tasks should not be taught when DSs time available may only be two hours a day every other day? Why?

Can you tell the difference in the companies as to how well trained the Soldiers are when they arrive to you? If so, what makes the difference? How could all companies be as good as the best company

What unit does the best job preparing the Soldiers?

What tasks are tested? What records are kept?

What 11C subjects give the Soldiers the most problems? How do you overcome those problem areas?

APPENDIX B
CONCURRENT TRAINING DATA COLLECTION FORM

Concurrent Training Data Collection Form

Due to the size and layout of the form, a copy of the form could not be included in this report. If desired, a copy can be provided digitally by the primary investigator. The following sections describe the details of the form.

Layout

The form was set-up in a landscape orientation for 11" x 14" paper. The left columns listed the 11C tasks that could have been included in unit training. These tasks were extracted from the most current 11C Program of Instruction (POI). The remaining columns captured details concerning the type and method of training, time spent, and the location. Specifics are provided below. Researchers also included any explanatory notes to help clarify data in the form.

Content

The list of tasks extracted from the POI is provided in Table B1. Any or all of these tasks are potential candidates for training that could be conducted by the 11C OSUT DSs prior to Soldiers participating in the two-week Mortar Training Committee session.

Table B1
Mortar Tasks Extracted From 11C POI

Task #	Title
	<i>60-mm Mortar</i>
071-084-0002	Maintain a 60-mm Mortar
071-084-0004	Engage Targets with a 60-mm Mortar While Firing in the Handheld Mode
071-323-4101	Place a 60-mm Mortar into Action While in the Handheld Mode
071-323-4102	Lay a 60-mm Mortar for Deflection and Elevation
071-323-4103	Boresight a 60-mm Mortar with a M115 Boresight
071-323-4104	Perform Safety Checks on a 60-mm Mortar
071-323-4106	Prepare 60-mm Mortar Ammunition for Firing
071-323-4107	Boresight a 60-mm Mortar with a M45A1 Boresight
071-084-0003	Perform Misfire Procedures on a 60-mm Mortar While in the Handheld Mode
071-084-0005	Place a 60-mm Mortar into Action
071-084-0006	Take 60-mm Mortar Out of Action
	<i>81-mm Mortar</i>
071-086-0002	Maintain an 81-mm Mortar
071-086-0003	Lay an 81-mm Mortar for Deflection and Elevation
071-086-0004	Perform Safety Checks on an M252 81-mm Mortar
071-086-0005	Boresight an M252 81-mm Mortar
071-321-3905	Prepare 81-mm Mortar Ammunition for Firing
071-086-0006	Place a 81-mm Mortar into Action
071-086-0007	Take 81-mm Mortar Out of Action
071-086-0008	Perform Misfire Procedures for 81-mm Mortar

Task #	Title
	<i>120-mm Mortar</i>
071-090-0001	Perform Safety Checks on a 120-mm Mortar
071-090-0002	Lay a 120-mm Mortar for Deflection and Elevation
071-090-0003	Boresight a 120-mm Mortar
071-090-0004	Prepare 120-mm Mortar Ammunition for Firing
071-090-0005	Maintain a 120-mm Mortar
071-090-0006	Place a 120-mm Mortar into Action
071-090-0007	Take 120-mm Mortar Out of Action
071-090-0008	Perform Misfire Procedures for 120-mm Mortar
	<i>Mortar Tactics</i>
071-074-0002	Determine a Grid Azimuth Using an M2 Compass
071-074-0008	Emplace Aiming Posts
071-074-0005	Refer and Realign Aiming Post
071-074-0038	Reciprocally Lay a Mortar Using a Laid Mortar
071-074-0004	Engage Targets with a 60-mm, 81-mm, or 120- mm Mortar Using Direct Lay
071-321-4012	Store Mortar Ammunition
071-074-0012	Occupy a Mortar Firing Position by a Squad
071-074-0007	Reciprocally Lay a Mortar Using an M2 Aiming Circle
071-074-0040	Control the Expenditure of Mortar Ammunition
071-074-0022	Conduct a Displacement by a Mortar Squad
071-074-0029	Conduct a Defense of a Mortar Firing Position by a Section
071-074-0033	Conduct the Defense of a Mortar Firing Position by a Squad
071-074-0011	Occupy a Mortar Firing Position by a Platoon
071-074-0026	Conduct a Displacement by a Mortar Platoon
071-074-0024	Conduct a Displacement by a Mortar Section
071-410-0018	Move as a Member of a Mortar Unit While Dismounted

The following details were captured for each task if any training was conducted. Inputs included both qualitative and quantitative data in addition to explanatory notes.

Type of training

- Concurrent
- Hip-pocket

Training Week

Group Size

- Squad
- Platoon
- Company

Method of Training

- Lecture
- Demonstration
- Hands-on

Length of Training

- Less than an hour
- 1-2 hours
- More than 2 hours

Location of Training

- Company area
- Other (specify)

APPENDIX C
MORTAR KNOWLEDGE TEST

Mortar Knowledge Test

INSTRUCTIONS: The purpose of this test is to measure your knowledge of 11C specific doctrine, skills, and tasks. Please circle the one response that best answers each question. If you do not know the answer, please do not guess. Instead, circle the “I don’t know” option.

1. Doctrine demands the _____ and _____ delivery of indirect, high-angle fire to meet the needs of supported units.
 - a. Fast and speedy.
 - b. Timely and accurate.
 - c. Reasonable and prudent.
 - d. Accurate and safe.
 - e. I don’t know.

2. Mortars should be employed in defilade to protect them from enemy direct fire and observation, and to take the greatest advantage of their indirect fire role?
 - a. True.
 - b. False.
 - c. I don’t know.

3. The indirect fire team consists of:
 - a. The gunner, the assistant gunner, and the ammunition bearer.
 - b. The Squad Leader, the gunner, the ammunition bearer.
 - c. The forward observer (FO), a fire direction center (FDC), and a gun squad.
 - d. I don’t know.

4. Match the mortar crew position to the correct definition.

Position	Answer	Definition
a. Squad Leader	_____	Loads the mortar and assists in shifting the mortar
b. Gunner	_____	Supervises the emplacement, laying, and firing of the mortar
c. Assistant Gunner	_____	Prepares ammunition and provides local security
d. Ammunition Bearer	_____	Manipulates the sight by placing firing data on the sight and lays the mortar for deflection and elevation

5. Who has the responsibility for safety when conducting indirect fire missions?
 - a. The Squad Leader.
 - b. The Gunner.
 - c. The Assistant Gunner.
 - d. The Ammunition Bearer.
 - e. All of the above.
 - f. None of the above.
 - g. I don't know.

6. The U.S. Army mortar components consist of:
 - a. The cannon, mount, and baseplate.
 - b. The gun, sight, and crew.
 - c. The fuze, cartridge, propellant charge, and tail-fin assembly.
 - d. The squad leader, gunner, assistant gunner, and ammunition bearer.
 - e. I don't know.

7. What are the three common types of cartridges for the mortar?
 - a. 5.56mm, 7.62mm, and 40mm.
 - b. High explosive, illumination, and smoke.
 - c. Point-detonating (PD), Impact (IMP), and Superquick (SQ).
 - d. Charge 0, 4, 10.
 - e. I don't know.

8. Standard markings for a U.S. Army HE round are:
 - a. Light Green body, Red markings, and Yellow band.
 - b. Blue body, White markings, and Brown band.
 - c. Light Green body, Black markings, and Brown band.
 - d. Olive body, Yellow markings, and Yellow band.
 - e. I don't know.

9. Match the type of mortar fuze to the description of effects.

Fuze	Answer	Description of effects
a. Point-detonating (PD), Impact (IMP), Superquick (SQ)	_____	Detonates the cartridge after a preselected time has elapsed from the round being fired (illumination)
b. Delay (DLY)	_____	Detonates the cartridge above the ground
c. Time	_____	Detonates the cartridge on impact with the ground
d. Near-surface burst (NSB)	_____	Detonates the cartridge on or near the ground
e. Proximity (PRX)	_____	Detonates the cartridge 0.05 seconds after impact with any object

10. When returning prepared but unfired mortar rounds to their containers, the round should be placed in the container fin-end first.

- a. True
- b. False
- c. I don't know.

11. When stacking ammunition for the mortar which way must the white phosphorus ammunition be stacked?

- a. Fuze-end down.
- b. Fuze-end up.
- c. Horizontal.
- d. Vertical.
- e. I don't know.

12. How many feet above the ground does a mortar round set with a Proximity (PRX) fuze burst?

- a. 2 – 16 feet.
- b. 1 – 10 feet.
- c. 4 – 15 feet.
- d. 3 – 13 feet.
- e. I don't know.

13. What is the weight of the M224 60mm Mortar (conventional and hand-held mode)?

- a. 39/15 lbs.
- b. 46/19 lbs.
- c. 49/18 lbs.
- d. 47/18 lbs.
- e. I don't know.

14. Which one of the three U.S. Army mortars can be both drop- and trigger-fired?
- M224 60mm mortar.
 - M252 81 mm mortar.
 - M120 120 mm mortar.
 - I don't know.
15. What is the minimum and maximum range of the M224 60mm mortar when fired in the conventional mode?
- 75 meters / 1340 meters
 - 70 meters / 3490 meters
 - 83 meters / 5608 meters
 - 200 meters / 7200 meters.
 - I don't know.
16. What are the maximum and sustained rates of fire for the M224 60 mm Mortar?
- 30 per minute for 4 minutes max / 20 per minute sustained.
 - 30 per minute for 2 minutes max / 15 per minute sustained.
 - 16 per minute for 1 minute max / 4 per minute sustained.
 - 15 per minute for 3 minutes max / 3 per minute sustained.
 - I don't know.
17. What is the weight of the 81mm cannon with BAD?
- 27 lbs.
 - 29 lbs.
 - 35 lbs.
 - 94 lbs.
 - I don't know.
18. What is the maximum range of the M252 81mm Mortar for a high explosive round?
- 5000 meters.
 - 4790 meters.
 - 5608 meters.
 - 5790 meters.
 - I don't know.
19. What are the maximum and sustained rates of fire for the M252 81 mm Mortar?
- 30 per minute for 4 minutes max / 20 per minute sustained.
 - 30 per minute for 2 minutes max / 15 per minute sustained.
 - 16 per minute for 1 minute max / 4 per minute sustained.
 - 15 per minute for 3 minutes max / 3 per minute sustained.

- e. I don't know.
20. What is the maximum range of the M120/M121 120mm Mortar for a high explosive round?
- a. 5790 meters.
 - b. 6608 meters.
 - c. 7200 meters.
 - d. 8500 meters.
 - e. I don't know.
21. What are the maximum and sustained rates of fire for the M120/M121 120 mm Mortar?
- a. 30 per minute for 4 minutes max / 20 per minute sustained.
 - b. 30 per minute for 2 minutes max / 15 per minute sustained.
 - c. 16 per minute for 1 minute max / 4 per minute sustained.
 - d. 15 per minute for 3 minutes max / 3 per minute sustained.
 - e. I don't know.
22. Who indicates the direction of fire when mounting the mortar?
- a. The Gunner.
 - b. The Ammunition Bearer.
 - c. The Assistant Gunner.
 - d. The Squad Leader.
 - e. I don't know.
23. What is the first step when mounting the mortar once the Squad Leader marks the exact location of the mortar?
- a. The assistant gunner attaches the M67 sight to the bipod.
 - b. The gunner places the baseplate against the baseplate stake.
 - c. The ammunition bearer attaches the bipod to the cannon.
 - d. The Squad Leader commands "Mortars Up".
 - e. I don't know.
24. Fire commands from the FDC/Squad Leader to gun crews are always echoed.
- a. True.
 - b. False.
 - c. I don't know.

25. What are the initial deflection and elevation settings placed on the M67 sight when removed from its carrying case and mounted on the M252 81mm mortar?
- Deflection 2400 mils and Elevation 800 mils.
 - Deflection 800 mils and Elevation 2400 mils.
 - Deflection 3200 mils and Elevation 1100 mils.
 - Deflection 1100 mils and Elevation 3200 mils.
 - I don't know.
26. When setting the deflection on the M67 sight you use the fixed coarse scale for the first 2 numbers and the fixed micrometer scale for the last 2 numbers.
- True.
 - False.
 - I don't know.
27. You always place the elevation on the M67 sight before the deflection.
- True.
 - False.
 - I don't know.
28. Under normal conditions, how far out are the aiming posts placed?
- 100 and 200 meters.
 - 75 and 150 meters.
 - 50 and 100 meters.
 - 25 and 50 meters.
 - I don't know.
29. Setting the correct deflection on the sight places the mortar, once the sight is back on the poles and leveled, in the direction commanded by the FDC.
- True.
 - False.
 - I don't know.
30. Setting the correct elevation on the sight places the mortar, once the sight is leveled, on the angle commanded by the FDC.
- True.
 - False.
 - I don't know.

31. Where on the aiming posts should the vertical reticle line of the sight be aligned when viewing a correct sight picture with the bubbles level?
- The right side of the aiming post.
 - The center of the aiming post.
 - The left side of the aiming post.
 - None of the above.
 - I don't know.
32. The mortar is properly laid for deflection and elevation when:
- The gunner attains a proper sight picture.
 - The sight bubbles are level within the outer red lines and the gunner has attained the proper sight picture.
 - The aiming posts are aligned.
 - The gunner announces "UP".
 - I don't know.
33. Who is primarily responsible for conducting safety checks before firing the mortar?
- The Ammunition Bearer.
 - The Assistant Gunner.
 - The Gunner.
 - The Squad Leader.
 - I don't know.
34. Wearing gloves to fire a mortar is only allowed in extreme cold weather.
- True.
 - False.
 - I don't know.
35. What are the settings when storing the M67 sight in the carrying case?
- Deflection 2400 mils and Elevation 800 mils.
 - Deflection 800 mils and Elevation 2400 mils.
 - Deflection 3200 mils and Elevation 1100 mils.
 - Deflection 1100 mils and Elevation 3200 mils.
 - I don't know.

36. What are the three types of malfunctions common to mortars?
- Failure to lock, failure to fire, failure to unlock.
 - Misfire, hangfire, cookoff.
 - Fouled bore, fouled firing pin, fouled ammunition.
 - Defective ammunition, defective firing pin, defective cannon.
 - I don't know.
37. When performing misfire procedures on a U.S. Army mortar, the Squad Leader supervises the removal of the misfire using a printed copy of the current misfire procedure.
- True.
 - False.
 - I don't know.
38. When a misfire occurs, who can immediately announce "Misfire"?
- The squad leader.
 - The gunner.
 - The assistant gunner.
 - The ammunition bearer.
 - All of the above
 - I don't know.
39. During live-fire training how far behind the mortar do all personnel, except the gunner, move?
- 50 or more meters.
 - 100 or more meters.
 - 200 or more meters.
 - 300 or more meters.
 - I don't know.
40. If the gunner cannot dislodge the mortar after a series of kicks, how long must all squad members wait before continuing with the misfire procedures?
- 1 minute.
 - 2 minutes.
 - 5 minutes.
 - 10 minutes.
 - I don't know.

APPENDIX D

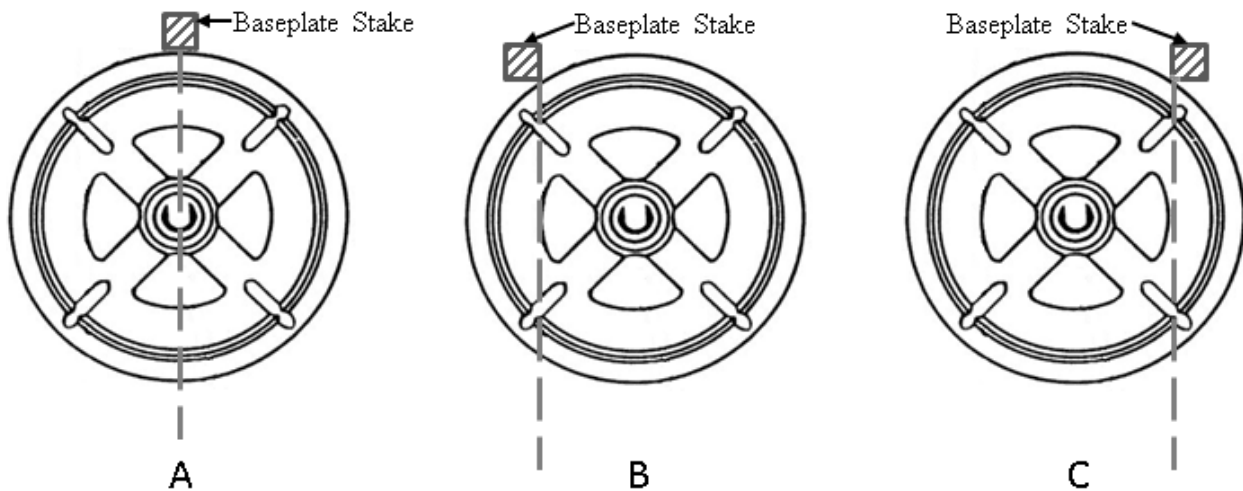
MORTAR APPLICATION TEST

Mortar Application Test

INSTRUCTIONS: The purpose of this test is to measure your knowledge of 11C specific doctrine, skills, and tasks. Please circle the one response that best answers each question. If you do not know the answer, please do not guess. Instead, circle the “I don’t know” option.

Situation: You are assigned to the 81mm mortar platoon of HHC/1-18 IBCT as a member of the Number 1 Gun. You are responsible for providing the maneuver companies with indirect fire support while they conduct operations in the surrounding mountains to interdict enemy infiltration. Your Platoon Leader has identified the positions for each of the guns and told the Squad Leaders where he wants them.

Your Squad Leader marks the position of the Number 1 Gun and commands “Action”.



1. Who aligns the baseplate with the baseplate stake?
 - a. Squad Leader.
 - b. Gunner.
 - c. Assistant Gunner.
 - d. Ammunition Bearer.
 - e. I don’t know.

In order to rotate the socket so that the open end is pointing in the right direction, you must know the direction of fire.

2. Who indicates the direction of fire?
 - a. The FDC.
 - b. The Squad Leader.
 - c. The Gunner.
 - d. The Assistant Gunner
 - e. I don’t know.

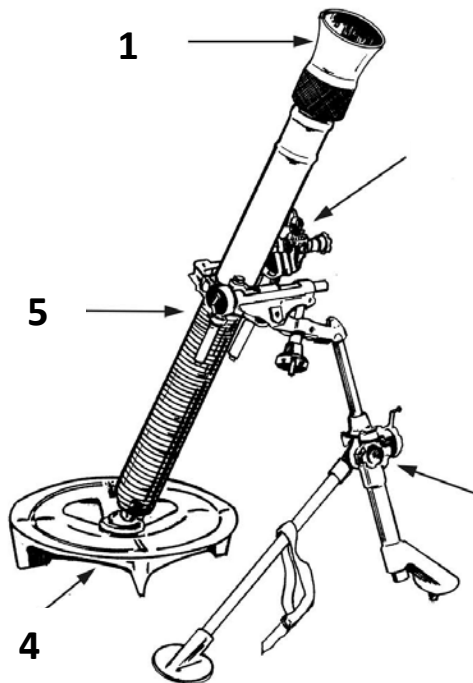
3. Using the pictures above, how would you align the baseplate with the baseplate stake?
- f. A.
 - g. B.
 - h. C.
 - i. None of the above.
 - j. I don't know.

The last step in mounting the mortar is to remove the sight from its case, set the deflection and elevation, mount it on the mortar, and level the bubbles.

4. What are the initial deflection and elevation settings placed on the M67 sight when removed from its carrying case and mounted on the M252 81mm mortar?
- f. Deflection 2400 mils and Elevation 800 mils.
 - g. Deflection 800 mils and Elevation 2400 mils.
 - h. Deflection 3200 mils and Elevation 1100 mils.
 - i. Deflection 1100 mils and Elevation 3200 mils.
 - j. I don't know.

Once the mortar has been set-up it looks similar to the picture below.

5. Correctly identify the components of a U.S. Army mortar. Write the corresponding number on the line to the left of the correct definition.



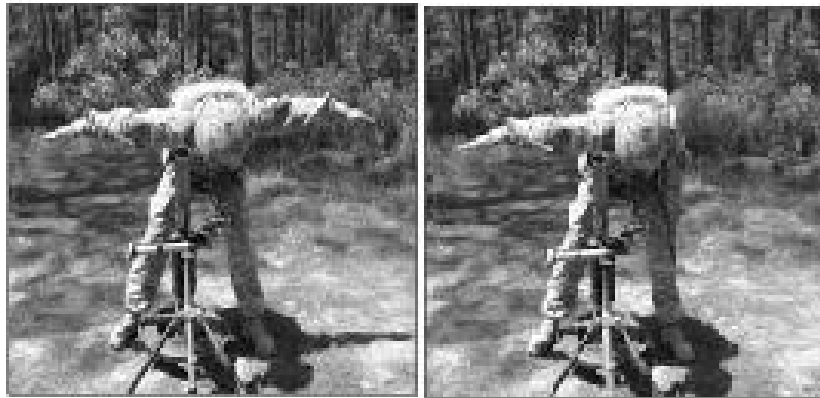
- _____ Gun
- _____ Flash Suppressor
- _____ Cannon
- _____ Ground Mount
- _____ Sight
- _____ Base Plate
- _____ Blast Attenuator Device
- _____ Self-illuminating sight unit
- _____ Bi-pod
- _____ Mount

The aiming posts are used to establish an aiming point (reference line) when laying the mortar for deflection. Once all mortars are placed parallel to the base mortar you hear the Section Leader command "Section, Refer Deflection, Two Eight Zero Zero (2800), Place out aiming posts". As the ammunition bearer you have to place the aiming posts.

6. Under normal conditions, how far out are the aiming posts placed?

- f. 100 and 200 meters.
- g. 75 and 150 meters.
- h. 50 and 100 meters.
- i. 25 and 50 meters.
- j. I don't know.

You run out and drop the closest post and continue out to place the farthest post. You place the post vertical to the ground and look back towards the mortar and see your gunner signaling:

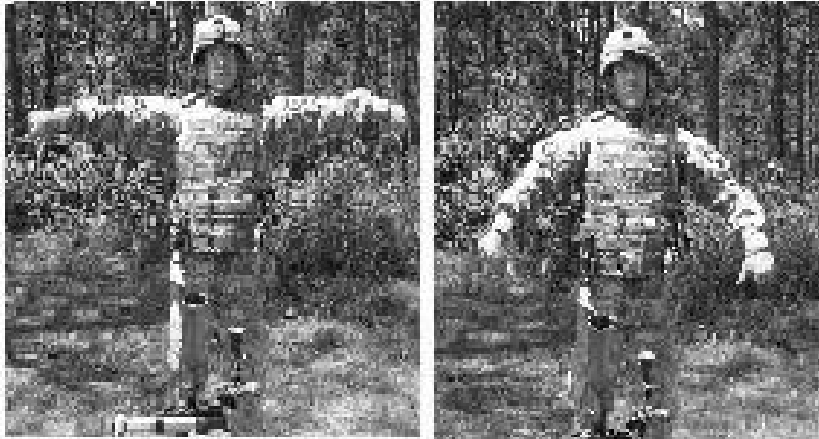


The gunner is moving his left arm up and down

7. What do you do?

- a. Move the post to the right.
- b. Move the post to the left.
- c. Make a minor adjust to the right.
- d. Drive in the post.
- e. I don't know.

You completed the task above and see your gunner signaling:



The gunner is moving both arms down

8. What do you do?
- a. Run to the closest post.
 - b. Pull up the post.
 - c. Drive in the post.
 - d. Move the post to the right.
 - e. I don't know.

You completed the task above and see your gunner signaling:



The gunner is moving his right hand on and off his helmet

9. What do you do?
- a. Make a minor adjustment to the right.
 - b. Make a minor adjustment to the left.
 - c. Tilt the post to the right.
 - d. Tilt the post to the left.
 - e. I don't know.

You completed the task above and see your gunner signaling:



The gunner is rotating his fists and forearms in a circular motion

10. What do you do?

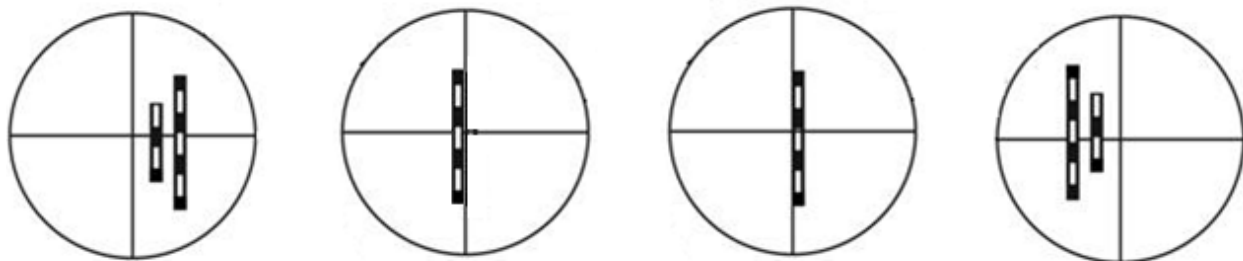
- a. Pull up the post.
- b. Run to the closest post.
- c. Drive the post.
- d. Lay down the post.
- e. I don't know.

As the gunner on the Number One gun when you hear the Section Leader announce "Section, Refer Deflection, Two Eight Zero Zero (2800)" you manipulate the sight to read the correct deflection as the ammunition bearer runs out with the aiming posts.

11. When placing a deflection on the M67 sight you use the Black fixed coarse scale for the first 2 numbers (28) and the Black fixed micrometer scale for the last 2 numbers (00).

- d. True.
- e. False.
- f. I don't know.

12. As the Gunner looking through the sight while the ammunition bearer is placing the aiming posts what is the final sight picture before announcing "Gun Up".



A

B

C

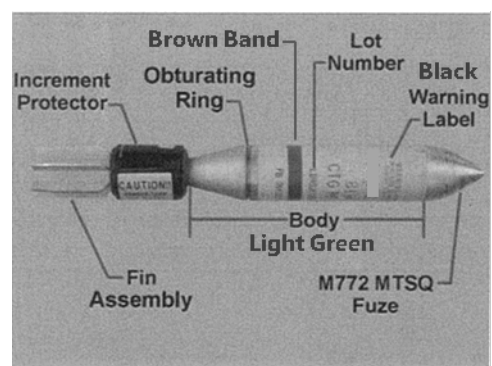
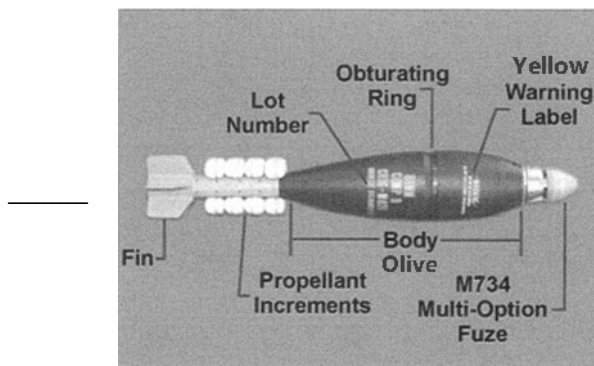
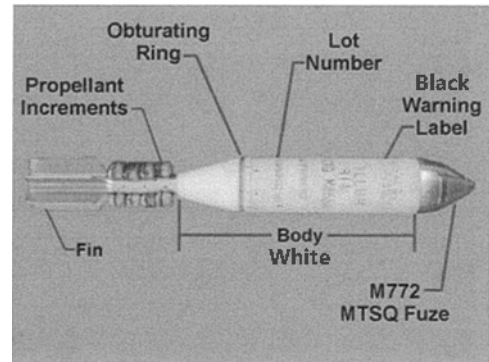
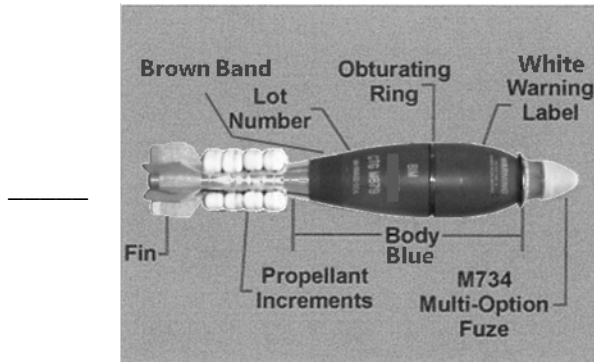
D

- a. A.
- b. B.
- c. C.
- d. D.
- e. I don't know.

Once the aiming posts have been emplaced your squad leader establishes priorities of work and tells you to store and prepare ammunition for upcoming fire missions.

13. Match the type with the picture of the three common types of cartridges for the mortar? Write "A", "B", and "C" in the space next to the correct cartridge.

- f. High Explosive.
- g. Illumination.
- h. Smoke.

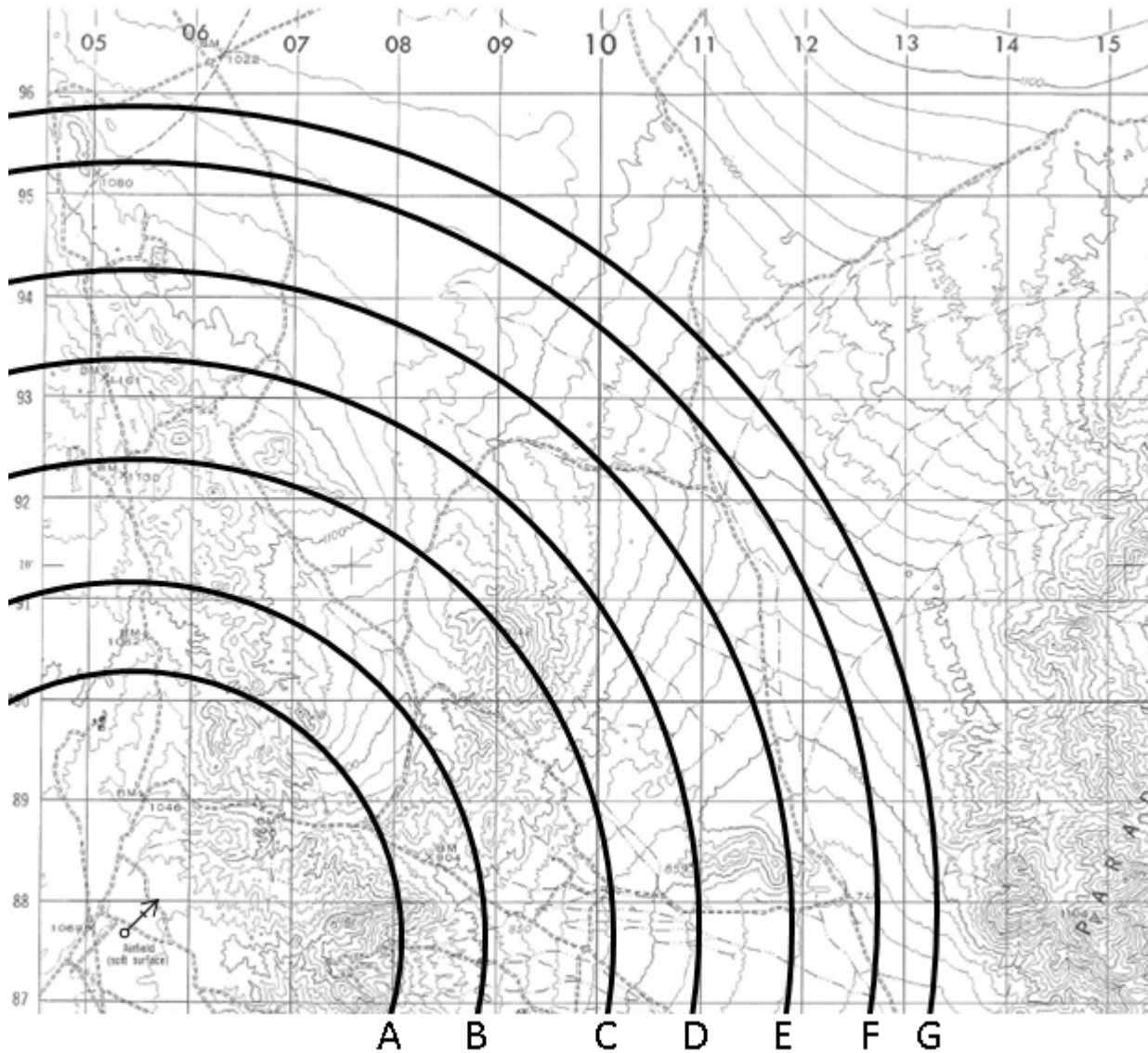


14. Match the type of mortar fuze to the description of effects.

Fuze	Answer	Description of effects
f. Point-detonating (PD), Impact (IMP), Superquick (SQ)	_____	Detonates the cartridge after a preselected time has elapsed from the round being fired
g. Delay (DLY)	_____	Detonates the cartridge above the ground
h. Time	_____	Detonates the cartridge on impact with the ground
i. Near-surface burst (NSB)	_____	Detonates the cartridge on or near the ground
j. Proximity (PRX)	_____	Detonates the cartridge 0.05 seconds after impact with any object

15. How do you store white phosphorus (WP)?

- f. Fuze-end down.
- g. Fuze-end up.
- h. Horizontal.
- i. Vertical.
- j. I don't know.



Your platoon is located near the airfield vicinity NJ054877. The maximum engagement lines (MEL) are drawn on the map.

16. If you were part of a 60mm mortar squad which line represents the maximum distance that your squad could provide indirect fire support? Write your MEL answer A-G in the first space provided, and the maximum effective range distance in the second space provided.

- a. _____
- b. _____
- c. I don't know.

17. If you were responding to an immediate suppression call for fire, what are the maximum and sustained rates of fire for the M224 60 mm Mortar that you can provide?

- f. 30 per minute for 4 minutes max / 20 per minute sustained.
- g. 30 per minute for 2 minutes max / 15 per minute sustained.
- h. 16 per minute for 1 minute max / 4 per minute sustained.
- i. 15 per minute for 3 minutes max / 3 per minute sustained.
- j. I don't know.

18. If you were part of an 81mm mortar squad which line represents the maximum distance that your squad could provide indirect fire support? Write your MEL answer A-G in the first space provided, and the maximum effective range distance in the second space provided.

- a. _____
- b. _____
- c. I don't know.

19. If you were part of a 120mm mortar squad which line represents the maximum distance that your squad could provide indirect fire support? Write your MEL answer A-G in the first space provided, and the maximum effective range distance in the second space provided.

- a. _____
- b. _____
- c. I don't know.

20. If you were responding to an immediate suppression call for fire, what are the maximum and sustained rates of fire for the M120/M121 120mm Mortar that you can provide?

- a. 30 per minute for 4 minutes max / 20 per minute sustained.
- b. 30 per minute for 2 minutes max / 15 per minute sustained.
- c. 16 per minute for 1 minute max / 4 per minute sustained.
- d. 15 per minute for 3 minutes max / 3 per minute sustained.
- e. I don't know.

Your 81mm mortar Section Leader tells you that there are troops in contact taking fire from a hilltop vicinity NJ0692. Your current sight settings are deflection Two Eight Zero Zero (2800)

and elevation One One Zero Zero (1100). Five minutes later the platoon forward observer (FO) initiates a call for fire.

21. The FO is one member of the indirect fire team, who are the remaining members?

- e. The Section Leader and a gun squad.
- f. The gunner, the assistant gunner, and the ammunition bearer.
- g. The Squad Leader and the fire direction center (FDC).
- h. The FDC, and a gun squad.
- i. I don't know.

Your Section Leader announces "Section, HE proximity, Number One, One round, Deflection Three Zero Seven Five (3075), Charge 3, Elevation One Two Seven Zero (1270), On My Command".

22. You have practiced crew drills for this occasion. You know you can provide _____ and _____ delivery of indirect, high-angle fire to support the unit in contact.

- f. Fast and speedy.
- g. Timely and accurate.
- h. Reasonable and prudent.
- i. Accurate and safe.
- j. I don't know.

23. Based on the deflection and elevation changes, what type of mission is this?

- a. Small deflection.
- b. Large deflection.
- c. Referring of the sight and realignment.
- d. Hip Shoot.
- e. I don't know.

24. It starts to get loud and hectic, therefore the gun crew starts echoing the commands. What parts of the fire command are echoed by the gun squad members?

- a. Deflection and elevation only.
- b. Type of ammunition, deflection and elevation only.
- c. All parts of the fire command.
- d. None of the fire command if the Section Leader announces "Number One" and you are on gun "Number Two".
- e. I don't know.

25. Setting 3075 on the sight places the mortar, once the sight is back on the aiming posts and leveled, in the direction commanded by the FDC.
- d. True.
 - e. False.
 - f. I don't know.
26. Setting 1270 on the sight places the mortar, once the sight is leveled, on the angle commanded by the FDC.
- d. True.
 - e. False.
 - f. I don't know.
27. As the Gunner of the number one gun, which setting do you place on the sight first?
- d. 3075.
 - e. 1270.
 - f. I don't know.
28. As the Gunner you continue to manipulate the sight and move the mortar to lay it on the deflection and elevation settings issued in the fire command. At what point do you indicate to your Squad Leader that the mortar is properly laid?
- f. Once I have attained a proper sight picture.
 - g. Once the sight bubbles are level within the outer red lines and I have attained a proper sight picture.
 - h. Once the aiming posts are aligned.
 - i. When I announce "UP".
 - j. I don't know.
29. Before firing, safety checks must be conducted. Who is primarily responsible for conducting the safety checks?
- f. The Ammunition Bearer.
 - g. The Assistant Gunner.
 - h. The Gunner.
 - i. The Squad Leader.
 - j. I don't know.

30. The Section Leader called for “HE proximity”, which is used to cause maximum casualties when engaging troops in the open. How far above ground does the fuze detonate the mortar cartridge?
- f. 2 – 16 feet.
 - g. 1 – 10 feet.
 - h. 4 – 15 feet.
 - i. 3 – 13 feet.
 - j. I don’t know.
31. The fire mission has progressed to the “fire for effect” phase of the mission. What is the maximum and sustained rate of fire for your 81mm mortar?
- a. 30 per minute for 4 minutes max / 20 per minute sustained.
 - b. 30 per minute for 2 minutes max / 15 per minute sustained.
 - c. 16 per minute for 1 minute max / 4 per minute sustained.
 - d. 15 per minute for 3 minutes max / 3 per minute sustained.
 - e. I don’t know.
32. Suddenly, all the guns are responding to immediate suppression and fire for effect missions, during this response who has the responsibility for safety when conducting indirect fire missions?
- h. The Platoon Leader.
 - i. The Section Leader.
 - j. The Squad Leader.
 - k. The Gunner.
 - l. The Assistant Gunner.
 - m. The Ammunition Bearer.
 - n. All of the above.
 - o. None of the above.
 - p. I don’t know.
33. In the process of firing the fifth round the mortar has a misfire and fails to fire, this is one type of malfunction; what are the two other types of malfunctions common to mortars?
- f. Failure to lock and failure to unlock.
 - g. Hangfire and cookoff.
 - h. Fouled bore and fouled ammunition.
 - i. Defective ammunition and defective firing pin.
 - j. I don’t know.

34. When a misfire occurs, who can immediately announce “Misfire”?

- g. The squad leader.
- h. The gunner.
- i. The assistant gunner.
- j. The ammunition bearer.
- k. All of the above
- l. I don’t know.

35. When performing misfire procedures on a U.S. Army mortar, the senior person present supervises the removal of the misfire using a printed copy of the current misfire procedure.

- d. True.
- e. False.
- f. I don’t know.

36. You attempt to dislodge the round with a series of kicks, but the round does not fire. You test the cannon for heat and find that the cannon is too hot to handle. How long should you wait before continuing with the misfire procedures?

- f. 1 minute.
- g. 2 minutes.
- h. 5 minutes.
- i. 10 minutes.
- j. I don’t know.

The gun squad was able to clear the misfire and get the mortar back into action. You continued to fire until rounds were complete and the target destroyed. Your Squad Leader announces “Out of Action” in order to move to a different location.

37. As the ammunition bearer, when returning prepared but unfired mortar rounds to their containers, the round should be placed in the container:

- d. Fin-end first.
- e. Fuze-end first.
- f. Horizontal.
- g. Vertical.
- h. I don’t know.

38. As the gunner, what settings must be set on the M67 sight when storing it in the carrying case?
- f. Deflection 2400 mils and Elevation 800 mils.
 - g. Deflection 3800 mils and Elevation 1100 mils.
 - h. Deflection 3200 mils and Elevation 1100 mils.
 - i. Deflection 1100 mils and Elevation 3200 mils.
 - j. I don't know.
39. In order to move to an alternate location you will have to carry the 81mm mortar. You have a four-man crew and three major components; you must distribute the weight equally. What is the weight of the 81mm cannon with BAD?
- f. 27 lbs.
 - g. 29 lbs.
 - h. 35 lbs.
 - i. 94 lbs.
 - j. I don't know.
40. Your Squad Leader is responsible for selecting the next position for your mortar and gun crew. He must take into consideration mask and overhead clearance, as well as survivability. One type of location that increases survivability is a defilade position. Why should mortars be employed in defilade?
- a. To protect them from enemy direct fire.
 - b. To prevent enemy observation.
 - c. To take the greatest advantage of their indirect fire role.
 - d. All of the above.
 - e. I don't know.