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# PRELIMINARY AND BASIC GUNNERY FOR THE HBCT

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*Soldiers in an M2A2 Bradley Fighting Vehicle from the 1st Infantry Division search for insurgents in Iraq.*

Field Manual (FM) 3-20.21 was written to standardize the evaluation process for all weapon system platforms including Abrams tanks, Bradley Fighting Vehicles (BFVs), and armored high-mobility multipurpose wheeled vehicles (HMMWVs). Moreover, it ensures a progressive training methodology for each type of unit's weapons proficiency strategy. Bradley gunnery, originally conceived from FM 23-1 and later FM 3-22.1, was designed to train BFV crews. During the crawl phase, individually assigned and crew-served weapons use Volume I (*Small Arms Weapons Training Strategy*) and the appropriate 3-22.X series manuals for qualification. The walk and run phases of qualification for the weapon system platform crews are covered in the heavy brigade combat team (HBCT) gunnery manual. The walk phase is for crew gunnery, and the run phase is collective gunnery.

BFV crew gunnery trains the crew members throughout the process, culminating in an evaluated event which tests their ability to take knowledge and skills learned during preliminary gunnery and apply it to the basic gunnery tables. Bradley crews exercise the weapon systems in both fully operational and degraded modes.

Inherent flexibility in FM 3-20.21 allows the commanders to tailor the engagements to support their anticipated contemporary operational environment (COE). For example, a unit deploying to an urban area with a threat of infantry and unarmored vehicles might focus on short range engagements with targetry placed in and around urban facades. In the event a unit may not have a contingent area of operation, commanders may opt to design scenarios to support a variety of threats at all range bands in any environment. In this article, I discuss the preliminary and basic crew gunnery concepts as they apply to the BFV.

## **Heavy Crew Gunnery Concept**

Heavy crew gunnery is transforming. As the Army stands up HBCTs with their inherent modularity and task organization, there is a need for a common scoring system. Currently, armor units score using a 1,000-point system, while Bradley units score using

a TPU (trained, needs practice, untrained) system. Armor commanders have limited latitude to modify their ranges to accommodate their individual and sometimes unique missions, whereas Bradley commanders have substantial latitude.

In an HBCT, the BCT, CAB, and squadron commanders will be able to assess all heavy fighting vehicle assets on a very similar scoring system with an extensive degree of flexibility to tailor gunnery to suit the unit's COE or area of responsibility (AOR).

The goal of crew gunnery is to train and certify a crew's ability to operate effectively using the direct fire engagement process. Crew gunnery leads to section and platoon qualification. This training consists of progressive tables to develop crew gunnery skills, which include engaging and destroying single and multiple targets from a stationary or moving BFV in a wide variety of conditions and environments. The tables and their evaluations focus on the individual crew's collective ability to operate the BFV in all of its configurations, that is, with all of its common and specialized systems and capabilities. Commanders can tailor the events based on their anticipated COE. Their options extend to target type and target engagement ranges.

**The Engagement Process: DIDEA**

The engagement process is a series of deliberate steps which aid in detecting, identifying, engaging and assessing targets on the battlefield to ensure their rapid destruction. The detect, identify, decide, engage, and assess (DIDEA) process provides an iterative, standardized, and systematic approach to target engagement activities across the user spectrum, from the individual infantryman to indirect fire controllers. The individual actions of the DIDEA process are summarized below:

**Detect** – The acquisition and location of an object in the operational environment.

**Identify** – A systematic process supporting the characterization of detected objects as friend, enemy, or neutral.

**Decide** – Determination of appropriate application of military options and weapons resources on identified objects.

**Engage** – Specific application of military options/weapons resources.

**Assess** – Did the applied weapons

resources bring about the desired effect?

Chapter 6 of FM 3-20.21 outlines the techniques used in the engagement process for all crews. The chapter is divided into six main sections with the first two sections being common to all weapons systems platforms. Section I discusses in broad detail the DIDEA process. Section II focuses on the combat identification process encompassing the detect, identify, and decide processes of DIDEA. Section III is divided into three subsections referencing specific weapon system platforms and specifically discussing the direct fire engagement techniques for each combat platform. Section IV discusses the engagement process for fire support while Section V outlines the final step in the DIDEA process of assessment. Though the latter sections of Chapter 6 are used throughout gunnery, the last section (Section VI) completely details fire control and distribution.

**Table Design and Development**

Outlined below is the new table layout for crew gunnery.

To underscore, FM 3.20-21 uses

CREW GUNNERY TABLES
Table I — Preliminary Crew Practice
Table II — Preliminary Crew Proficiency Course
Table III — Crew Practice I
Table IV — Crew Practice II
Table V — Crew Practice III
Table VI — Crew Qualification

minimum proficiency levels (MPLs) to maintain the critical skill requirements during crew gunnery. The following are the MPLs that must be conducted, at a minimum, from the crew proficiency course through the crew qualification tables during table development:

- 1 friendly or 1 neutral target - day and night
- 1 defensive engagement - day and night
- 1 offensive engagement - day and night
- 1 short halt engagement - day and night
- 1 CBRN (chemical, biological, radiological, and nuclear) engagement - day and night

- 1 25mm point target 800m or less - day and night
- 1 COAX target 300m or less - day and night
- 1 25mm point target (BFV ODS [Operation Desert Storm]) 1,400m or greater - day and night
- 1 25mm point target (BFV A3) 1,600m or greater - day and night
- 1 call for fire engagement (CFV and BFIST) - day or night
- 1 lateral dispersion target greater than 1.5 WFOV - day and night

**Preliminary Crew Gunnery**

Preliminary crew gunnery tables are primarily device-based tables, designed to be used by the commander to either indoctrinate new crews into the first steps of Bradley gunnery or to train assessed strengths and/or weaknesses in established stabilized crews. These tables are used extensively in new equipment training (NET) and are cost effective in that they place crews into Bradleys and train fundamental skill requirements without the reoccurring and potentially prohibitive costs of ammunition, range time, materials and staff, and vehicle operational tempo costs, thus saving full-caliber ammunition to train high payoff critical skill requirements. However, recent developments have made it evident that those conventional devices used through today to train device-based precision gunnery are soon to be gone. The life cycle support (WCLS) for the precision gunnery system (PGS) has been terminated, and the devices will rapidly erode until pulled from service. These tables will be resourced for sub-caliber ammunition with the use of a sub-caliber device. They can also be fired using the PGS until the systems are no longer functional but should not be fired using current MILES (Multiple Integrated Laser Engagement System) or dry fire. If the weapons and visual effects and ballistic solution become a threshold requirement for the future MILES system (currently an objective requirement maintaining its inadequacies as a gunnery trainer), that system will replace the use of sub-caliber ammunition.

Preliminary crew gunnery training tests the crewmembers' ability to take knowledge

and skills learned during classroom instruction, simulation training, and hands-on training and apply it to device-based gunnery tables that exercise the fire control and weapon systems in both fully operational and degraded modes.

Table I introduces crews to engaging stationary and moving targets (placed in a tactical array) from a stationary Bradley under normal and degraded conditions. Each engagement is designed to train crew duties and engagement techniques against stationary or moving targets, with each type of ammunition and sight. MPL conditions are implemented for both day and night engagements to evaluate the crew's ability to operate the weapons and fire-control systems. Friendly targets should be included to give the crew practice in combat identification.

Table II is designated as a gate-to-live-fire (GTLF) event. It evaluates the crew's ability to engage stationary and moving targets that are placed in a tactical array, from a stationary and moving Bradley under normal and degraded conditions. Each engagement is designed to test crew duties and engagement techniques against stationary or moving targets, with each type of ammunition and sight.

### Basic Crew Gunnery

Basic crew gunnery training tests the crewmembers' ability to take knowledge and skills learned during preliminary gunnery and apply it to basic gunnery tables that exercise the fire control and weapon systems in both fully operational and degraded modes. Crewmembers, to include the platoon leader's backup, must complete the following prerequisite training events prior to conducting full-caliber, live-fire gunnery training:

- Vehicle commanders, gunners, loaders, and drivers must pass all GSTs (gunnery skills tasks).
- A crew must pass Table II, Crew Proficiency Course.

Table III trains Bradley crews to engage stationary and moving targets using the coaxial machine gun. Various tasks are presented using single and multiple machine gun targets requiring the gunner or commander to employ point target engagement techniques. Table III is a newly designed table in BFV gunnery in which sub-caliber ammunition is replaced with 7.62mm 4:1 ammunition and crews are given the table authorization in order to train on machine gun engagement techniques. As is the case for all basic crew tables, MPL conditions are implemented for both day and night engagements to train and evaluate the crew's ability to operate the weapons and fire-control systems.

Table IV trains crews on firing all weapons for their platform system. This table measures the crew's ability to engage stationary and moving targets, placed in tactical arrays, from a stationary and moving combat vehicle under normal and degraded conditions. Friendly targets will be included to give the crew practice in combat identification.

Table V trains crews to engage stationary and moving targets, placed in tactical arrays, from a stationary and moving BFV. Table V consists of five day and four night tasks with single and multiple weapon system engagements. Various tasks require the crew to use precision or degraded-mode gunnery techniques against main gun and machine gun target arrays. Crews on digitally-equipped vehicles will complete the minimum requirements for digital gunnery stated in Chapter 8. One day and one night engagement

will be fired in a CBRN environment. Crews will fire the two CBRN tasks with protective masks on. Friendly targets will be included to give the crew practice in combat identification.

Table VI is the culminating event for crew gunnery. Table VI is a single-vehicle qualification table. It evaluates the crew on the entire engagement process in various firing conditions. Table VI evaluates the crew's ability to put steel on target quickly, while ensuring proper combat identification on a course that presents friendly, neutral, and threat target arrays at realistic ranges. The Bradley crew engages single and multiple weapon systems, and delayed target presentations from a moving and stationary BFV. Table VI consists of five day and five night firing tasks. Various tasks will be presented requiring precision or degraded-mode gunnery techniques against main gun and machine gun targets. Crews on digitally-equipped vehicles will complete the minimum requirements for digital gunnery stated in Chapter 8. One day and one night engagement will be fired in a CBRN environment. Crews will fire the two CBRN tasks with protective masks on. Friendly targets will be included to give the crew practice in combat identification.

### Evaluating Heavy Crew Gunnery

Bradley crews will be held to threat-based timing (except during use of the TOW [tube-launched, optically tracked, wire-guided] family of missiles). They will have to meet the established target threat times to receive a 70 percent, which will be considered as the minimum score for passing an engagement. The 100-point score line is based on the mechanical operating rate of the platform/weapon plus time of flight of specific rounds fired, to include sensing and killing bursts. This assumes the worst case scenario on the crew's behalf with regards to ammo change for 25mm. There is also a one second allowance at each 100-point line for non-crew induced variables. This is to account for a wide variety of inconsistencies, including but not limited to turret slew rates and gun/cannon cycle rates.

A crew earning only 70 points based on time can still pass the engagement if all tasks, conditions, and standards are met. Any point deductions resulting from crew cuts, such as fire command and engagement techniques, will be applied at the end of the table phase.

Scoring for Crew Qualification Table is as follows:

CREW QUALIFICATION RATINGS	
Distinguished	Crew scored at least 70 points on at least 9 of 10 engagements. Crew scored 900 to 1,000 points overall.
Superior	Crew scored at least 70 points on at least 8 of 10 engagements. Crew scored 800 to 899 points overall.
Qualified	Crew scored at least 70 points on at least 7 of 10 engagements. Crew scored 700 to 799 points overall.

The modern battlefield is not always as convenient as we would like; therefore, the result is that not all engagements must be fired from an own vehicle posture of a dug-in defensive position or on

the offensive. A new own vehicle posture is being instituted; it is the short halt. In the short halt, the BFV crew must engage and destroy vehicles faster than ever before as the BFV is fully exposed as in the offense, but no additional time is allowed.

In an effort to maximize the commander's flexibility, engagements within the tables are no longer defined by prescribed offensive, defensive or CBRN definitions. The commander may opt to vary the number of offensive, defensive, short halt or CBRN events within his gunnery to tailor it to their COE/AOR.

TOW scoring is being revised. In keeping with TOW missile design specifications and Bradley operational requirement documents, a BFV must have an uninterrupted 30 inches of clearance from the bottom of the missile tube to impact at the target. In order to achieve this, a Bradley in a dug-to-standard, proofed two or three tier fighting position must move into and remain in the hull down position to fire and track a TOW missile. For more on this, refer to the staffed and published white paper on Warrior University under Stryker/Bradley Proponent Office (pending). To reinforce this training, a crew cut will be assessed a zero-point engagement for disregarding to follow the task, conditions, and standards.

Delayed targetry is also being added. This had been the purview of the A3 community but is being brought to the ODS and A2 community as well. Delayed targetry, known as a "Hunter Killer" task in A3 circles, keeps the BFV ODS and below variants in the fight beyond their previous simultaneous exposure of multiple targets.

As the Bradley community continues to mature, the determination has been made to eliminate single target engagements where possible. TOW engagements are the exception, as they are based on missile flight times. The focus in basic gunnery will be on multiple target engagements as they are a higher payoff skill set. Single target engagements are a building block towards this goal and are addressed in simulations, preliminary gunnery and Crew Practice I. All engagements in Crew Practice II, III, and Crew Qualification will be multiple engagements.

In summary, crew gunnery is, as it has always been, the foundation of a successful gunnery program, but it is only the precursor to section and platoon gunnery. As crew gunnery continues to be refined and migrates into its final form for this iteration, the need for feedback from the field is a valuable tool to the training developer.

Commanders, master gunners, and training managers are encouraged to read the coordinating draft of FM 3-20.21 and ask that them to contact the Stryker/Bradley Proponent Office with recommendations for the gunnery manual. The point of contact is Sergeant First Class William Simons. He can be reached at (706) 544-6201 or [william.f.simons@us.army.mil](mailto:william.f.simons@us.army.mil).

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# Truck Crew Gunnery

**SERGEANT FIRST CLASS WILLIAM SIMONS**

**T**ruck gunnery, originally conceived from FM 17-12-8 and later FM 3-20.8, was designed to train reconnaissance elements in the same crawl-walk-run methodology as other weapon system platforms. During the crawl phase, MK-19, .50 caliber, and M240B gunners fire using Volume I, *Small Arms Weapons Training Strategy*, and the appropriate 3-22.X series manuals through tripod-mounted qualification. The walk and run phases of qualification for the gunners are covered in the HBCT gunnery manual. The walk phase is crew gunnery, and the run phase is advanced gunnery.

Truck crew gunnery trains the crew to take the knowledge and skills learned during preliminary gunnery and apply it to the basic gunnery tables exercising the crew and the weapon systems in both fully operational and degraded modes. Truck crew gunnery tables should also be utilized by all combat support (CS) and combat service support (CSS) elements within the HBCT until Volume III, *Combat Support/Combat Service Support Gunnery*, is released. The culmination of truck crew gunnery is Table VI, crew qualification.

The inherent flexibility built into FM 3-20.21 allows the commanders to tailor the engagements to support their anticipated contemporary operational environment (COE). For example, units deploying to an urban area with a threat of infantry and unarmored vehicles could focus on short range engagements with targets placed in and around urban facades. Some units may not have a contingent area of operation. In this case, commanders may opt to design scenarios to support a variety of threats at all range bands in any environment.

## **Truck Crew Engagement Process: DIDEA**

The engagement process is the process of detecting, identifying, engaging and assessing targets on the battlefield to ensure their rapid destruction. The detect, identify, decide, engage, and assess (DIDEA) process provides an iterative, standardized, and systematic approach to target engagement activities across the user spectrum, from the individual



infantryman to indirect fire controllers. The individual actions of the DIDEA process are summarized below:

**Detect** – The acquisition and location of an object in the operational environment.

**Identify** – A systematic process supporting the characterization of detected objects as friend, enemy, or neutral.

**Decide** – Determination of appropriate application of military options and weapons resources on identified objects.

**Engage** – Specific application of military options/weapons resources.

**Assess** – Did the applied weapons resources bring about the desired effect?

Chapter 6 of FM 3-20.21 outlines the techniques used in the engagement process or DIDEA for all truck crews.

### Truck Crew Gunnery Concept

Throughout FM 3-20.21 there is an inherent flexibility for the commander to train for his anticipated COE. In the development of FM 3-20.21, the gunnery doctrine team from both the Armor and Infantry Centers removed all task prescription from the gunnery manual and established only minimum proficiency levels (MPL) to maintain critical skill requirements and to have a standard evaluation methodology for every weapon system platform in the HBCT; therefore, regardless of unit type (combat arms, CS, CSS), every truck crew will be evaluated in the same manner for both preliminary and basic gunnery.

Though truck crew gunnery was specifically designed for scout/reconnaissance units in the combined arms battalions (CAB) and reconnaissance squadrons, the tables have two further purposes. First, these tables should be used throughout the brigade for both CS and CSS units. Elements such as distribution platoons, transportation companies, and military police platoons, for example, now share a common evaluation process with their combat arms counterparts. Commanders should tailor truck crew gunnery with similar engagements that the latter units can expect while in combat; for example, transportation units traveling at actual rate of march speeds engaging close range targetry.

Second, these tables are also used for units that will deploy in nontraditional roles. For example, artillerymen can be organized as dismounted rifle squads or

armor and infantrymen deployed to an AOR where they will have two vehicle sets or will be on HMMWVs exclusively. It is noteworthy that these truck crew tables will be replicated in the two subsequent weapons proficiency manuals: SBCT and IBCT.

### Table Design and Development

In order for truck crews to conduct crew gunnery, the crew members must complete the following prerequisite training prior to conducting full-caliber, live-fire exercises:

□ Crewmembers must pass all gunnery skills tests (GST) tasks; and

□ A crew must pass Table II — crew proficiency course.

Outlined below is the new table layout for truck crews during basic gunnery.

#### Truck Crew Tables: Chapter 10

**Table III** — Section Proficiency Exercise

**Table IV** — Section Practice

**Table V** — Section Qualification

**Table VI** — Platoon Proficiency Exercise

Table III trains crews to proficiency using the assigned weapon system on a stationary vehicle against stationary single targets. The inherent flexibility of FM 3-20.21 allows commanders and master gunners to arrange targets in a realistic array. The crews will fire four day and three night engagements. As a common theme throughout crew gunnery, friendly targets are included in all crew tables to give the crew practice in combat identification.

Table IV trains crews to employ direct fire to destroy threat targets from a stationary or moving vehicle. The crews engage stationary area and point targets during day and night conditions. Table IV is a building block toward Table V. The unit commander can modify Table IV to train weak gunnery areas or to sustain or improve the crew's strengths or weaknesses.

Table V trains the truck crew to engage moving and stationary targets with the platform weapon systems. It requires the crew to call on all the knowledge gained and lessons learned during Tables I through IV and employ those skills against various targets during day and night operations. Table V prepares the truck crew for Table VI, crew qualification, by presenting

engagements with task conditions similar to those on Table VI.

Table VI is a single-vehicle qualification table. It evaluates the crew on the entire engagement process outlined in Chapter 6 in various firing conditions. Table VI is designed to evaluate the crew's ability to put steel on target quickly, while ensuring proper combat identification on a course that presents friendly, neutral, and threat target arrays at realistic ranges. The firing vehicle crew engages single, multiple, and delayed target presentations from a moving and stationary combat vehicle. Table VI consists of five day and five night firing tasks.

To underscore FM 3-20.21 uses MPLs to maintain the critical skill requirements during truck crew gunnery. Below are the MPLs that must be conducted, as a minimum, on both the crew proficiency course and crew qualification tables:

- 1 friendly or 1 neutral target during the day and night for all tables;
- 1 defensive engagement during the day and night for all tables;
- 1 offensive engagement during the day and night for all tables;
- 1 short halt engagement during the day and night for all tables;
- 1 CBRN (chemical, biological, radiological, nuclear) engagement during the day and night for all tables;
- 1 call-for-fire target during the day and night for all tables (Cavalry units);
- .50 cal./MK-19/M240B:
  - 1 point target 900m or greater during the day and night for all tables;
  - 1 point target 200m or less during the day and night for all tables; and
- MK-19:
  - 1 area target 1,500m or greater during the day and night for all tables.

### Truck Crew Evaluations

For the development of FM 3-20.21, both the Armor and Infantry Schools came together to develop one standard for evaluating gunnery within the HBCT for all of its weapon system platforms. The greatest change that the reader will discover is the decade long reversal from the TPU (trained, needs practice, untrained) system

of scoring to point scoring. For readers that understand both mechanized infantry systems of scoring (past and present), it is important to note that the future point scoring system is similar to the TPU in that the MPL for the future crew gunnery is directly tied to the 70-point line on the timing matrixes. Just as the former point scoring system and current tank point system are evaluated, crew-duty penalties are imposed to ensure that crews practice proper engagement techniques and system procedures. There are five categories of crew-duty penalties:

- \*Applied immediately to each engagement
  - o Immediate disqualification — Crew operates with hazardous conduct.
  - o Automatic zero point — Crew disregards a requirement for an announced task, conditions, and standards.
  - o 30-point penalty — Crew fails to adhere to basic safety or force protection precepts.
- \*Applied as a total at the end of each phase (day/night)
  - o 10-point penalty — Crew fails to perform fundamental leader/crew tasks.
  - o 5-point penalty — Crew fails to employ correct engagement techniques or respond properly to fire commands.

Essentially, crews receive a numerical score based on their exposure to the threat matrix. Once the score is obtained from an engagement, the crew receives 100 points if there were no crew-duty penalties to assess. The crew will receive a lesser score for the engagement if an immediate crew-duty penalty is assessed. For example, immediate disqualification penalties are assessed for the negligent discharge of the weapon system and firing outside the range fans; an automatic zero applies when a crew engages a friendly target or fails to fire a CBRN engagement in MOPP; or a 30-point penalty occurs when crews fail to destroy both targets in accordance with the threat timing matrix. Ten and five-point crew cuts are cumulative for a table phase. For example, a 10-point penalty is assessed against the crew for fundamental leader and crew-type tasks, such as improper fire command, using improper ammunition, etc. Five-point penalties are assessed if the crew uses improper engagement techniques, responds improperly to fire commands, etc.

The table above shows the truck crew ratings that will be received by the crew after completing Table VI, crew qualification.

Truck crew gunnery tests the crewmembers' ability to take knowledge and skills learned during preliminary gunnery and apply it to the basic gunnery tables exercising the crew and the weapon systems in both fully operational and degraded modes. Though truck crew gunnery was developed for the reconnaissance elements commanders should utilize it for all wheeled systems in the HBCT to include combat support and combat service support

CREW QUALIFICATION RATINGS	
Distinguished	Crew scored at least 70 points on at least 9 of 10 engagements. Crew scored 900 to 1,000 points overall.
Superior	Crew scored at least 70 points on at least 8 of 10 engagements. Crew scored 800 to 899 points overall.
Qualified	Crew scored at least 70 points on at least 7 of 10 engagements. Crew scored 700 to 799 points overall.

elements until Volume III, *Combat Support/Combat Service Support Gunnery*, is released. Flexibility in FM 3-20.21 allows the commanders to tailor the engagements to support their anticipated COE. Training managers are encouraged to develop the basic gunnery tables similar to their in-theater threat.

We encourage commanders, master gunners, and training managers to read the coordinating draft of FM 3-20.21 and ask them to contact the Stryker/Bradley Proponent Office with recommendations for the gunnery manual. The point of contact is Sergeant First Class William Simons. He can be reached at (706) 544-6201 or [william.f.simons@us.army.mil](mailto:william.f.simons@us.army.mil).

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