

# Echeloning Fires: Breaking Bad Training Habits

By Lieutenant Colonel Scott G. Wuestner

Photos by Raymond A. Barnard, Command Photographer, JRTC, Fort Polk, LA

Over the years, many articles have been written about echeloning fires. Most Field Artillery Fire Supporters and their Infantry brethren can recite the 6-5-4-3 rule. This rule (in hundreds of meters) refers to the mini-

mum safe distances (MSDs) outlined in “AR 385-63 Safety Policies and Procedures for Training, Target Practice and Combat” that units employ during danger-close live fires. The rule applies to units’ using MSDs to echelon fires—

step rounds closer to friendly troops: 155-mm, 105-mm, 81-mm and, finally, 60-mm munitions.

In their March-April 1997 article “Risk Estimate Distances for Indirect Fire in Combat,” Major Gerard Pokorski and Lonnie R. Minton sought to refine these distances by determining risk estimate distances (REDs) for combat conditions. The article provided excellent data in terms of the probability of rounds’ incapacitating soldiers at the various ranges, called probability of incapacitation (PI). The REDs derived were based on the fragmentation patterns of the different weapons.

However, one critical assumption about the RED data was not emphasized in the article—and is a problem today. The article says, “The distances assume that the firing unit has had its *fires adjusted* onto the target by an observer” [I added the emphasis].

A combination of the misuse of REDs, an AR 385-63 safety procedure mentality (6-5-4-3 rule) and a lack of understanding or application of the five requirements of accurate, predicted fire have led to flawed tactics, techniques and procedures (TTPs) for echeloning fires. This article outlines the impact these failings have on the accuracy of rounds and what units can do about it.

**Risk Estimate Distances.** For whatever the reason, units fail to meet the major assumption upon which REDs were developed—adjust the rounds landing at those REDs.

During offensive operations at the Joint Readiness Center (JRTC), Fort Polk, Louisiana, mortars and artillery seldom are adjusted onto the target prior to an attack. Leader recons rarely are conducted, and forward observers (FOs) very rarely are left in position to watch over the objective in order to adjust the initial rounds of a preparation. During defensive operations, we achieve only a 20 to 30 percent success rate in adjusting rounds on single targets tied to obstacles.

In the September-October 1999 edition, the Chief of Infantry Major General Karl F. Ernst in his article “Is the FA Walking Away from the Close Fight” stated, “By changing between weapon systems as the distance between the friendly force and the enemy is reduced, the maneuver force is essentially assaulting behind a ‘wall of steel’...” If rounds have not been adjusted onto a target, then REDs don’t apply and our current methodology of using the effects radius to echelon fires is invalid.



Mortarman emplacing a 60mm mortar at the JRTC.

### Five Requirements of Accurate, Predicted Fire.

The five requirements are 1. Accurate target location and size, 2. Accurate firing unit location, 3. Accurate weapon and munition information, 4. Accurate meteorological (Met) information and 5. Accurate computational procedures. These requirements are critical to assuring that fires are accurate and predictable and critical to the principle of mass that preparatory fires are based on. Nevertheless, they are not addressed in our current echelonment TTP. For more information, see the article "How to Meet the Five Requirements for Accurate, Predicted Fire (And What to Do If You Can't)" by Captain Christopher A. Patton, September-October 1998, Page 22; you can access the article on line at [sill-www.army.mil/famag](http://sill-www.army.mil/famag) at "Previous Editions."

**Mortar Inaccuracies.** Mortars inherently are not as accurate as cannon artillery. Our fixation on the effects radius has blinded us to many problems with mortars and their firing accuracy. At the JRTC, we commonly see the following errors with mortars in the indirect fire mode.

First, mortars rarely account for the error that occurs when they settle their base plates. Mortars must first settle their base plates for two to three rounds before they can fire accurately. Such errors can cause rounds to fall as much as 200 meters short of the target. This fact has not been factored into the echeloning fires model.

Second, mortars don't do a good job of consistently updating their Met data. Air temperature, air density, wind direction and wind speed all affect the lighter mortar round, thus mortars fail to compensate for nonstandard conditions.

The weight of the round makes a difference. The artillery's most accurate shooter is the 155-mm howitzer firing a 95-pound projectile. The 81-mm mortar round weighs 9.5 pounds while the 60-mm mortar round weighs only 4.5 pounds. Mortar rounds are affected significantly more by the effects of meteorological conditions than the heavier 155-mm projectile or the 33-pound 105-mm round.

Third, mortar systems rarely are provided the survey required for common direction to each firing unit. This, again, directly impacts our ability to mass all systems at the required time and space.

In comparison, artillery units do a reasonable job of meeting the five re-



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quirements in order to achieve accurate first-round fire-for-effect (FFE).

Using REDs at the maximum range of 10 percent PI, the difference between the effects of a 60-mm mortar and a 105-mm round is 25 meters. However, when we add in the effects of not settling base plates, the lack of Met data and survey, and the lack of observer adjustments or registrations to the mortars, the difference dramatically increases, making the higher caliber round more accurate.

**Operational Training Data.** During training at Fort Bragg, North Carolina, units consistently conduct "Walk and Shoots." Walk and Shoots are MSD live-fire tactical exercises without troops (TEWTs) with various surface- and aerial-delivered assets. In a two-year period, one brigade at Fort Bragg conducted 18 iterations of this training.

During these iterations, artillery maintained the five requirements and conducted registrations on their MSD targets. Likewise, the 60-mm and 81-mm mortars had Met and survey and registered on their closest targets. In each TEWT, the company executed preparatory fires on the final target using a quick-fire plan. The target was approximately two-thirds of the ranges for all assets.

After all 18 iterations were conducted, the average operational errors for the 105-mm were between 0 and 100 meters, the 81-mm errors between 100 and 300 meters, and the 60-mm errors between 200 and 400 meters.

Again, these errors, even with all requirements satisfied, cast serious doubt



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on the validity of our current TTP. The firing errors that occurred during the Walk and Shoots far exceed the effects patterns of the rounds.

The concept of echeloning fires by attacking targets on or around the objective using the weapons system with the largest RED (combat) is not valid if rounds are not adjusted.

Many rotations at the JRTC have shown that units rarely adjust their mortars or artillery. Firing accuracy must be the driving factor when executing fires in the close fight. We must understand each weapon system and the factors that affect that system's accuracy

before selecting the system to engage a target. We cannot afford to lose soldiers in combat because of poorly defined and developed TTP that contribute to fratricide.

Unfortunately, we have been practicing bad techniques that have become accepted as doctrine. We must not forget that our task is to place accurate fires on the enemy—to kill the enemy while protecting our troops.

**Changing Bad Habits.** Units should not let the AR 385-63 mindset take hold in their fire support teams (FISTs), fire support officers (FSOs) and infantry leaders. Unfortunately, many already have this mindset and require retraining. Here are ways to break the bad training habit.

- Conduct leader development classes on the principles and fundamentals of how MSDs and REDs are developed and applied and the capabilities/limitations of mortars and artillery, especially in regards to terminal ballistics and effects and the five requirements of accurate, predicted fire.

- Conduct a fire coordination exercise (FCX) that trains the maneuver-fire support team on how to plan for, coordinate and execute fires in the close fight. The FCX should include prep fires; actions

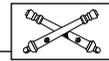
on contact; suppress, obscure, secure, reduce and assault (SOSRA); conducting a deliberate attack; military operations in urban terrain (MOUT), etc.

The FCX can be on a terrain model or in the field as a situational training exercise (STX) lane with pyrotechnics and fire markers. This type of training enables leaders to visualize how fire and maneuver can work together without having to deal with the safety concerns of a live-fire exercise (LFX).

- Continue to execute MSD training LFXs. Units must re-examine the impact of the lack of firing accuracy on both mortars and artillery. They should obtain operational data on how accurately their mortars and artillery shoot with and without meeting the five requirements. Then units should apply those numbers to the REDs to obtain a more accurate combat MSDs. This will allow the maneuver commander to gauge the accuracy of his mortars and artillery and determine the risks he would be willing to take in combat.

In the end, we must train as we will fight. Clearly, the methodology to fix the current echelonment mindset requires a considerable investment in manpower, time and resources. But in combat, the ability of our companies

and platoons to execute close supporting fires to standard is what will produce the greatest effect on the enemy and not ourselves.



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## Assistant Commandants Change

On October 11th, the Assistant Commandant (AC) of the Field Artillery School and Deputy Commanding General for Training of Fort Sill Brigadier General William F. Engel participated in ceremonies passing his responsibilities to Brigadier General David C. Ralston. General Engel had held the position since October 1999. He now commands White Sands Missile Range in New Mexico.

General Ralston also served as Chief of Staff of Fort Sill and commanded the 1st Cavalry Division Artillery, Fort Hood, Texas—the same division artillery in which he served as Executive Officer. Also at Fort Hood, he was the S3 of the Division Artillery and S3 of the 3d Battalion, 3d Field Artillery, both in the 2d Armored Division. Among other assignments, he commanded the 3d Battalion, 1st Field Artillery, part of



Photo by Linda A. Young, Fort Sill TSC

Shortly after becoming AC, BG Ralston attended the Army's inspection of Green Hall, 95th Reception Battalion, at the Field Artillery Training Center (FATC), Fort Sill. Green Hall is being considered for the Phillip Connelly Dining Facility Award. To the right is COL Tom O'Donnell, Commander of the FATC, and LTC Angie Joseph, Commander of the 95th Battalion.

the 3d Infantry Division (Mechanized) in Germany. He was an Army War College Fellow at Harvard University

and holds a Master of Arts in Personnel Management and Administration from Central Michigan University.