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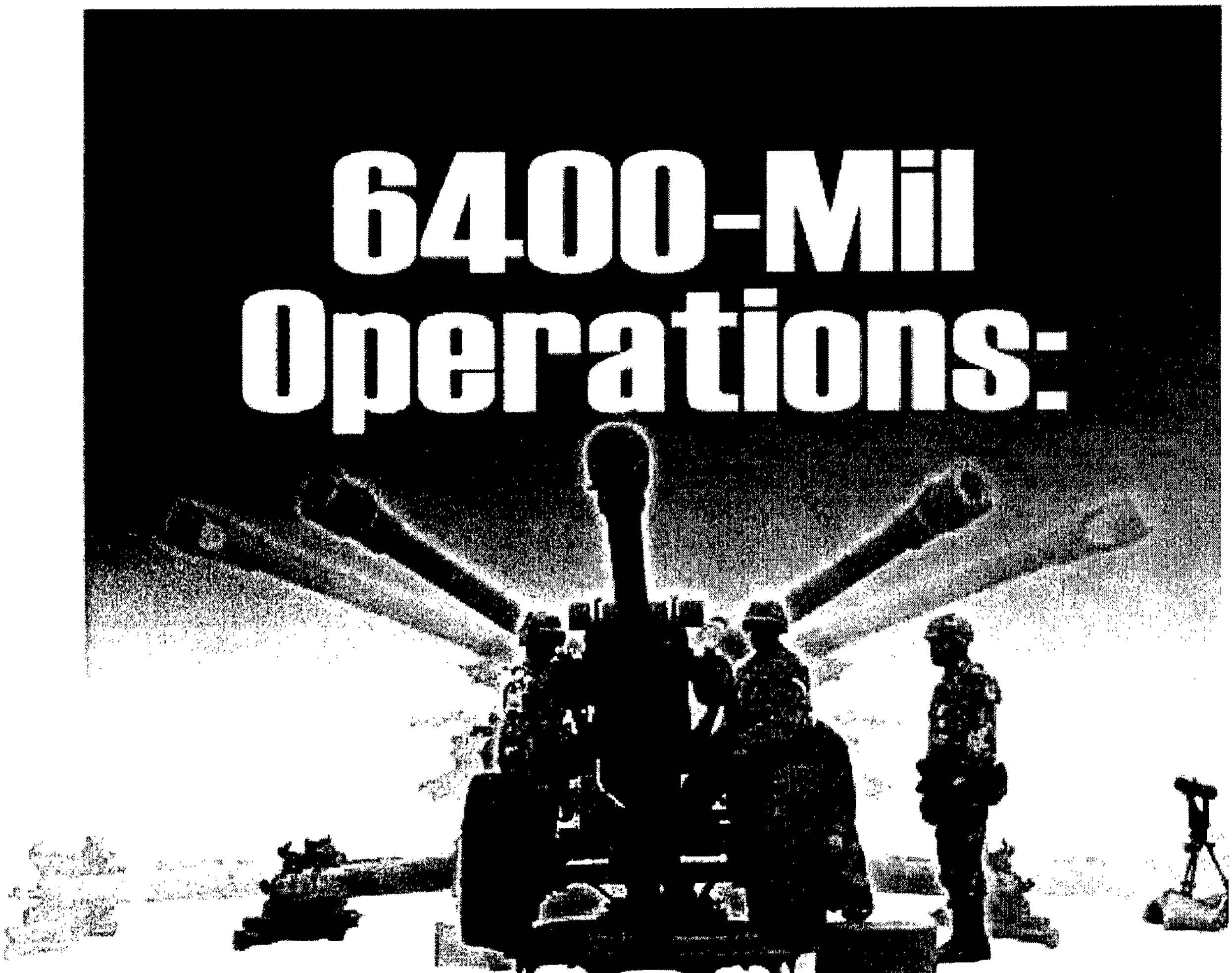
6400-Mil Operations:



Timely Fires in All Directions

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At the Joint Readiness Training Center (JRTC), Fort Polk, Louisiana, firing units must provide 6400-mil fires in the low-intensity phase of the rotation, yet too many units come lacking proficiency in 6400-mil operations. Units tend to fail to conduct timely, effective 6400-mil operations because their home-station training has been designed with a live-fire mindset limited by their impact areas. The nonlinear JRTC battlefield is similar to the one we faced in Vietnam and requires 6400-mil fires to support maneuver elements.

The purpose of this article is to provide tactics, techniques and procedures (TTP) for timely, accurate fires in any direction. Here are some of the most common problems that the observer/controllers (O/Cs) at the JRTC witness month after month. Units have a tendency to choose position areas (PAs) that do not facilitate 6400-mil operations. They fail to position equipment properly in the firing location, emplace their aiming references incorrectly or fail to compute the executive officer's minimum quadrant elevation (XO's min QE), terrain gun position corrections (TGPCs) and graphical firing table (GFT) settings for all eight octants. Failing to perform any of these steps leads to the unit's failure to deliver timely, massed and accurate fires in all directions.

Choosing a Position Area. The most important aspect of providing 6400-mil fires is choosing a position that facilitates this mission. Optimally, a 6400-mil firing location will sit on high ground in a clearing with the nearest screening crest a minimum of 200 meters from the guns. The position must be large enough to emplace all guns yet maintain the distance between the guns and the screening crest. The advance party initially checks the site-to-crest using an M2 aiming circle or an M2 compass around the point to verify that the screening crest is not a problem at that location.

The position cannot be a wood line firing position used to mask the battery's location. Because the battery is exposed in a position that facilitates 6400-mil firing, the leaders must ensure the position also facilitates 360-degree security.

Preparing the Gun Positions. Preparation of the gun positions starts with the advance party. Under the direction of the gunnery sergeant, the advance party designates the physical layout of each position. The gunny designates gun positions that facilitate 6400-mil firing.

Each gun guide marks the azimuth-of-fire on the ground and prepares the individual gun position for occupation. The gun guide levels the ground where the baseplate will rest to eliminate cant. Each guide has a tent stake with a piece of engineer tape tied to it the length of the trails plus five feet as a buffer zone for the length of the tube. The guide pounds the stake into the ground where he wants the baseplate to rest. He then extends the engineer tape to its maximum length and walks around the position. As he walks around the arc, the guide scratches out the path of the trail's traverse. When the gun arrives, the section places nothing inside this arc that can impede the traverse of the trails.

The section chief positions his vehicles, section equipment and fighting position based on the arc the gun guide scratched into the ground. The chief positions the trucks away from the gun's traverse arc so the trails and tube can turn a full circle without impediment.

Another consideration for positioning the trucks is min QE. Preferably, the section will dig the vehicles in using engineer assets so the vehicles are below ground level and close to the section. But the chief may have to position the vehicles far enough away to reduce the angle of the site to an acceptable elevation.

Next, the chief places his gun section equipment outside the arc. The platoon/battery should have a standard layout of its equipment, so the unit can cross-level cannon crewmembers to different sections during degraded operations.

Last, the chief designates the locations of his section's fighting positions. Once again, he ensures these are outside the traverse arc. If a section digs its fighting positions too close to the arc, it could drop a trail into the fighting position, preventing its engagement of targets along that azimuth.

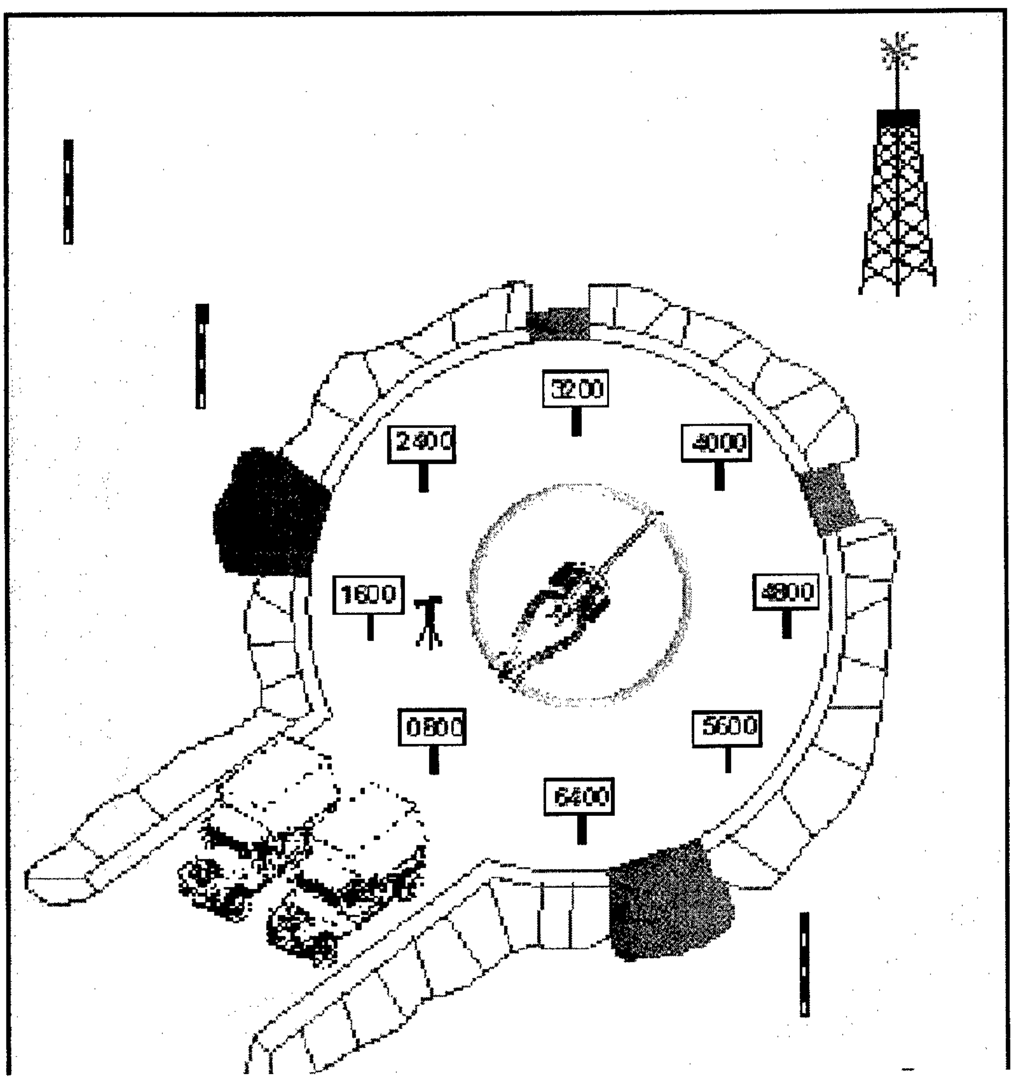
After the equipment is ready to fire, the section improves the gun position to facilitate responsiveness to fire missions. First it digs a trench the entire 6400-mil traverse arc of the trails. This facilitates firing out-of-traverse missions because the spades are automatically dug in for the full circumference of the trails.

While digging the trenches, the section traverses the howitzer to all eight octants, placing an azimuth marker either at the end of the tube or the trails. This makes it easy for the chief to find the azimuth he's supposed to lay on during an out-of-traverse fire mission. (Pulling out a compass and digging in spades wastes too many precious seconds during fire missions.) Using these simple steps, a section can shave minutes off its response time for out-of-traverse missions.

While traversing the gun to dig a trench and mark azimuths, the chief also validates he can see his aiming references in all eight octants. If the section emplaces the aiming references along the same line of sight (i.e., the collimator and aiming poles in line to the left rear of the trails), it's highly probable the gunner won't be able to see them in an out-of-traverse mission that has a significant change in azimuth. Therefore, the chief emplaces them at different angles to the site. Then he validates that the gunner can see at least one of them in each octant when they traverse to trench and set out azimuth markers.

In conjunction, the chief checks site-to-crest for each octant. After setting out his azimuth markers for that octant and checking aiming references, the chief traverses left and right of the azimuth, recording the site-to-crest to the highest point along that octant. (See Figure 1.)

The chief keeps his data organized and reports all eight sets of data to the platoon leader or executive officer (PL/XO) for computation of min QE. If the chief does not record the data systematically, he could inadvertently report bogus information for an octant, setting up a potential safety problem.



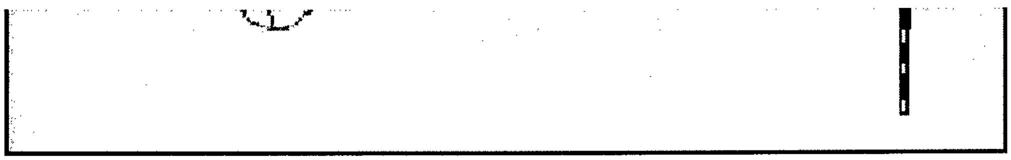


Figure 1

To ensure the gun is capable of firing 6400mils, the section chief verifies the aiming references for all azimuths in the position area (PA) and records the site-to-crest for each octant. (Th e PA in this figure is only one example.)

Leader Checks and Rehearsal. Once the guns complete their tasks, the "Big 3"—PL/XO, chief of firing battery and gunnery sergeant—verify the tasks were performed properly. They start at opposite ends of the line-of-metal, checking each gun systematically. The leaders verify the aiming references, physical layout of the gun positions and defensibility.

The section chief submits a report to the PL/XO for each gun with its site-to-crest for all eight octants recorded on it. The PL/XO then computes the min QE problem for all octants.

If any of the guns has a significant min QE problem for an octant, the PL/XO takes steps to correct the problem. Then he briefs the fire direction center (FDC) on his computations. The Big 3 check to ensure the guns can engage any target in all directions.

The final check of the line-of-metal is a rehearsal. The PL/XO has the FDC work up dry-fire missions for each octant. The FDC then sends dry missions to one gun at a time to verify each gun's ability to engage targets in any direction. One of the Big 3 posts himself on each gun during the rehearsal. Once the rehearsal is complete, the PL/XO knows his guns can fully support the maneuver elements in all directions.

Tasks in the FDC. Operations requiring the firing element to provide 6400-mil coverage are more demanding on the FDC than operations in the impact area. Because the FDC computes firing data for all eight octants, it also computes TGPCs and GFT settings for each octant. Also, the FDC records and tracks the min QE data for each octant, once the PL/XO computes it.

The toughest part about 6400-mil operations in the FDC is managing the data. To make the task easier, the FDC can record the data for min QE, TGPCs and GFT settings for each of the eight octants.

The first piece of data the FDC needs is the min QE. The PL/XO must compute the min QE for several charges across the eight octants. The charges he computes are the ones for the likely range-to-targets in the operational area. This requires the PL/XO and the FDC to have a thorough knowledge of the mission and locations of targets and supported units. Once the PL/XO delivers the min QE data to the FDC, the FDC records the data on a wheel depicting the octants as shown in Figure 2. The FDC posts the chart conspicuously for quick reference during fire missions.

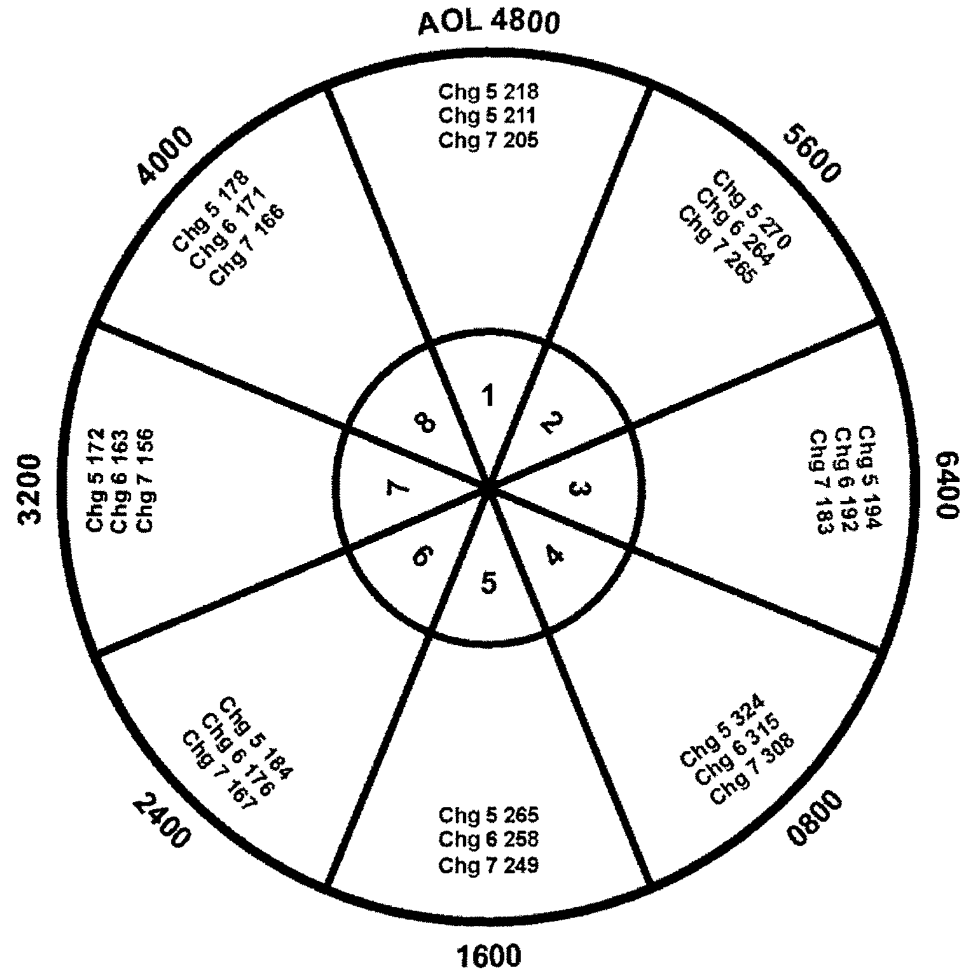


Figure 2

Minimum Quadrant Elevation of 6400-Mil Operations. The FDC records the Min QE data on a diagram similar to the one shown in Figure 1 and posts the chart conspicuously for quick reference during firing missions. The example in this figure has the azimuth of lay (AOL) as the 4800 octant.

Next, the FDC computes TGPCs for the position area. The FDC uses a center of battery ghost piece as the base piece to compute the corrections. It computes corrections for the most likely charges, just as the PL/XO does for min QE. Also, it computes corrections for all desired sheafs and shell families (high-explosive, improved conventional munitions, etc.) If the unit only has a short time to prepare, it should compute its TGPCs for open sheaf, the most frequent sheaf required for the standard fire order in low-intensity conflict; however, if in the course of the battle the unit needs to fire a different sheaf, it *must* compute the TGPCs for that sheaf.

The unit uses TGPCs when digital gun display units (GDUs) are inoperative on the gun line. The TGPCs facilitate sending gun commands to the pieces by allowing the FDC to send one set of data over the voice net and having the guns apply individual corrections. If an FDC fails to compute TGPCs for all eight octants based on several charges, sheafs and shell families, when a fire mission comes down and GDUs are inoperative, the FDC must send several sets of firing data. This slows responsiveness considerably.

As with min QE, the FDC records the TGPCs on a wheel and posts it for quick reference (See Figure 3). It is imperative that the FDC exercise care and attention to detail in recording and managing this data to prevent the application of the wrong charge, sheaf or munition data. In addition to the FDC, the gun line records the TGPCs in a fashion that makes the data easy to apply when needed; the Big 3 ensure the gun line has the data available.

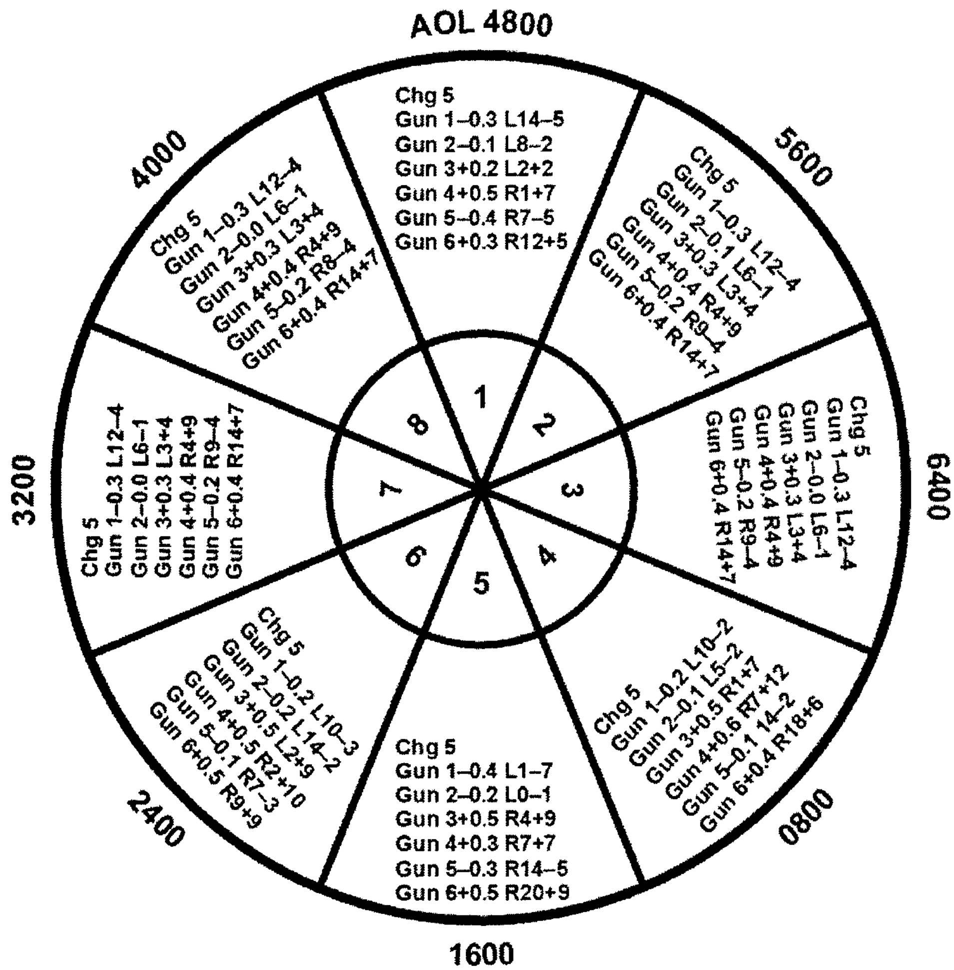


Figure 3

TGPCs for 6400-Mil Operations. The FDC computes TGPCs with the "center of battery" as a ghost base place. (This example is of TGPCs for a Charge 5, open sheaf fire mission using high-explosive munitions.)

Finally, the FDC computes GFT settings for all azimuths. The FDC may have to use GFT settings if the battery computer system (BCS) goes down, forcing the FDC to operate manually. Again, the FDC uses likely ranges-to-targets to compute the charges.

To derive the settings, the FDC conducts a dry-fire mission in the BCS for each octant and charge. It then places the corrections for the primary azimuthon the GFT and records the data for all octants. (See Figure 4.)

Octant 1 4400 to 5200– Chg 5 Rg 5000 EL 345 Ti 24.3 GFT Df Corr L6
Octant 2 5200 to 6000– Chg 4 Rg 4350 EL 325 Ti18.5 GFT Df Corr R2
Octant 3 6000 to 0400– Chg 5 Rg 4800 EL 307 Ti 20.8 GFT Df Corr L3
Octant 4 0400 to 1200– Chg 5 Rg 5000 EL 346 Ti 24.5 GFT Df Corr L4
Octant 5 1200 to 2000– Chg 5 Rg 5000 EL 350 Ti 24.7 GFT Df Corr L3
Octant 6 2000 to 2800– Chg 6 Rg 6850 EL 336 Ti 23.7 GFT Df Corr L4
Octant 7 2800 to 3600– Chg 4 Rg 4350 EL 322 Ti18.3 GFT Df Corr L1
Octant 8 3600 to 4400– Chg 5 Rg 5000 EL 348 Ti 24.6 GFT Df Corr R6

Figure 4

GFT Settings for 6400-Mil Operations. The FDC places the corrections for the primary azimuth on the GTF and records the data for all octants as shown here.

1. Compute the data (sample): Chart Range 5000, Chart Deflection 1867; Octant 1 Time 24.3, QE 345, Drift Left 6

   Octant 1 is the primary azimuth, and Octant 4 is the azimuth of the fire mission

   Octant 4 deflection correction is left 4; the difference in time settings between the two octants is +0.2 and the difference in elevation is +1.

2. Apply the differences to the Octant 1 data to obtain the data to fire:

Time Setting Octant 1	24.3	Deflection 1867	QE 345
(Difference Between Octants 1&4)	+0.2	L10	+1
(Data to Fire	24.5	1877	346

Figure 5

FDC Method for Compiling Quick Corrections for 6400-Mil Operations. The FDC uses this method to quickly compute firing data in emergencies.

If the FDC receives a fire mission in an octant other than the primary azimuth, it places the setting for that azimuth on the appropriate GFT, if time allows. If not, the FDC can use the method shown in Figure 5 to make quick corrections to firing data. The method in Figure 5 is not as accurate as the doctrinal GFT setting and only should be used in an emergency.

Too many times, units wait until an out-of-traverse mission comes in before solving for 6400-mil fires. The result is slow, inaccurate fires with the firing element failing to mass.

The difference between providing timely, accurate fires versus slow fires that miss the target is leaders who are proactive. Using the procedures outlined in this article, any FA unit can provide massed, timely and accurate fire for maneuver units—in any direction they need them.

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