



## Mortars 101: Training and Tactical Guide (version 1.1)

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## Introduction

This guide has been developed to assist all players in the Battlegroundeurope community with the challenges of indirect fire.

The Mortars 101: Training and Tactical Guide is the compilation of various ideas, theories, and practical experiences of many gamers; then subsequently tested within the gaming arena.

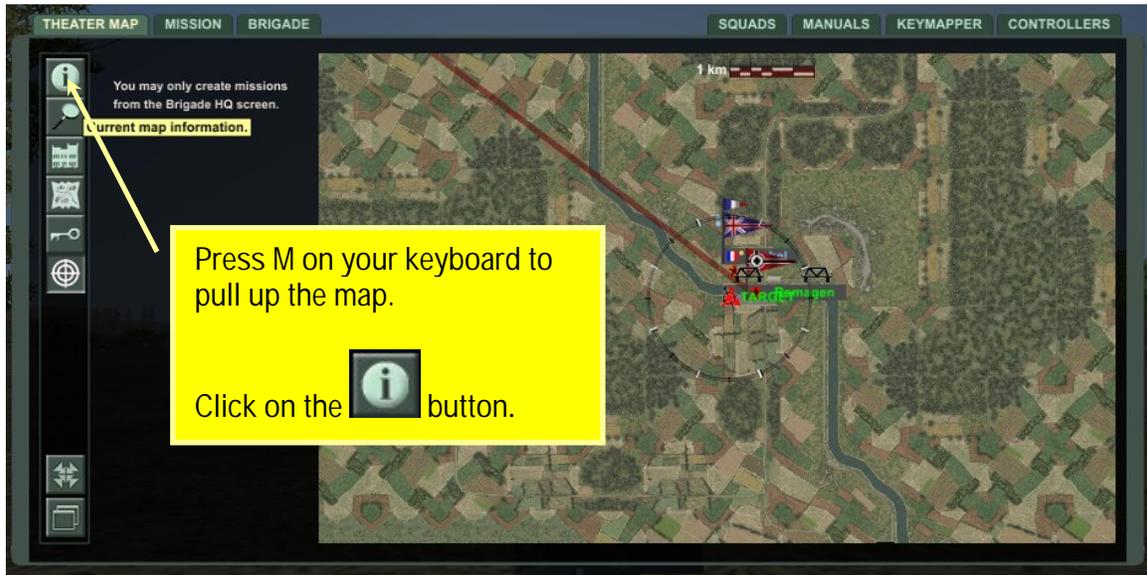
The 1<sup>st</sup> Lithuanian Brigade "Iron Wolves" cannot take sole credit for the basis of this guide as other gamers such as Xanthus, who in conjunction with Hathcock, determined the exact number of metres for each second of Latitude and Longitude, not to mention the use of the Pythagorean Theorem. Also, Robert11 introduced the element of Vertical Interval.

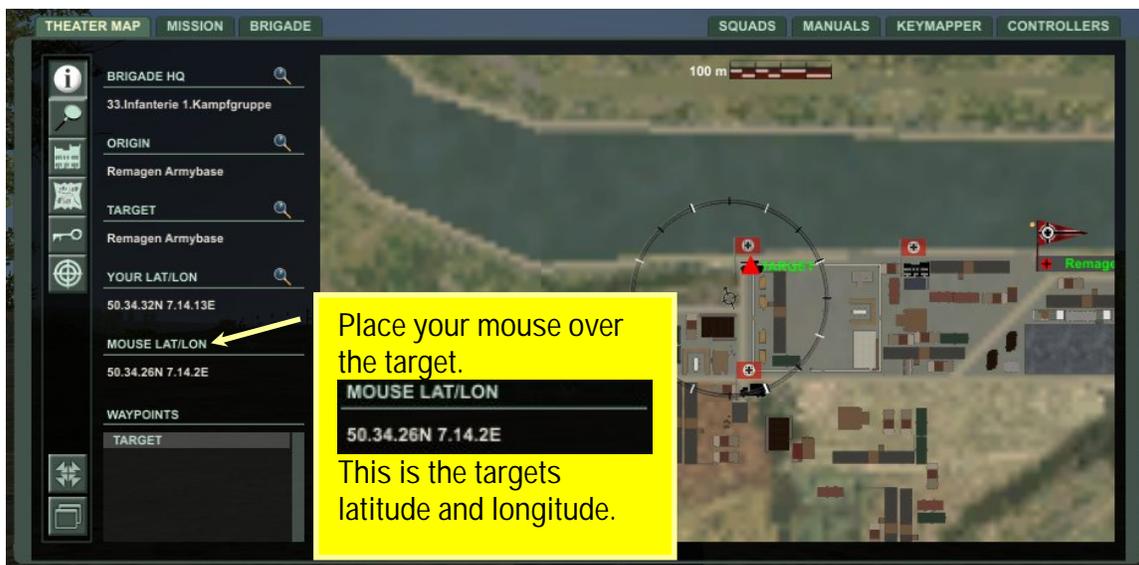
Thanks to all of the Iron Wolves for their assistance in the testing of these tools to ensure their accuracy and practicality, in particular Zimmer, Klunk, Jetmo, Kreigtor, Borntogo, Thebacon, and Herbel.

Special thanks to Ladyfog and [www.battlegroundtools.com](http://www.battlegroundtools.com) for hosting this information. You have served this community for years with such quiet dedication. Without you and Fogaban, many players would have gained the enjoyment that is battlegroundeurope.

Salute!  
Tex64  
Mortar Section  
Infantry Battalion  
1<sup>st</sup> Lithuanian Brigade  
2d Kampfgruppe  
17<sup>th</sup> Infanterie Division

## 1.1 How to: Mortar Range Table





Now that you know the location of the mortar tube AND the target, let's determine the range.

#### Step #1:

In this example your tube location is 50.19.40N / 5.0.11E. The target's location is 50.19.41N / 5.0.4E.

#### Step #2:

We need to determine the number of seconds (in Lat/Lon) between the tube and target. Find the **red** colored numbers. The difference between these two numbers is one second of Latitude. ( $41 - 40 = 1$ ) Find the **blue** colored numbers and their difference. The difference is seven seconds of Longitude. ( $11 - 4 = 7$ )

#### Step #3:

Find the proper column (1) in **Latitude** then find the number of rows (7) in **Longitude**. Where the column and row intersect is the range to target. The correct range is 94m.

#### FAQ:

Q: How do I determine range when the Lat or Lon changes to another minute?

Ex: 50.19.04N / 5.0.11E (Target location) versus 50.18.58N / 4.59.57E (Tube location)

Answer:  $19.04 - 18.58 = 6$  (Lat)     $0.11 - 59.57 = 14$  (Lon). The range is 210.

\*NOTE\*: All the ranges appear to be accurate. If there is an error on the range table, please let me know at [texas1964@hotmail.com](mailto:texas1964@hotmail.com) or post on [www.the-iron-wolves.com](http://www.the-iron-wolves.com).

# LONGITUDE

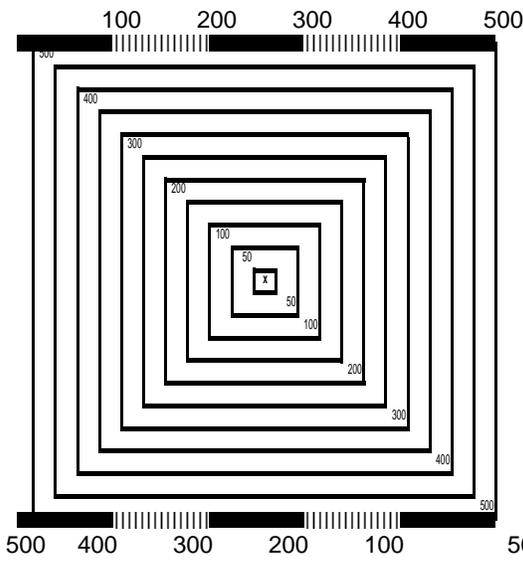
RANGE		LATITUDE																																				RANGE		
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36				
0	0	17	33	50	67	84	100	117	134	150	167	184	200	217	234	251	267	284	301	317	334	351	367	384	401	418	434	451	468	484	501	518	534	551	568	585	601			
1	13	21	36	52	68	85	101	118	134	151	168	184	201	218	234	251	268	285	302	318	334	351	368	384	401	418	434	451	468	484	501	518	535	551	568	585	601			
2	26	31	43	57	72	88	104	120	136	153	169	186	202	219	235	252	269	286	303	319	335	352	368	385	402	418	435	452	469	485	502	519	535	552	569	586	602			
3	40	45	52	64	78	92	108	123	139	155	172	188	204	221	237	254	271	287	303	320	336	353	370	386	403	419	435	453	469	486	503	519	535	553	569	586	603			
4	53	55	62	73	85	99	113	128	144	159	175	191	207	223	240	256	272	289	305	322	338	355	371	388	404	421	437	454	471	487	504	520	537	554	570	587	604			
5	66	68	74	83	94	106	120	134	149	164	180	196	211	227	243	259	275	291	308	324	340	357	373	390	406	423	439	456	472	489	505	522	539	556	572	589	605			
6	79	81	86	94	104	115	128	141	155	170	185	200	215	231	246	263	279	295	311	327	344	360	376	392	409	425	441	458	474	491	507	524	540	557	573	590	606			
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24	317	317	319	321	324	328	332	338	344	351	358	366	375	384	394	404	414	425	435	445	455	465	475	485	495	505	515	525	535	545	555	565	575	585	595	605	615			
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28	370	370	371	373	376	379	383	388	393	399	405	413	420	429	437	446	456	466	476	487	498	510	521	533	545	558	570	583	596	609	623									
29	383	383	384	386	389	392	397	402	408	415	423	431	440	449	457	467	477	487	497	508	519	531	542	554	566	579	591	604	617											
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2.0

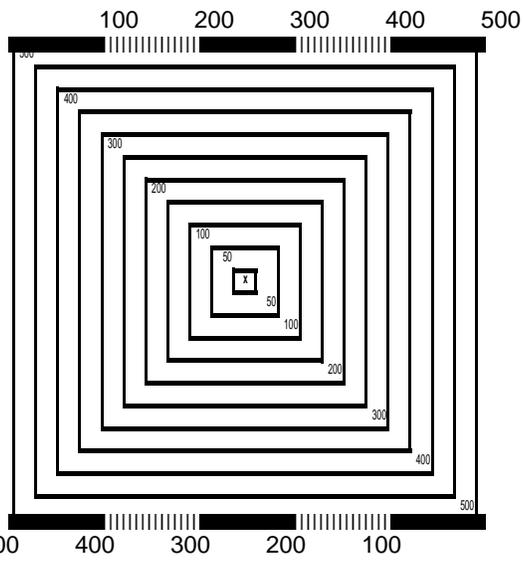
Fire Mission

# \_\_\_\_\_

NOTES:



Tube Location:	
Target # / Type	Lat / Lon Range
T1	
T2	
T3	
T4	
T5	



Tube Location:	
Target # / Type	Lat / Lon Range
T1	
T2	
T3	
T4	
T5	

Fire Mission

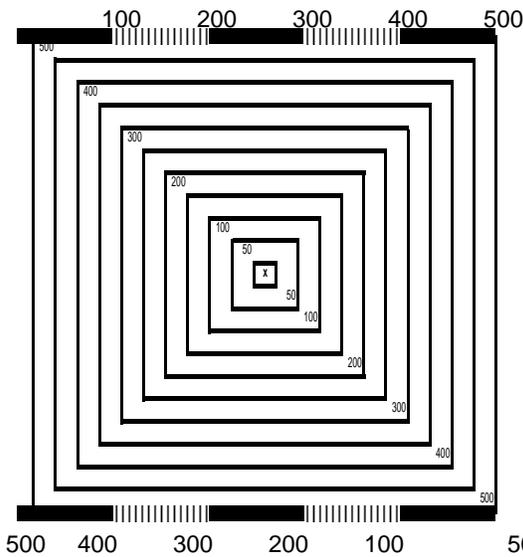
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NOTES:

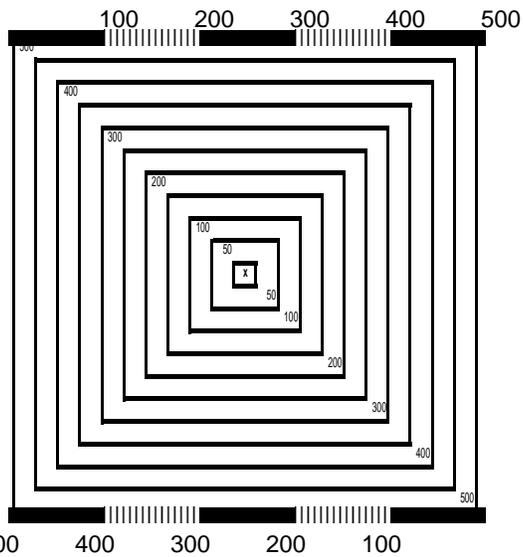
Fire Mission

# \_\_\_\_\_

NOTES:



Tube Location:	
Target # / Type	Lat / Lon Range
T1	
T2	
T3	
T4	
T5	



Tube Location:	
Target # / Type	Lat / Lon Range
T1	
T2	
T3	
T4	
T5	

Fire Mission

# \_\_\_\_\_

NOTES:

### 3.0 How to use the Lateral Adjustment Guide:

#### v1.1 1074x768 resolution

- A half-tube increment (large pointed arrow) is equal to one-half of the mortar tube width. The smaller vertical line increment is equal to one-quarter of the mortar tube width.
- Plus Numbers with parenthesis indicate a Range Adjustment is required to strike targets moving perpendicular (90 degrees) from the original target area.
- Minus Numbers with parenthesis indicate a decrease in mortar capability on the lateral axis as it is firing at maximum range. When engaging targets at maximum range, the mortar tube will have to be re-deployed and oriented towards the new location each time the target moves until the engagement range decreases to within 450 metres.
- All numbers are in metres and have been rounded up.
- Vertical Interval: Altitude correction divided by 2  
 Ex: Altitude of Target is 60 metres higher than mortar. You increase range by 30 metres.  
 Ex: Altitude of Target is 60 metres lower than mortar. You decrease range by 30 metres.
- Targets falling within the 10-metre increment can be hit by bracketing your fire. Alternate the range in 10-meter increments and let the round dispersion work to your advantage.

Range	Lateral Adjustment Guide (aka "The Bacon Strip" or "LAG")					Range
500m	40	80 (-17)	120 (-17)	160 (-33)	200 (-33)	500m
400m	25	65 (+20)	110 (+30)	130 (+30)	170 (+40)	400m
300m	25	40	65 (+10)	90 (+10)	130 (+20)	300m
200m	12	25	40	65 (+10)	80 (+10)	200m
100m	0	12	25	40	40	100m
Half-Tube Increments						Half-Tube Increments

Trim the Lateral Adjustment Guide above the text or use a clear sheet of overhead material.

Number	Item	Description of Activity
4.1	In-field and urban supply	<p>The mortar can be supplied in various ways in a combat situation.</p> <p><u>In-field:</u> The most common and <u>preferred</u> method is to overstock the mortar with an ammo pack from a rifleman (press the #5 on your keyboard to access the ammo). The ammo pack adds 10 HE and 10 SMK rounds.</p> <p>The maximum ammo a mortar can hold is 50 rounds of overstock PLUS the 10 rounds the unit spawned in with for a total of 60 rounds HE and SMK (120 rounds total).</p> <p>Parking an opel adjacent to a mortar position while unselfish does NOT overstock the mortar. It simply resupplies the mortar once the total number of rounds DROPS below 10. It takes approximately 30-seconds for the initial round to resupply the mortar. After that, a fresh round is resupplied every five seconds. Total resupply occurs in 75-seconds. In a combat situation, this is too long.</p> <p>An effective combination would be using the opel as a supply point while a dedicated 'ammo bearer' continually supplies the mortar. The rifleman acquires a new ammo pack when positioned next to the opel in about 15-seconds.</p> <p><u>Urban supply:</u> This is a unique feature that Borntogo brought to our attention. It is possible for an opel to park on the first floor of a partially destroyed building while the mortar on the 3<sup>rd</sup> floor receives supply as long the mortar remains with the circle of supply.</p> <p>The resupply feature of the opel is VERTICAL.</p>
4.2	Bracket fire	<p>Bracketing your fire allows the mortar to address certain tactical realities. The realities are dispersion, 10-metre range increments, and varying target sizes.</p> <p>The dispersion on the mortar is random and should be accounted for when firing. At times up to one-third of the rounds fired may become dispersed and categorized as 'flyers'. Flyers are rounds which are not close to the target in regards to orientation and range. If your orientation is correct and the range is accurate, continue to fire. There will be times when you can conceivably place multiple rounds on the target and on top of one another.</p> <p>Should a target be ranged at a number between the 10-metre increment, simply round UP to the nearest increment with the first round then round DOWN to the next lower 10-metre increment. This allows you to make random dispersion work for you. Ex: Range is 256m to target. Range to 260m and fire, set range to 250m and fire. Rinse/repeat.</p> <p>Spawn points, depots, and buildings vary in size. Without an FO to adjust</p>

		<p>your fire, it is difficult to saturate an area when adjusting your fire laterally.</p> <p>A slight adjust of a half to a quarter half-tube while factoring in the random dispersion is an excellent method to provide a tight 'box' of fire given the small kill radius of the mortar round.</p> <p>Using this method will typically cover most spawn points and depots (re: FB, Infantry, &amp; Vehicle spawns).</p>
4.3	Terrain and the Target: Vertical Interval	<p>There will be times whether firing from a 3<sup>rd</sup> story of a blown-out building or firing uphill from a camped AB, vertical interval will play an impact on your range to target.</p> <p>Elevation difference / 2 = Vertical Interval</p> <p>To factor in the Vertical Interval (VI) into your firing mission, the difference in elevation must be estimated.</p> <p>Take the difference in elevation and divide by 2. This equals the number of metres the range must be adjusted either up or down.</p> <p>When mortars engage a higher elevation target the rounds are not able to continue to travel in their downward arc (ie further down range) before it strikes the earth.</p> <p>To compensate the mortar range must be <u>increased</u>.</p> <p>When mortars engage a lower elevation target the rounds travel further in their downward arc before striking the earth.</p> <p>To compensate the mortar range must be <u>decreased</u>.</p> <p>A simple rule to remember: If the target is high, range higher. If the target is low, range lower.</p>
4.4	Proper tactical deployment methods	<p>If you are delegated to create a mortar fire mission, your first spawn should NOT be as a mortar. A rifle is sufficient for several reasons:</p> <ul style="list-style-type: none"> <li>• Unaware of tactical surroundings (ie is there a sniper nearby, enemy tanks or aircraft?) There are only 50 mortars per town – they are precious assets if used correctly. Don't waste them.</li> <li>• Sufficient stamina to allow a quick reconnaissance of the terrain or town to determine the best position for a single mortar or a mortar battery.</li> </ul> <p>Plot the fire mission from a secure position. As you build the fire mission, you</p>

		<p>become tactically unaware of the immediate battlefield, making you a tempting and easy target.</p> <p>Each mortar round fired generates a small discharge cloud over the mortar this is easy to spot for an alert enemy.</p> <p>In an urban environment, select a location with at least TWO walls to protect you from bombs and small arms fire (ie a bombed-out church is an excellent location). The walls also hide the tell-tale discharge cloud.</p> <p>In-field deployments are more difficult as there is limited cover (hard objects) to protect you from bombs or small arms fire. However, there is concealment (camouflage) which allows you to conceal for a limited time your position.</p> <p>A good source of concealment would be a large bush or bushes. I prefer to deploy on the back-side of the bushes which hides the discharge cloud. The draw-back is this leaves the mortar exposed to enemy fire attempting to flank the mortar position.</p> <p>Forests are excellent to fire from as the canopy does not prevent the rounds from traveling upward. Rounds can pass through tree branches but not the main root of the tree. It will cause an immediate detonation of the round, injuring/killing the mortar or draw attention to your position.</p> <p>A strong position of limited cover and excellent concealment are the small circular berms sometimes found within large berms. The small circular berms are typically dense with foliage and have a small steep earthen berm to stop small arms fire.</p> <p>A diligent security team is critical in securing the flanks of the mortar position as well as to the front and rear.</p>
4.5	Plotting a fire mission	<p>The first step in plotting a fire mission is to determine a good firing position that allows for resupply via rifle or ammo truck.</p> <p>Once a good firing position is determined, notate the firing 'base' on the map then begin plotting the critical tactical targets. More than likely they will be depots (choke points) and potentially the spawn buildings, too.</p> <p>Other areas could include buildings or terrain features which could allow the enemy the necessary concealment and cover to assault your position.</p> <p>TIP: If you chose not to write down the target's lat/lon, simply activate your chat bar and type the lat/lon info that the mouse shows you from the map screen. This way you don't have to write it down and can quickly have the lat/lon which you can re-type into the waypoint/target. Unfortunately, we don't have the cut/paste feature in game.</p> <p>Become comfortable in potting a target which is not listed as a contact report</p>

		<p>due to being sighted from a separate mission (ie JohnDoe reports a target at a specific Lat/Lon). You need to be able to find the target using your mouse.</p> <p>TIP: If you are still a Mission Leader, consider posting waypoints labeled a specific latitude (ex: 51.20.00) followed by specific longitude (5.57.0). Should you post multiple 'markers' along latitude and longitudinal lines, you make it much EASIER for you and other mortars to easily determine the location and range of spotted contact reports/targets which may or may not appear on their mission map.</p>
4.6	Multiple Mortars	<p>A single mortar with adequate overstock may be able to have an impact on a FB assault but for only a short period of time.</p> <p>The small fragmentation area necessitates that a concentration of fire is critical in the battlefield and can yield results exponentially if directed and plotted well.</p> <p>Most mortars are not comfortable firing without a line of sight that is because they are not adequately trained or lack the patience of understanding what is involved to use the weapon effectively.</p> <p>The 1<sup>st</sup> Lithuanian Brigade Mortar Section will be effective firing without a line of sight through training, firing drills, and coordination with a Forward Observer.</p> <p>Ideally, it is recommended a 10-metre separation between mortar tube positions combined with a well-chosen position which offers cover and concealment to the battery to increase survivability. A textbook deployment would recommend a much widely dispersed battery. Dependent upon the tactical situation and the level of training, this could be re-addressed in a more advanced setting.</p> <p>An effective tactical battery begins with at least three over-stocked mortars. Excessive clustering of mortars is ripe for an effective enemy bombing run due to the limited range of the weapon combined with the visible discharge cloud. Always assume your section is under enemy observation; plan accordingly.</p> <p>A second three-mortar battery displaced away from the first battery is an excellent tactical decision, despite requiring more players committed to the resupply/over-stock effort.</p> <p>Should one battery be decimated; hopefully the other can remain online to continue the fire missions while the others redeploy to a more secure position.</p> <p>With two mortars sections active and having to fire from different ranges, it may be more expedient for the Mission Leader to update the mortars sections in terms of range information based upon the plotted targets versus being active on the mission as a mortar. You have to assume that not everyone will</p>

		<p>have the needed mortar tools (Range Tables and Bacon Strip) to accurately determine the targets range.</p> <p>A vigilant security element is always needed, no matter the circumstances.</p>
4.7	Tactical Smoke Barrages	<p>Smoke barrages offer an excellent opportunity to distract the enemy with a 'false' smoke barrage or to conceal the movements of friendly troops and equipment moving to the assault or even a tactical retreat.</p> <p>A good Forward Observer (FO) can determine where and when a smoke barrage is needed. With good coordinates combined with the existing mortar tools in hand, you can effectively deploy a smoke barrage which conceals the movement of troops from a bush line to a berm line.</p> <p>First, determine the starting and ending points of the barrage. Determine the range to each point, orient the tube to the start point and fire. Adjust the range and orientation based upon the end point of the barrage.</p> <p>A few practice missions will make you a pro at delivering tactical movement barrages.</p> <p>Assault smoke barrages are difficult to plot, deploy, and execute. It's not simply about throwing enough smoke down range to allow concealment for your side, it's about producing a moving corridor of smoke to allow friendly troops to gain a foothold onto the objective.</p> <p>The Assault barrage will be taught in the "Mortar Class: Advanced".</p>
4.8	"Box Barrage" Fire Plan and Coordination	<p>The Box Barrage is designed to saturate a given area with a high-volume of overlapping fire in a short period of time. Without coordination and sporadic firing, the enemy can displace rendering your efforts useless while wasting ammunition, revealing your capabilities; potentially revealing your position.</p> <p>It is critical to keep the barrage tight and not be too widely dispersed. By keeping the barrage tight rounds impacted by the natural dispersion of the mortar will still fall within the area of the kill zone.</p> <p>The estimated width and depth of the kill zone is 20-metres by 20-metres.</p> <p>Using a battery of three mortars and following a pre-determined fire plan, the battery should saturate the kill zone within 30-seconds from the first round impacting.</p> <p>With practice, even less time could be expended.</p> <p>(1.8 continued)</p>

Fire Plan Example:

The range to the center of the target is 400m. In the fire plan this will be denoted with the lower-case  $\Gamma$  symbol (Ex:  $\Gamma + 10 = 410\text{m}$ ).

Orientation, denoted with the lower-case  $O$  symbol, will be listed on the fire plan and indicates the orientation of the tube from the previous shell (Ex:  $O + 10 =$  add 10m of range and keep the tube aligned from the previous firing).

An upper-case  $R$  or  $L$  indicate an orientation adjustment to the right or left.

The half-tube is the standard unit of measure to adjust the mortar laterally and denoted on the fire plan as  $HT$ .

A forward or backward-slash / indicates a quarter-tube adjustment (Ex:  $R/HT =$  adjust right one-quarter tube).

The number  $1$  indicates a half-tube adjustment (Ex:  $L1HT =$  adjust left one-half tube).

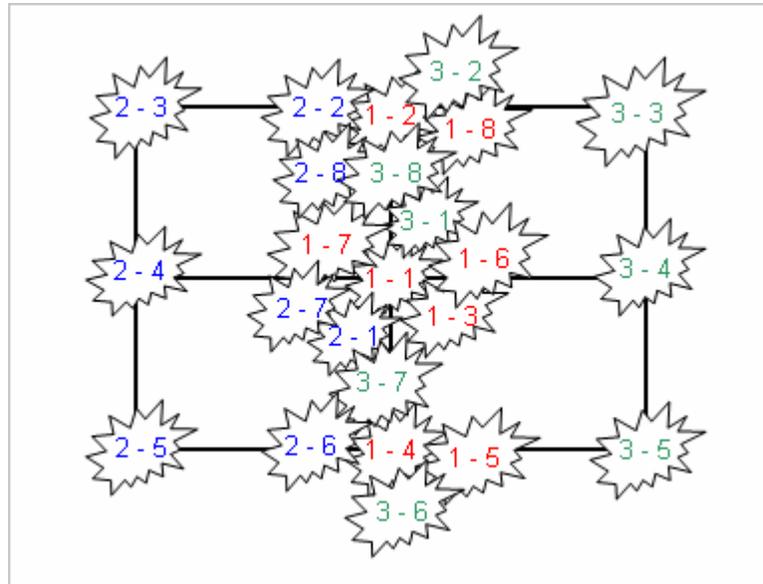
Fire Plan

Round	Gun 1	Gun 2	Gun 3
# 1	r	r	r
# 2	r + 10	r + 10	r + 10
# 3	r - 10	L/HT	R/HT
# 4	o + 10	o - 10 *	o - 10 *
# 5	o + 10	o + 20 *	o + 20 *
# 6	o - 10	R/HT	L/HT
# 7	o - 10	o + 10 *	o + 10 *
# 8	o + 10	o + 20 *	o + 20 *

\* Factor range diminishment at extreme ranges. See "Bacon Strip" for further reference!

(1.8 continued)

Box Barrage (20 x 20 kill-zone)



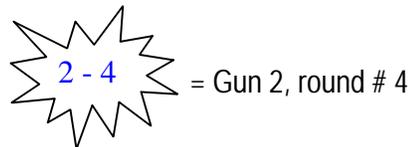
Gun 2



Gun 1



Gun 3



The "Box" barrage will be taught in the "Mortar Class: Advanced".