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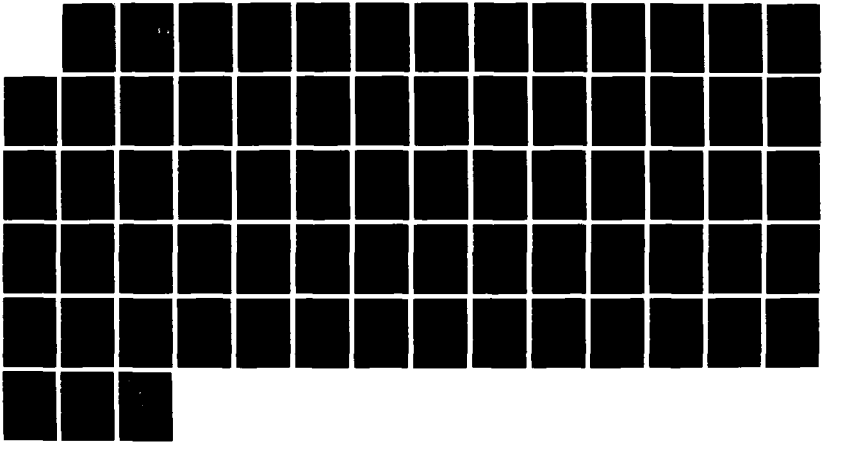

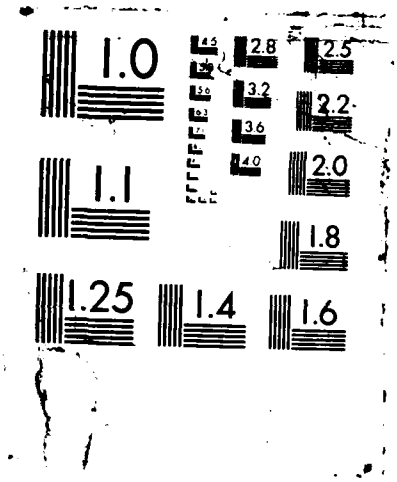
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# The Direct Support Field Artillery Battalion
# Counterfire or Close Support?

by

Major Albert F. Turner Jr.
Field Artillery



School of Advanced Military Studies
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas

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Upon completion of the case study, an evaluation of the presented material is conducted. The monograph concludes that that artillery threat facing the United States is so large that to attack it with anything but all available forces risks defeat of the entire force. The study also concludes that there are weaknesses associated with the mass artillery Soviet tactics. Those weaknesses can be attacked. This will upset the rhythm of the Soviet attack and will then free friendly artillery to conduct close support for maneuver forces.

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# INTRODUCTION

The next battlefield is acknowledged to be lethal, fluid, and confusing. If it occurs in Europe against the Warsaw Pact forces, it will be an environment where NATO and United States forces will be outnumbered in many ways. One manner will be a significant Soviet numerical advantage in artillery tubes.[1]

The United States Field Artillery prides itself on its ability to support the maneuver forces. One established manner of support is providing a Direct Support (DS) battalion to every committed maneuver brigade. Readily available fire support to the brigade is the intent.

On the next battlefield, an unaddressed issue is whether or not that battalion will be available. The question is whether or not that battalion's efforts would be better spent attacking enemy artillery systems. If the enemy is able to bring a preponderance of artillery to the battlefield, and if he is able to use that artillery to suppress or destroy friendly front line forces, then their massive attack techniques will succeed. If their artillery numerical advantage can be quieted or reduced, the correlation of forces is less unfavorable to friendly forces. The question to be answered is whether or not the DS artillery battalion would be better employed fighting the counterfire battle rather than attempting to provide the close support that is sought by the maneuver brigade; or, if

not an either/or case, under what conditions should it fight in the counterfire battle.

## METHODOLOGY

The methodology to be employed will use both historical, doctrinal and numerical analysis techniques. History will reveal the foundations upon which the Soviet Union and the United States built their artillery formations and their doctrine. The emphasis will be on artillery attack and counterfire methods.

With that as background, a comparison of current artillery doctrines will be conducted. This comparison will reveal the extent the historical trends have carried forward. Once the historical background and current doctrine is presented, a discussion of the attack methodologies for the two sides will be presented.

Then the discussion will turn to the technical side for a case study. In it the total number of targets available to be attacked in a doctrinal scenario are tabulated. In this particular case, the case study will portray a US J-Series maneuver brigade defending against a Soviet Motorized Rifle Division (BMP) conducting a supporting attack. The scenario will employ current doctrinal formation templates. It will provide a vivid portrayal of the fruition of the two doctrines.

An analysis will follow. This analysis will reveal the similarities and/or differences between the two doctrines.

This analysis will also reveal certain strengths and weaknesses of the two systems.

From the analysis, it will be possible to draw certain conclusions. Those conclusions will lead to specific recommendations.

Before that point can be reached, it is necessary to make certain assumptions to narrow the discussion.

## ASSUMPTIONS

Certain assumptions were made, especially in regards to the fictitious analysis scenario.

1. The war is taking place in a US sector in Europe. Spillover from adjacent unit sectors is not a concern.

2. A US J-Series maneuver brigade with no additional augmentation other than a "normal" division slice will be opposed by a Soviet Motorized Rifle Division. (It could just as easily be a Tank Division in terms of artillery systems represented.)

3. Artillery reinforcements will consist of a corps artillery battalion reinforcing the DS battalion in the US unit. (Given that this is a supporting attack sector, providing no additional artillery is not unreasonable.) The Soviet division will receive augmentation from Front and Army.

4. Nuclear exchanges have not occurred and are not anticipated in the immediate future.

5. Current weapons and equipment in the US inventory are employed. No consideration is given to developmental improved US artillery systems.

6. The data employed is unclassified. As such, some of the technicalities may not be completely accurate, but will be close enough to suffice for the analysis.

Having narrowed the scope, it is prudent to review first the historical foundations of the US and Soviet artillery doctrine and technology.

## HISTORICAL BACKGROUND

### PRE WORLD WAR II

Counterfire doctrine did not keep pace with the development of modern artillery weaponry. Its employment was as early as the Russo-Japanese War. In 1904 at the Battle of Sha-Ho, the Japanese were the first to use reverse slope positioning and forward observers to direct their artillery fall of shot against the Russians. The Russians, employing tactics which were normal for the time, deployed their artillery on line in full view of the enemy with the intention of engaging in an artillery duel. The Japanese, protected by their reverse slope were able to decimate the Russian artillery with little loss.[2]

The Germans were the first to recognize the value of concealed artillery positions. The concealed positions were incorporated into their 1911 Drill Regulations.[3] The British and French, slower to adopt concealed artillery techniques, suffered greater artillery attrition in the early stages of World War I. By the time the United States joined the conflict, the allies had adopted counterbattery techniques and were actively attempting to silence the enemy artillery.

During World War I, counterbattery fires were either for destruction or neutralization. Destruction was

predominant during the early part of the war but was soon discovered to be very expensive in terms of ammunition expended and the number of artillery tubes involved. Neutralization was later adopted as a less expensive route achieving the same effect -- the quieting of enemy artillery.[4] Soldiers of the period later concluded that counterbattery never won a battle. Targets were often destroyed, but rarely in time to affect the maneuver battle. What was important was that the targets were silenced. The US' first exposure was to an economical solution -- neutralization.[5]

WORLD WAR II

During World War II, different trends were displayed by both the United States and the Soviet Union. In the United States Army, counterbattery was handled primarily by Corps headquarters. Concurrently, there was a refinement of sound and flash locating and crater analysis.[6] This facilitated the accurate location of targets. Another trend developed during and refined since World War II was the massed fire technique. The Field Artillery School developed the method where a single fire direction center (FDC) could mass the fires of several units. That combined with a Time-On-Target mission could provide effective and demoralizing fires.[7]

While these changes were taking place in the US artillery, the Soviet Union artillery underwent five main

changes. First, they increased the concentration of their weapons.[9] For example:

Density of Soviet Artillery 1941-1945

| Year | Battle Area | Total # Tubes | Main Atk Zone (km) | Tubes in Zone | Tubes/ Km |
|---|---|---|---|---|---|
| '41 | Moscow | ? | 10 | 30 | 3 |
| '42 | Stalingrad | 14000 | 2 | 340 | 170 |
| '43 | Kursk | 34000 | 2 | 460 | 230 |
| '44 | Vistula-Oder | 33500 | 2 | 500 | 250 |
| '45 | Berlin | 41600 | 4.5 | 1600+ | 360+ |

Table 1[7]

Second, they developed and introduced the concept of the "artillery offensive". This provided uninterrupted support to the ground forces during all stages of the offensive. Third, command of the artillery was increasingly centralized in order to maximize its use. Next, wide use of artillery was made in the direct fire mode. Finally, there was an increased use of self propelled artillery.[10] The Soviet artillery attack techniques most successful included the destruction of located point targets and the conduct of a thorough preparation.[11]

The norm established by the Soviets during The Great Patriotic War was three hundred cannon weapon systems per kilometer of front.[12] Another trend they developed was the massive expenditure of artillery ammunition. During the attack on Berlin, the final extreme, they fired 7,140,000 rounds of artillery.[13]

Their counterfire techniques relied upon the same tactic -- mass. They felt it best to attack the enemy preemptively, to fire a counterpreparation, before the enemy was able to seize the initiative by firing his own preparation. The premier example of this was the counterpreparation fired to support the defense of the Kursk salient.

> In preparing to repulse the German offensive at Orel and Kursk, we were firmly convinced that in an artillery counterpreparation it is necessary first of all to shell the enemy's artillery and mortars...We felt that once our artillery effectively silenced the enemy's artillery and mortars, his infantry and tanks would be deprived of supporting fires and his attack weakened to the utmost...The result was the silencing of a large number of batteries and destruction of numerous OP's. This blow necessarily affected German plans for their artillery preparation. This was fired along the entire front, but it was weak and disorganized. We found that even those batteries which had not been included in our counterpreparation plan acted in a highly unorganized fashion.[14]

The discussion thus far leads to a question as to the more effective means of attacking enemy targets -- mass or technique. Technique relies upon accurate target location.[15] If target location is inaccurate, or sufficient weapons to compensate for the inaccuracies are not employed then the effect will likely be lost. This is a fault of the technique method which is overcome by the mass method. The mass tactic concentrates on an area vice a point. It is more expensive in terms of ammunition and weapons, but has a better probability of hitting something in the targeted area by virtue of covering a larger area.

## POST WORLD WAR II

United States. Subsequent to World War II the established artillery trends of the United States and the Soviet Union continued their divergence. In the US there was rapid demobilization. Organizations and units literally ceased to exist. Counterbattery organizations that had been formed during the war were "stood down" along with the rest of the army. The skills that had been developed were erased to such an extent that counterfire disappeared from the 1947 version of FM 100-5.[16]

When the Korean War erupted, the artillery was caught short as was the rest of the Army. Despite that, the United States was able to enjoy artillery superiority. The North Koreans and Chinese had limited artillery assets which were easily attacked by the superior quantities and techniques of the US.

In VietNam the US again enjoyed artillery superiority. The primary indirect fire threat was from mortars. The counterfires fired were often preplanned and on likely mortar positions. Additionally, radar systems were available to assist in locating these limited enemy indirect fire systems.[17] When counterfires were employed, they contributed significantly to the success of friendly maneuver.[18]

US weapon systems development followed much the same trend as the personnel policies. During World War II, allied artillery had been concerned with gradual

improvement. New systems were scheduled for fielding in the second half of the 1940's. With the termination of the war, resources went to other areas. Thus, the Korean War was fought with World War II systems. However, new systems appeared shortly thereafter.[19] Since then, the US and NATO trend has been to acquire fewer weapons with multiple uses.[20]

The result of this historical development was that the US had enjoyed artillery superiority since World War II and had developed techniques for massing on targets from numerous different sources to achieve an effective silencing. The critical aspect of it which must be highlighted is that the number of opposing systems was always small. Technical massing was effective under those conditions.

Soviet Union. The Soviet Union followed a different path. They felt that the artillery provided a major contribution to the success of the Great Patriotic War.

> From the numerous battle orders of the army commands and the reports on the actions of the forces in the operation, it is clear that artillery played the leading role in supporting infantry and tank actions.[21]

Through the 1950's Soviet artillery enjoyed this reputation. It retained an inordinate proportion of all ground forces personnel.

With the advent of nuclear weapons, the role of the artillery was reexamined. The artillery was downgraded and replaced by nuclear systems, similar to the US Air Force

bomber versus missile debate occurring during the same time period. The Soviet intent remained the same. Massive fires would be delivered on the breakthrough zone. Only the means of delivering them was changing. In the 1960's there was a realization of the impact of this total dependence on nuclear weapons. Consequently the Soviets returned to an increased reliance on conventional field artillery.[22]

The Soviets were impressed with the US' ability to mass the fires of several dispersed units during World War II. Unable to achieve that themselves, they substituted numbers of weapons for technique.[23] Since the resurgence of the artillery in the 1960's, they have been steadily increasing the numbers of tubes in their inventory. The Defense Intelligence Agency's assessment is that the increase means that the artillery is approaching the level of importance that it had at the end of World War II.[24]

This was borne out by the '73 Middle East War. The '73 war revealed to the Soviets that Field Artillery was the most dependable means of fire support available on the battlefield.[25] Israel, having lost the use of its Air Force, suddenly recognized the importance of the artillery. The Soviet's observation was:

> ...when support for the attacking tanks and motorized infantry units had been prepared and carried out by the artillery in a superficial manner, the consequences for the attackers were disastrous.[26]

Another observation from the war was that artillery was not a killer of tanks. Both the Israelis and the Egyptians (the

Soviet surrogates) attributed only two to five percent of the tank casualties to enemy artillery.[27]

SUMMARY

Artillery tactics, techniques, doctrine, and materiel followed diverging courses starting before World War I. The Soviet Union, with its long memory, learned painfully the necessity of avoiding effective counterfires. The United States learned during World War I the benefits of accurate target location which then allowed them to economize in the attack of those targets.

During World War II, the US refined its massing fire technique and its target location methods. The Soviets, unable to duplicate those skills, relied on massive quantities as the method to counter enemy artillery.

Subsequent to World War II, the US has enjoyed numerical and qualitative superiority over enemy artillery. Consequently, it has never had to combat the problems associated with inferiority in either category. The Soviets maintained a recognition of the value of artillery learned during World War II. Their post World War II history shows this trend continuing.

With this history as background, the study now turns to a comparison of the current doctrine: Soviet and US. The foundations laid by history will continue forward into current conditions.

## CURRENT DOCTRINE

### DEFINITIONS

Overview. The Israelis and Soviets would agree that artillery played a critical role in the last war. It most closely approximated the anticipated type of warfare in Europe. It appeared that artillery was not effective as a tank killer. If it does not kill systems, how does it achieve a critical role? How does it contribute to the battle? What are the effects of artillery fire?

In today's lexicon, target servicing is:

> ...neutralizing and/or destroying threat forces within line-of-sight that are capable of firing their primary weapon system on friendly forces. Targets include tanks, combat vehicles, antitank guided missiles (ATGMs), and dismounted infantry...Target servicing may also include employment of supporting weapons, such as mortars, field artillery, tactical aircraft, and electronic jammers, as they contribute to the direct fire battle.[28]

Significant in the definition is that the focus is on the close battle and the use of non-direct fire systems to assist in its conduct.

Another way to say that is close support. Close support "...engage[s] enemy troops, weapons, or positions that are threatening or can threaten the force..."[29] Close support is generally defined as engaging those forces that are in direct fire range of friendly forces. It achieves its effects by disrupting the momentum of the attack and suppressing those weapon systems attempting to engage friendly forces.

United States Terms. FM 6-20, Fire Support In Combined Arms Operations, provides the fire support doctrine for the US Army. It categorizes the type of desired enemy damage as suppression, neutralization, or destruction. Although there are differences between each, the primary difference is in the amount of damage to be inflicted.

> SUPPRESSION of a target limits the ability of the enemy personnel in the target area...creates apprehension or surprise and causes tanks to button up...to blind or confuse. The effect of suppression fires usually last only as long as the fires are continued. Suppression fires are used against likely, suspect, or inaccurately located enemy firing positions.
>
> NEUTRALIZATION of a target knocks it out of the battle temporarily. Experience has shown that *10 percent or more* casualties may neutralize a unit. The unit will become effective again when casualties are replaced and equipment is repaired. Neutralization fires are used against targets located by accurate map inspection, by indirect fire adjustment, or by a target acquisition device.
>
> DESTRUCTION puts the target out of action for a prolonged period of time. Dependent on the type, morale, and discipline of the enemy force, *30 percent or more* casualties normally will render a unit ineffective. Direct hits are required to destroy hard materiel targets. Targets must be located by accurate map inspection, by indirect fire adjustment, or by a target acquisition device.[30]

There exist varying doctrinal differences or interpretations of the definitions. FM 6-141-1, Field Artillery Target Analysis and Weapons Employment: NonNuclear, expands the definition of suppression to include that it is delivered by small delivery units and requires only a small expenditure of ammunition. FM 6-141-1 includes in its definition of neutralization a statement that it will vary according to

the type and size of the target and the weapon/ammunition combination used. It goes on to state that destruction will require large expenditures of ammunition from many units.[31]

Soviet Terms. The Soviets differ in their definitions of damage to be done to targets. They categorize their levels of damage as annihilation, destruction, neutralization, or harassment.

> ANNIHILATION of a target consists of inflicting such losses or damage on it from which it becomes completely noncombat-effective.
>
> DESTRUCTION of a target consists of putting it in an unfit condition.
>
> NEUTRALIZATION of a target consists of inflicting losses (destruction) on it and creating such conditions with the fire in which it temporarily loses combat effectiveness, its maneuver is restricted, or control is disrupted.
>
> HARASSMENT of a target is accomplished by conducting harassing fire with a limited number of pieces and a limited amount of ammunition for putting moral-psychological pressure on enemy personnel.[32]

Harassment norms are designed to achieve a ten percent level of damage; neutralization achieves 20-30% while annihilation is meant to destroy 50-60% of the unit.[33]

Differences. The obvious difference between the two systems is the level of destruction that they seek to achieve and their interpretation of the damage required to incapacitate a unit. The US definition is considerably lighter than the Soviet. The Soviet definition of harassment includes the impact of moral-psychological impact on the individual soldier. The US definition of suppression

only alludes to it. The purpose of both definitions appears the same.

SUPPRESSION

Artillery achieves its greatest effect through suppression.[34] As the FM 6-20 definition indicated, suppression is temporary, but its effects can be renewed. "Suppression is the process of temporarily degrading unit or individual combat performance through psychological and physical means."[35] Historically, this has also been the case.

> A number of reported experiences from World War II suggest other than weapon lethal area for the scaling of suppressive effects. For instance, rocket projectiles reportedly had a large suppressive effect due to the their distinctive sound signature. German-designed "whistling" artillery rounds also reportedly had a larger suppressive effect than predicted on the basis of round lethality. When the British attempted to increase the lethal effects of the bombs during the bombing of Ft. Lapin (25 September 1944) by use of "daisy cutter" fuzed (nose extender with point detonating fuze) ordnance, the subsequent interrogation of German prisoners of war revealed that it was the conventionally fuzed bombs that produced large craters which had a greater suppressive effect on the defenders.[36]

John Ellis in The Sharp End reports that "...artillery and high explosives were the most terrifying, the ones that made men feel utterly dwarfed by the materiel holocaust around them."[37] At the same time, the effect of suppression cannot be quantified too accurately due to the wide variability of human reaction in combat.[38]

There is a close relationship between suppression and attrition. If a unit is not suppressed, it can continue its

mission. If it is suppressed, it has two choices. It can cower in position, seeking whatever cover is available while also risking damage to its equipment and personnel. Or, it can move to escape the bombardment. In either case, the result is the same - the unit is temporarily out of action.

Thus, although suppression works primarily against the human mind, it can also damage personnel or equipment. In order to maximize both suppression and damage, it is best that the initial volleys be both massive and surprising. This catches the target in the most unprepared and vulnerable state. To counter this vulnerability, both the US and the Soviets have gone to increasingly armored personnel carriers and weapon systems.

MISSIONS OF ARTILLERY

United States. Part of the reason for becoming self-propelled has been the focus of artillery. The focus for US artillery has been to facilitate maneuver. Fire support facilitates maneuver by destroying enemy forces and suppressing direct and indirect fires including counterfires.[39] A close analysis of the four standard missions of the field artillery (Direct Support, Reinforcing, General Support Reinforcing, General Support) will reveal that they are designed to complement maneuver plans. The hostile artillery threat is not a planning factor in the standard mission.[40]

FM 6-20 states that the fire support tasks in support of the defense are to mass canalizing fires that slow enemy

forces and increase engagement times, to plan fires on obstacles, to assist maneuver in moving and engaging, and to plan fires that will separate the infantry from the armor.[41] There is no specific mention of counterfire. It is defined in a separate section.

> Counterfires attack enemy indirect fire systems to include mortar, artillery, air defense, missile, and rocket systems. Observation posts and field artillery command and control facilities are also counterfire targets. Counterfire *allows freedom of action to supported maneuver forces* and is accomplished with mortars, cannons, guns, and aircraft. It must be emphasized that counterfire is not a separate artillery battle. Counterfires are planned and executed for offensive and defensive operations, or they are fired in response to an immediate request from a maneuver commander. Within the field artillery, counterfire is normally the primary responsibility of GS/GSR units but may be fired by anyone.[42]

The intent of counterfire is to improve friendly direct fire force's survivability. It does so by denying the enemy artillery the freedom to suppress those friendly forces.[43]

Soviet Union. The Soviet purpose of maneuver is to exploit the effects of fire.[44] Their *maneuver by fire* is a means employed to rapidly attack multiple targets, or to deliver massive fires on a single target.[45] This maneuver clears the way for the following maneuver forces.

They continue to compute combat power ratios based on the density of artillery weapons and others. The Soviets have established norms for the number of tubes desired per kilometer of front. In the main attack sector against a prepared defense, they desire to mass sixty to one hundred tubes per kilometer. Against a hasty defense they will try

to achieve sixty to eighty. If on the secondary attack sector, they desire forty tubes per kilometer of front.[46]

> Artillery is to open the way for the breakthrough by suddenly stunning the enemy troops and neutralizing or destroying major defensive threats with a massive volume of fire against carefully planned targets according to a precise timetable. Its main objectives are the destruction of the enemy means of nuclear weapons delivery and artillery and anti-tank weapons which could cause trouble with the advance of the armored forces in the second phase of the operation.[47]

It is apparent that the current emphasis is on the density of fire, rather than on the weapons.[48] However, the emphasis is shifting from a density of weapons to a density of fire.[49] The density of fire is aimed at areas - the hectare being the normal standard of measurement. Despite that, they still enjoy a massive superiority in numbers and a belief in the superiority of mass.

SUMMARY

The doctrine for the US and the Soviets continues its divergence. In terms of the amount of damage that is to be done to the enemy, the US has only three categories while the Soviets have four. That in itself is not significant. What is significant is the level of destruction desired. The Soviets require much more damage to achieve an end similar to that which the US desires.

## ATTACK METHODOLOGIES

### FIRE SUPPORT PROCESS

US Artillery System. The US artillery must be able to attack the enemy's artillery and to blunt its effect. It has no equivalent to the Soviet *maneuver by fire* technique.

Instead, the fire support process is the means employed and is a four facet procedure as depicted below.[50]

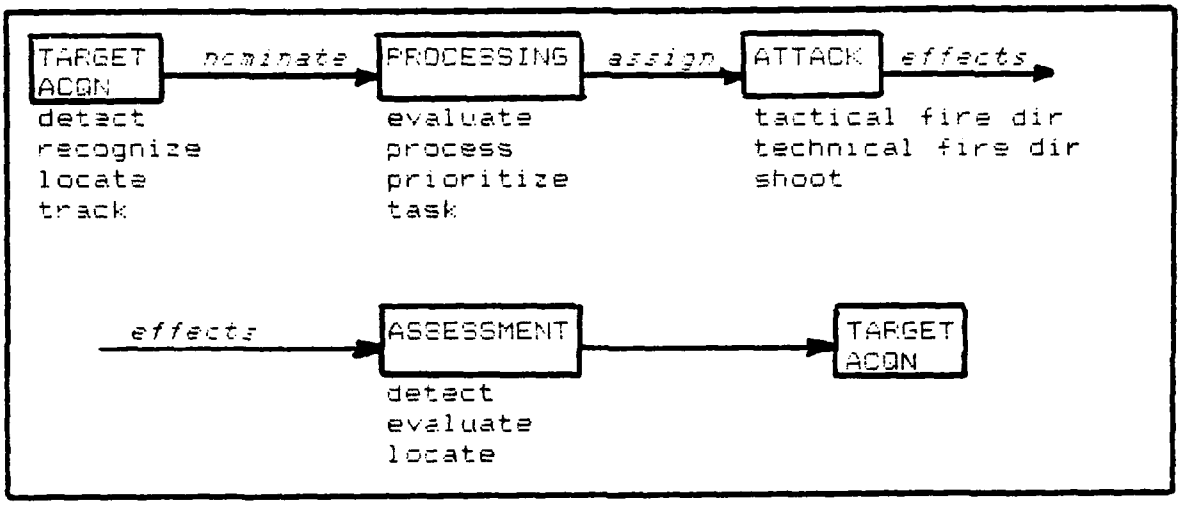


Figure 1

It is a closed loop system that continually processes information with the intent of attacking either new or previously undefeated units. There are two critical aspects to this process: target acquisition and the attack decision.

Target Acquisition. The importance of target acquisition for the artillery is most clearly demonstrated by the original Division 86 design. It planned a target acquisition battalion for each division artillery.[51] Accurate location of targets will allow for more economical attacks of enemy units. When dealing with limited assets, such a concept cannot be far wrong.[52] There are other assets available within the division such as the CEWI battalion or units in contact. However, timeliness can suffer with the former due to competing demands upon its services. The latter is limited to line of sight. For

artillery targeting, the target acquisition battery (battalion) is the most responsive.

Attack Decision. The attack method decision itself is the next critical decision. It is the process of determining the most suitable weapon, ammunition, and level of destruction desired. The decision is based on a variety of variables.[53] The primary reason one would choose to fire less than the amount required to defeat a target would be ammunition availability.[54]

The Division 86 study developed an expenditure rate for logistic planning. It called for a 155mm howitzer to expend 550 rounds per tube per day for an intense period of combat (lasting one to five days) or 300 rounds per tube per day for an extended period (20-60 days). A 203mm would expend 380 and 200 rounds respectively.[55]

The planned expenditure rates seem generous on the surface. It is rapidly used up when projected against the amount of ammunition required to attack a target.

Recommended Munition Expenditures
155mm 6 Howitzer Battery vs. 152mm SP Howitzer Battery

| | Suppression | | | Destruction | | |
|---|---|---|---|---|---|---|
| Type Ammo | HE-Q | VT | ICM | HE-Q | VT | ICM |
| Rounds | Bn4 | Btry4 | Btry1 | Bn10 | 2Btrs6 | Btry3 |
| Total Rds | 72 | 24 | 6 | 180 | 72 | 18 |

Table 2[56]

Quick calculations will show that expenditure rates such as these will not allow many missions to be fired without

running out of ammunition, even at the Division 8s rates. Extracts of planned expenditure rates in FM 101-10-1 are in the Appendix. Also in the Appendix is a sample attack guidance for training purposes provided to Command and General Staff Colleges. They are considerably less. Unfortunately, the Soviets appear to be less constrained.

Soviet Artillery System. The Soviets believe that their artillery achieves the same effect. Its principal effect is to inhibit US tanks and anti-tank weapons. However, they also believe that they have sufficient artillery to attack both direct fire (i.e. front line) weapons and indirect fire weapons simultaneously.[57]

The Soviets have determined what their priorities for artillery attack should be. First they attack those units capable of delivering nuclear weapons. Then they will attack other fire support systems. Third, they attack combat forces in tactical, operational and finally strategic depths. Finally they will attack rear service and support units.[58] The top three priorities are the critical elements under discussion since virtually all US artillery is nuclear capable and will be in the tactical or operational depth.

Each of these targets will be attacked by a battalion. "The battalion is the basic artillery weapons and tactical subunit."[59] Designating the battalion as the basic firing unit has been an evolutionary process. Previously the battery was the basic unit. This is due to the Soviet perception that modern targets are too hardened, dispersed

and mobile to be destroyed by their 'fire strike' tactics.[60] Therefore it is necessary to place larger amounts of artillery on a target in order to achieve the desired level of destruction. It is also due to their fear of the US counterfire.[61] If they can deliver their munitions more rapidly, then they will be better able to avoid detection and therefore able to avoid counterfires. In this manner they are able to retain fire superiority.

Fire superiority is a firepower advantage over the enemy. It is characterized by a unit's ability to execute its own missions while effectively suppressing enemy counterfire. It is achieved by maintaining continuous fire on the enemy's fire support means.[62]

Their desire to achieve fire superiority reinforces their belief that they have sufficient assets to do both. Their doctrine states that Army and Front artillery will fight the counterfire battle while the organic artillery of the divisions will conduct the preparations and target neutralization or annihilation.[63]

Even though they apparently distinguish between responsibilities for target attack, the Soviets still use the same fire support process as the US. They must acquire targets, process them, make the attack decision, fire it and then assess the results.

In making their attack decision, targets are characterized by area. This translates to the amount of artillery required to neutralize or annihilate an area.[64]

An example of their munition expenditure requirements is below.

Munition Expenditure Requirement
Soviet 152mm Battalion at US 155mm
Various Areas

| Range | Pt Tgt | US Battery Layout Area - meters 150x 100 | 400x 200 | 500x 200 | 600x 200 | 800x 200 | 1000x 200 |
|---|---|---|---|---|---|---|---|
| 8 Km | 217 | 319 | 704 | 860 | 1019 | 1341 | 1666 |
| 12 Km | 431 | 545 | 1014 | 1219 | 1430 | 1864 | 2304 |
| 16 km | 784 | 906 | 1460 | 1720 | 1992 | 2556 | 3138 |

Table 3[65]

An extract from the Field Artillery Officers Handbook indicates that they will attempt to neutralize an ATGM with 140 122mm rounds or 100 152mm rounds.[66] That is for neutralization, only! By US standards, such ammunition expenditures would be prohibitive. That presupposes that the ammunition for such missions is available. Such exorbitant rates require an extensive ammunition supply system. They have such a system. The rates are based on logistical capabilities rather than anticipated usage rates.[67]

The amounts of ammunition that they expend is considerably greater than the US will employ. In World War II, the Soviets were poor at engaging targets of opportunity once they had commenced their forward displacement. Precalculated firing data was no longer available.[68] There is reason to believe that this is still the case. Observation of recent exercises shows that they have a hard

time engaging surprise targets, unobserved targets, conducting precision fire and massing.[69] Attacking areas with prescribed amounts of ammunition is a means to compensate for these difficulties.

Target acquisition parameters are similar to US standards. The target must be visually observed, detected by electronic means or predicted. In many ways, however, Soviet target acquisition is not as capable as the US system. Their radar is less able than the FIREFINDER system.[70] Also there are fewer systems available.[71] Aside from prediction, which is based on intelligence, the only other means that they have to acquire targets is through observation.

The primary means of observing targets is through the Command Observation Post (COP). Each battery operates a COP. Not only is it used to observe the target area, it is also the primary location in which firing data is determined. Although there exists redundancy in the computation system, the location of both the observation and technical fire direction aspects in one location leads one to the conclusion that this is a critical node in the system.[72] By their very nature, these COPs are oriented towards the front lines and troops in contact.

With the target acquisition means limited primarily to COP's and planned fires, the question arises as to the ability of their artillery to accompany the maneuver forces. The almost total fielding of self propelled weapons belies

their intent to move with and close to the forces in contact. Their ammunition haul capability shows that they intend to maintain their resupply rates regardless of the movement rates. Another indicator is their desire to complete missions quickly. They desire to maintain the momentum of the attack.

SUMMARY

The preceding discussion of the attack methodologies of the two countries has revealed that there is little similarity other than the fire support process model. It has shown that the US relies on its superior target acquisition capabilities. US artillery is then able to make maximum use of its limited ammunition supply. The attack decision made is probably the most difficult one facing the artilleryman today because of the lack of abundant ammunition.

The Soviet system maintains the process learned in World War II - mass. It has not made significant strides in target acquisition capabilities, relying primarily on its visually oriented COPs and limited radars. Consequently, it has developed an ammunition resupply capability that allows it to fire exorbitant, by US standards, amounts of ammunition. It attacks areas instead of points.

Having presented the historical foundations, the opposing doctrines, and the attack methodologies of the two nations, an case study of the two artillery systems can now be conducted.

## CASE STUDY

### SCENARIO

Soviet Division Laydown. The mass that the Soviets desire to achieve, along with the density of targets that will be available to be attacked, is best represented graphically. In Figure 2 (p. 40) a Soviet Motorized Rifle Division is represented attacking in accordance with doctrinal guidance provided in FM 100-2-1, The Soviet Army: Operations and Tactics (see p. 5-19). It is attacking with three regiments abreast, each of which has two battalions attacking abreast. The main attack is occurring in the right two regiments, and their frontage is accordingly six kilometers across. The supporting attack on the left has a frontage of eight kilometers (each square equals 1000m).

The organic indirect fire systems are shown. Each of the regimental artillery battalions is shown with an "R" to the left of the unit symbol. Additionally, each regiment has a heavy mortar battery. The four divisional artillery battalions (including one MRL battalion) are shown with a "D" to the left of the symbol. All are at their doctrinal depth for an attack.

Soviet Artillery Terrain Occupation. Some may challenge that a battalion will occupy a complete grid square. Figure 3 shows a typical battalion inside a 1000 meter grid square. Again according to FM 100-2-1, each battery will be separated from its sister batteries by 500-1500 meters. Additionally, each battery will have two or

three alternative positions. Figure 3 shows three batteries separated by 500-750 meters, plus one set of alternative positions. This demonstrates that a grid square is a good standard of measure for a soviet artillery battalion.

Soviet Artillery in Zone Laydown. Figure 4 shows the same maneuver scenario with the appropriate number of eighteen gun battalions superimposed to reach the doctrinal tube density level. It actually depicts the low end of the scale. Rarely in the laydown presented are there more than sixty tubes per kilometer in the main attack sector.[73] This places 34 artillery battalions opposing the US brigade. The 34 battalions represent 102 batteries. Including three mortar batteries brings the total to 105 indirect fire battery locations opposing the assumed US brigade.

US Brigade Laydown. The density of the targets in the US maneuver sector is similar in scope, but much simpler. There is only a Direct Support battalion (three firing batteries with eight guns each) and its reinforcing battalion. Plus, there would logically be a Multiple Rocket Launch System (MLRS) platoon in the sector. These three elements would occupy nine grid squares as depicted in Figure 5. They represent seven battery locations. This represents a 15:1 battery advantage in this non-breakthrough sector. This is significant if engaged solely in an artillery duel.

A J-Series maneuver brigade consists of three battalions. As depicted in Figure 5, it is defending with

two battalions up and one in reserve.[74] Each forward battalion would have four maneuver company battle positions within range of enemy artillery. Each company's three platoons would be spread across an approximate three kilometer frontage. Each platoon would employ 3-4 IFV's or tanks. This equates to approximately 3-5 direct fire weapons per kilometer. (Note: This does not imply that each platoon would physically occupy the kilometer frontage. It may occupy less, but still cover the remainder with fire.

Assuming such dispersal and that each weapon was suitably sited, no two systems could be engaged by a single indirect fire attack. With 54 IFV's in a mechanized battalion and 58 tanks in an armor battalion, 100+ weapon systems are on the front line.

If both friendly artillery and direct fire weapons were engaged by the Soviet artillery depicted, the artillery duel tube ratio would be approximately 1:1. However, the tradeoff is that each direct fire system would be under concurrent suppressive fires.

Case Studies: Ability of US to Attack Soviets.

Case 1: An examination of possible counterfire tactics is revealing. If the US cannon artillery battalions ignore the Soviet artillery targets, only the MLRS platoon in sector is available for the mission. Assuming the targets have been accurately located, and only two rockets per enemy battery are expended (which is low), only eighteen of the 102 enemy batteries can be suppressed before the platoon

must reload. During reload time, no enemy artillery elements are prevented from firing.

Case 2: If the reinforcing battalion's fires are added to the artillery duel, the number of elements suppressed increases. If each four gun platoon fires at a Soviet battery, six additional batteries can be engaged. Further, the reinforcing battalion can randomly shift its fires to other located targets. This has the effect of doubling or possibly tripling the suppressive effects. Conceivably, 18 plus 12 (or 30 of the 102) batteries are now suppressed or moving to escape the fires.

Case 3: Adding the fires of the DS battalion to the equation raises the total enemy batteries kept from the battle to approximately half of those available in the scenario. If the fires can be maintained, enemy batteries will be forced to displace, and those still in position can be suppressed. This is only possible if all three available friendly elements are employed.

SUMMARY

Physically portraying the doctrinal templates for Soviet artillery illustrates the massive quantity they will bring to the battlefield. Were this extended to a Soviet main attack sector, the amounts would increase dramatically.

A correlation of forces overwhelmingly favors the Soviets. An analysis of the various cases presented shows that only by using all available friendly artillery is it possible to even come close to countering the threat.

Thus far, the discussion has focused on the differences in the historical lessons learned, doctrine, and artillery attack methods. A case study applying those principles was then presented. It is now time to analyze and evaluate all of the information thus far presented. From this analysis, it should be possible to derive some relevant conclusions.

## ANALYSIS AND EVALUATION

### HISTORY

Counterfires evolved from a destruction of the opposing force's artillery to a neutralization through its suppressive effects. The United States pursued that route primarily due to economic reasons. The amount of ammunition and weapons required to achieve destruction of the enemy was prohibitive.

The Soviets have maintained a steady course. They discovered during the Russo-Japanese war the negative aspects of effective counterbattery fire. They learned in World War II the positive effects of massive fires upon the enemy. Using those two premises they have, despite a brief interruption while the role of nuclear weapons on the battlefield was resolved, steadfastedly relied heavily on their artillery to carry the battle.

Both sides discovered during the '73 Middle East war that artillery plays a critical role. The war cannot be fought singlehandedly by one arm of the force. It is a combined arms effort. Stripping away one of those arms causes ripples throughout the system. The impact in the

Soviet Union was to modernize their artillery by making more and more of it self propelled. They also increased the amount of artillery organic to various tactical units. Regiments have gone from having a battery to a battalion in support of them.

The United States has been bound by economic constraints. It has fielded new weapon systems. However, the larger effort has been to acquire better target acquisition and command and control systems. This is in line with its economic approach to the problem. It is better to deliver less fire accurately than more fire inaccurately and therefore with a lesser chance of success. The Soviets have gone the opposite route, more fire with little significant improvement in their target acquisition ability.

Historically, either approach can be defended. Artillery is not an effective killer of enemy artillery, armored systems, or direct fire weapons. Only if massive amounts of ammunition are expended will the enemy be placed in a position where he is physically incapable of continuing the battle. Artillery achieves the most benefit through suppression (US) or neutralization (Soviet). It causes the enemy to lose his psychological edge. Concern for survival outweighs an ability to continue the mission, be it maneuvering a vehicle or firing an individual weapon.

DOCTRINE

United States. Current artillery doctrine is maneuver oriented. The standard missions are all designed to provide means of providing fires to the forward elements. The ability of the artillery today to "reach out and touch someone" is limited primarily by its range. Other than Lance, division and corps artillery units are unable to attack the echeloned forces presented by the Soviets. Thus, they are limited to the near range battle. This is, in effect, supporting those forces in contact. The issue then becomes whether counterfires are classed as support to the maneuver forces or as a separate battle. FM 6-20, Fire Support in Combined Arms Operations, defines a counter-preparation as:

> Usually ...planned by a direct support FA battalion or higher echelon...It is intensive prearranged fire delivered when the imminence of an enemy attack is discovered.[75]

Note the emphasis is on an enemy attack as opposed to an enemy barrage. Also note that it is planned by the direct support artillery battalion. Both statements are indicative of the support to maneuver forces.

A counterpreparation is planned in two phases. Phase I is early and simultaneous attacks on enemy forward elements, their indirect fire systems and enemy OP's. Phase II attacks enemy command posts, communications and reserves while continuing the neutralization of enemy indirect fire systems.[76] Thus, hidden in the counterpreparation portion

of the doctrine is an indicator that the enemy indirect fire systems are worthy of continuous attack.

Even though doctrine does not overtly dictate that the enemy artillery systems must be attacked, it does allude to the necessity. Therefore the effective method, if not his destruction, is to force him to worry for his own survival. It is to make him stop firing while in his present position or to force him to move to a new position. In either case he is out of action and unable to influence the battle.

When opposing the Soviets with their massive ammunition supplies, this is doubly effective. In order to support an attack with the desired norms of ammunition prestocked, more than three-fourths of it must be stockpiled on the ground. If the artillery units are forced to displace, they are forced to leave the grounded ammunition behind. While it can eventually catch up with the maneuvering artillery, it is not immediately available for the current battle.[77] Furthermore, the left behind ammunition is subject to damage from counterfire. This is another effective means of limiting the effectiveness of their artillery.

Soviet. The Soviets believe they have sufficient artillery to provide suppression of enemy direct fire weapons while simultaneously engaging the enemy indirect fire systems. The quantities indicated in Figure 3 are on the low end of the desired densities. Still, it shows that it is possible to do both missions. Their artillery is dual-tasked and able to fulfill the requirement.

Comparison. US artillery is also dual-tasked. However, it is spread thin if it tries to accomplish both missions. An argument advanced by the US artillery community is that reinforcing elements will do the counterfire mission, leaving the DS battalion to do the close support. The comparison with the Soviet intent to do both simply collapses when the amount of artillery available is compared. The numbers just do not support dual tasking.

Counterfire Target Analysis. There are recurring counterfire requirements: the attack of indirect fire units, the attack of indirect fire $C^3$, and the attack of indirect fire acquisition systems. The critical node is difficult to discern. Attacking the hostile weapon systems directly is simplest as they are most easily located. Yet they are the most numerous and least susceptible to damage. Attacking the $C^3$ is lucrative, but is more difficult to locate. Finally attacking the target acquisition eliminates their ability to see beyond the front line. But their attack method (mass on an area) compensates for the inaccuracies or lack of target location data. It is a tradeoff.

## STRENGTHS AND WEAKNESSES

Observations of the case study and the previous analysis reveal the strengths and weaknesses of the two systems. The strengths and weaknesses of the US and Soviet systems are exactly opposite. The US' strength is target acquisition, primarily through the FIREFINDER radar system. Its weakness is tube density and ammunition supplies.

In contrast, the Soviet strength is the amount of artillery they have plus the amount of ammunition dedicated to it. It bespeaks their belief in the dominance of the artillery on the battlefield. The density is also a weakness. Such large formations (Figures 2-4) are difficult to conceal and complicate their terrain and route management problems. Alternate positions are likely to already be occupied. Another weakness is target acquisition which is limited primarily to line of sight. The sheer number of units to be controlled makes $C^3$ difficult, hence the reliance on preplanned fires versus targets of opportunity.

The US has pursued an economic/qualitative approach. Historically, the US realized that artillery was not an effective killer of enemy systems unless large amounts of ammunition were expended. However, if it was possible to locate the enemy targets accurately, then it was possible to achieve the maximum damage at the minimum cost. It then becomes a question of whether or not the approach is adequate in the face of the Soviet threat.

## CONCLUSIONS

The premise at the beginning was that the Direct Support Field Artillery Battalion would be better employed shooting counterfires than it would providing close support to the maneuver forces. It was founded on the assumption that the Soviets enjoyed an overwhelmingly favorable correlation of forces in artillery. Is the artillery still an issue that should be addressed in battle, engagement and

campaign plans? Yes. The record shows that the artillery is an effective supporter of the ground gaining arms. Without artillery, the ground gaining arms are less likely to achieve success.

Should the DS battalion provide counterfires instead of close support? Yes.

If one abides by the philosophy that counterfires are part of the support provided to the maneuver forces, then this is not an issue. Relief from opposing artillery bombardment is a necessary ingredient to the maneuver commander's battlefield success.

If one believes the artillery duel is separate from the battle at the line of contact, the answer remains the same. The DS battalion should participate in the counterfire battle.

The Soviets openly state that they can and will simultaneously fight the counterfire battle and provide support to their maneuver forces. They have the artillery weapon system strength to do so. The US working with less equipment is less able to do so.

US artillerymen are torn between providing support to the maneuver forces or combating the enemy artillery. Neither solution is entirely satisfactory. A maneuver brigade commander will soon discover that his DS battalion is overwhelmed when it attempts to deal with all of the targets that are within visual range (and therefore detection) by his front line forces. His DS battalion has

insufficient systems available to deal with the attacking forces. Combined with the suppressive effects of the Soviet artillery, his forces will be overwhelmed and defeated in detail. Meanwhile, the limited reinforcing or general support artillery assets available to the brigade commander will also come under suppressive fires. They also will be unable to defeat the enemy artillery singlehandedly and will be neutralized.

If the DS battalion is not employed initially in the counterfire battle, the entire force will be guilty of attempting to to do much with too little, spreading itself too thin. When that occurs, the principles of mass and concentration are violated, and the likelihood for defeat increases dramatically. CACDA, in their Division 86 study, reached much the same conclusion.

> Reducing target servicing assets to increase counterfire assets, either weapons such as MLRS or equipment such as ammunition resupply vehicles, increased the overall combat effectiveness of the division.
>
> Reducing counterfire weapon assets (both MLRS and tube artillery), while increasing either target servicing weapon assets or counterfire ammunition resupply assets, decreases the overall combat effectiveness of the division.[7e]

It is readily apparent that a solution to the dilemma would be to increase the amount of artillery weapon systems or ammunition available. It is also apparent that qualitative improvements significantly extending the range and destructiveness of the weapon systems would greatly assist the effort. However, such solutions are not

economically feasible. Qualitative improvements are in development, but will not be fielded in the near future. Thus, this study deals from a "status quo" basis.

Other conclusions are possible if the conditions change. It has already been shown that the Soviet rhythm will be upset if they are forced to shift away from their prestocked ammunition sites. If that occurs, they will be prevented from applying the desired norms. Then, friendly artillery could possibly afford to do missions other than counterfire.

This argument lends credence to the need for a deep covering force area. It forces the Soviet to displace his artillery forward in order to engage the forces at the FEBA. If that is the case, it is again possible to divert friendly artillery to other missions.

Another possible conclusion concerns their massing of artillery. If it is done in accordance with their norms, will be very difficult to conceal, especially given today's detection means. If their massing for an attack can be detected, an aggressive preemptive counterpreparation would be significant in achieving success. A Kursk in reverse!

There are risks involved in any decision. This is no different. Using the DS battalion for counterfire deprives the maneuver forces of indirect fires other than their mortars. Currently, the M1 tank and M2 IFV are qualitatively superior to their enemy counterparts. Conceivably they can win their fight without artillery

support.[79] There is always the possibility that this will not hold true.

The idea of the DS battalion doing counterfire was rejected in the past under the argument that the maneuver elements need support.[80] However, it is an argument with risk. The risk of not trying to win the artillery superiority battle is one of defeat in detail. The artillery fighting the close engagement battle will probably have more missions sent to it than it can handle. Further, this artillery risks being accurately located on the battlefield. The reinforcing artillery can, by itself, have only limited effects upon the enemy. Consequently, the enemy will be able to do as he desires, fight both the artillery and close support battle concurrently.

## RECOMMENDATION

Doctrine should be rewritten in two particulars. Fire support doctrine needs to recognize more clearly the need for the counterfire. It should be clearly articulated in FM 6-20. The standard missions given to the artillery should be worded in such manner to include counterfire tasks, or a separate mission should be developed that would satisfy the requirement.

Second, the DS battalion should not be constrained from participating in the counterfire duel. The emotional reaction that the maneuver forces will be deprived of their support ignores the size of the opposing threat. It ignores

the objective reality of the enemy's artillery to influence the performance of friendly forces on the front line. Until the Soviet artillery is defeated, all efforts should be devoted to attacking it. Failure to do so will surrender the initiative to the Soviet. He has no such qualms.

SOVIET DIVISION

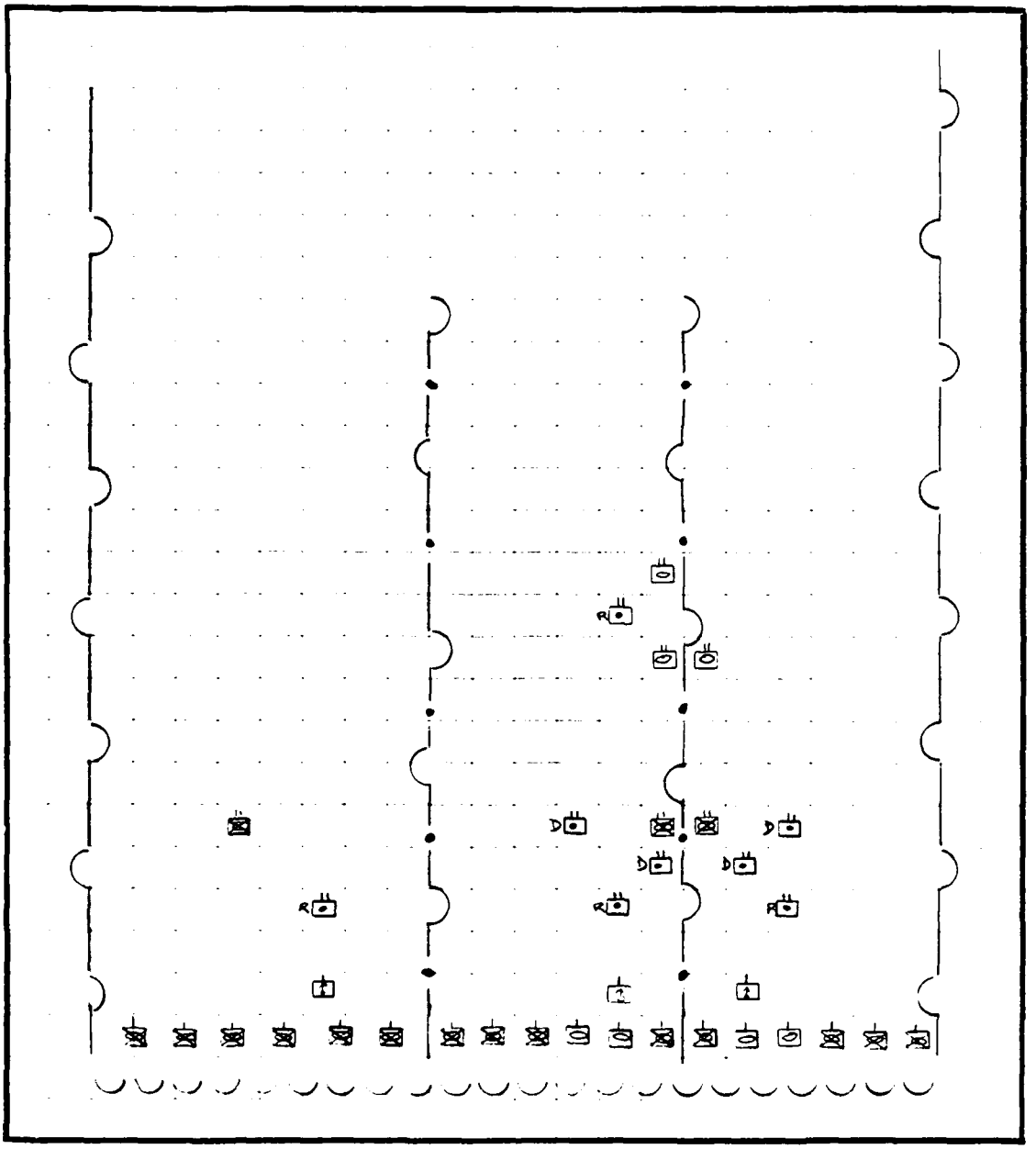

Figure 1

ARTILLERY TERRAIN OCCUPATION

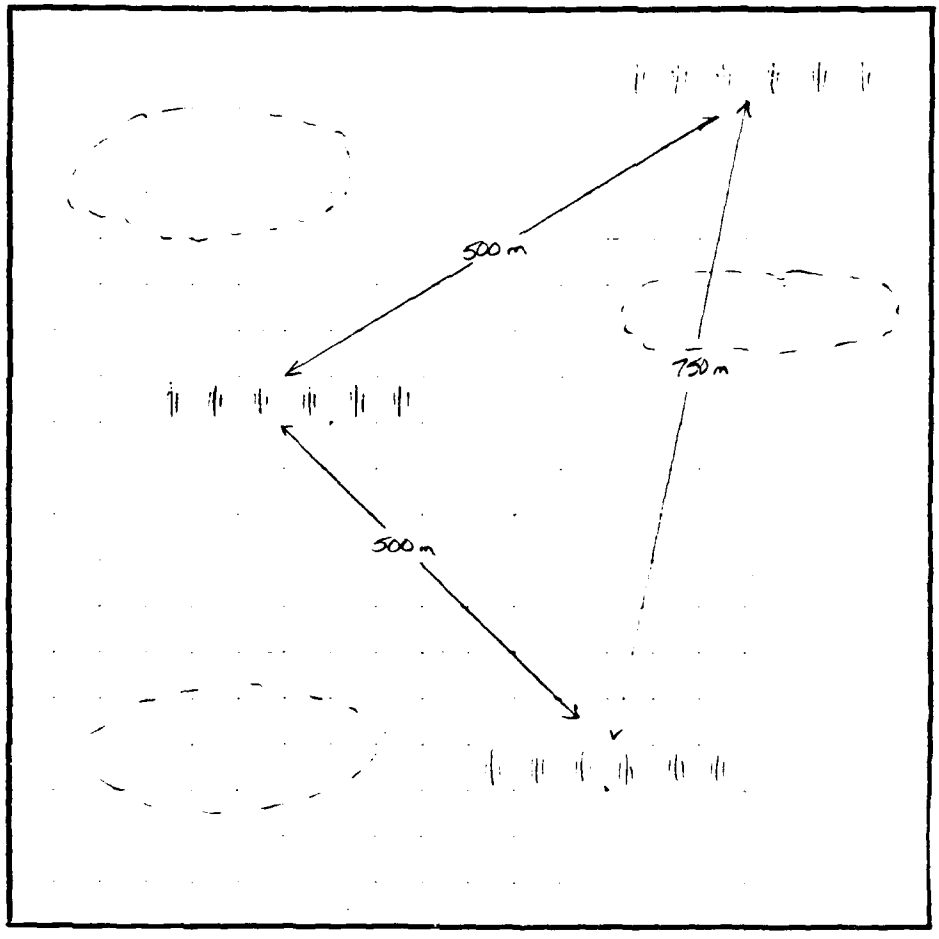


Figure 3

ARTILLERY IN ZONE

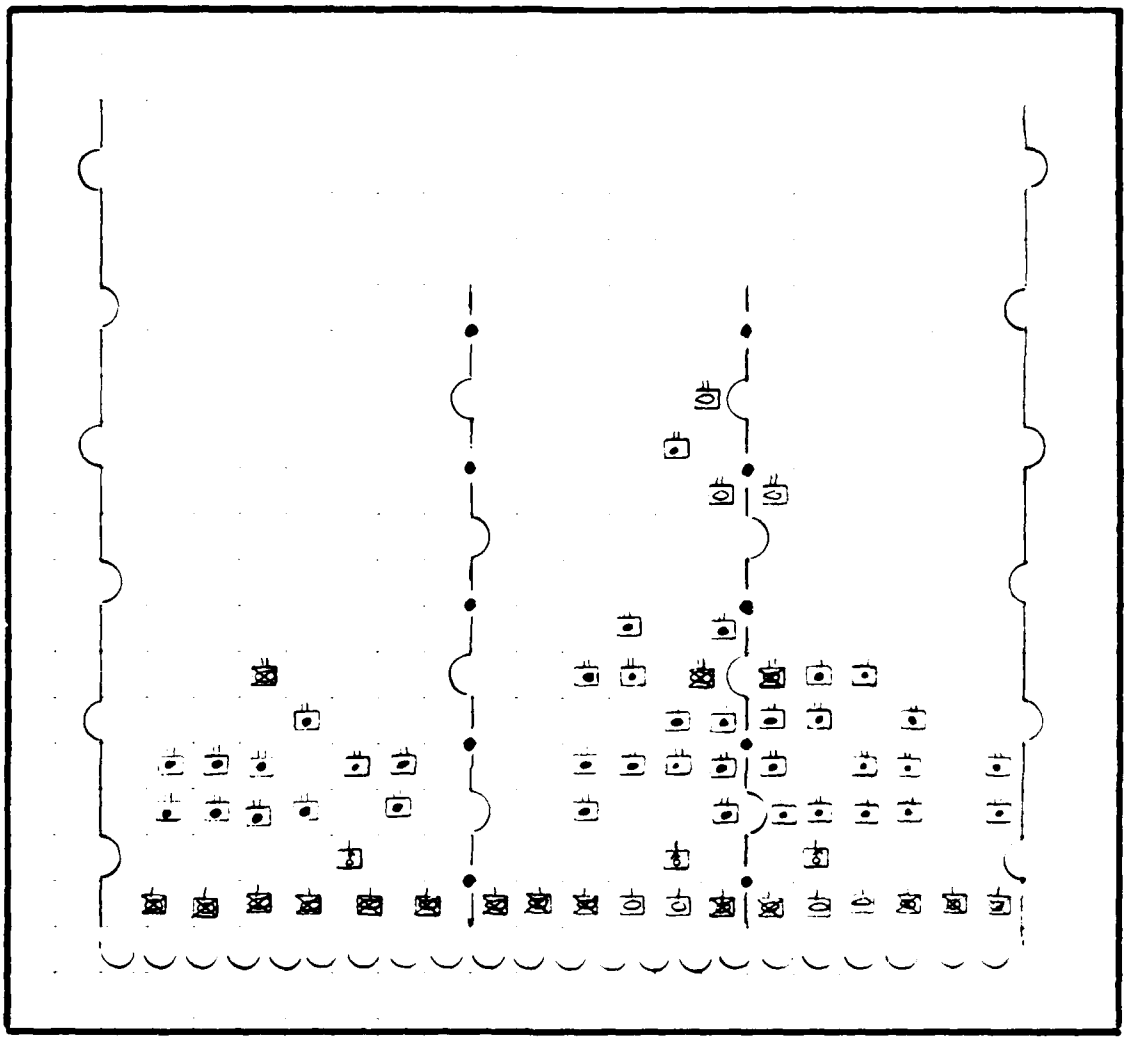

Figure 4

US BRIGADE

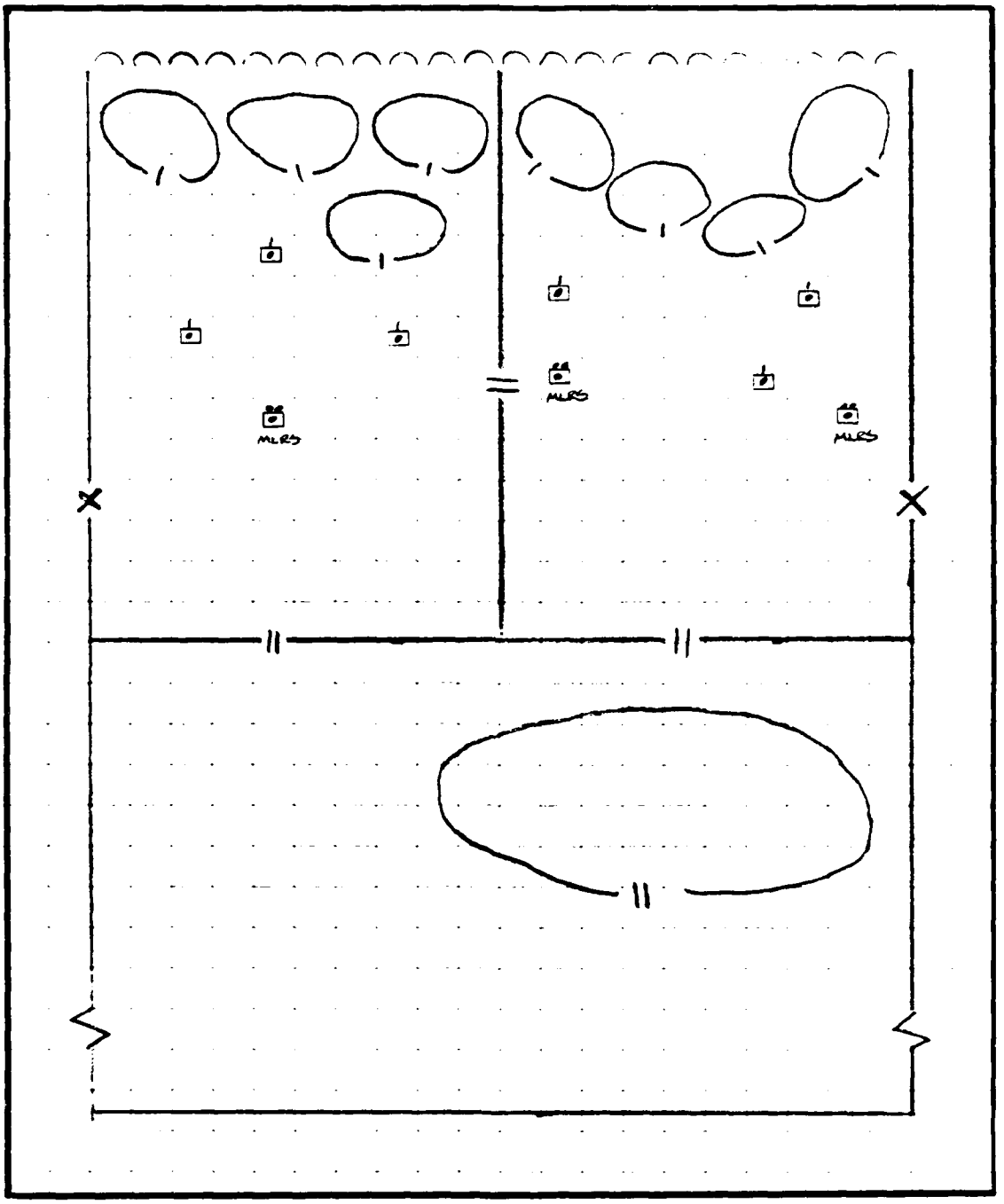


Figure 5

# APPENDIX: Extract from FM 101-10-1 (Artillery Expenditure Rates)



*Table 7-4. Daily Artillery Ammunition Requirement-Rounds Per Weapon and Short Tons (STON)*

| Type of operation | Level of operation | First day | | Succeeding days[1] | | Protracted period[2] | |
|---|---|---|---|---|---|---|---|
| | | Rounds | STON[3] | Rounds | STON | Rounds | STON |
| **Part A. 105-mm Howitzer** | | | | | | | |
| Covering Force | 1-Heavy | 491 | 16.8 | 511 | 17.5 | 198 | 6.8 |
| | 2-Moderate | 319 | 10.9 | 332 | 11.4 | 129 | 4.4 |
| | 3-Light | 172 | 5.9 | 179 | 6.1 | 69 | 2.4 |
| Defense of Position | 1-Heavy | 423 | 14.5 | 467 | 16.0 | 222 | 7.6 |
| | 2-Moderate | 275 | 9.4 | 304 | 10.4 | 144 | 4.9 |
| | 3-Light | 148 | 5.1 | 163 | 5.6 | 78 | 2.7 |
| Attack of Position | 1-Heavy | 376 | 12.9 | 381 | 13.0 | 210 | 7.2 |
| | 2-Moderate | 244 | 8.4 | 248 | 8.5 | 137 | 4.7 |
| | 3-Light | 132 | 4.5 | 133 | 4.6 | 74 | 2.5 |
| **Part B. 155-mm Howitzer (Divisional)** | | | | | | | |
| Covering Force | 1-Heavy | 254 | 17.2 | 274 | 18.6 | 174 | 11.8 |
| | 2-Moderate | 165 | 11.2 | 178 | 12.1 | 113 | 7.7 |
| | 3-Light | 89 | 6.0 | 96 | 6.5 | 61 | 4.1 |
| Defense of Position | 1-Heavy | 203 | 13.8 | 207 | 14.0 | 183 | 12.4 |
| | 2-Moderate | 132 | 9.0 | 135 | 9.2 | 119 | 8.1 |
| | 3-Light | 71 | 4.8 | 72 | 4.9 | 64 | 4.3 |
| Attack of Position | 1-Heavy | 146 | 9.9 | 153 | 10.4 | 140 | 9.5 |
| | 2-Moderate | 95 | 6.4 | 99 | 6.7 | 91 | 6.2 |
| | 3-Light | 51 | 3.5 | 54 | 3.7 | 49 | 3.3 |
| **Part C. 155-mm Howitzer (Nondivisional)** | | | | | | | |
| Covering Force | 1-Heavy | 309 | 21.0 | 333 | 22.6 | 212 | 14.4 |
| | 2-Moderate | 201 | 13.6 | 216 | 14.7 | 138 | 9.4 |
| | 3-Light | 108 | 7.3 | 117 | 7.9 | 74 | 5.0 |
| Defense of Position | 1-Heavy | 227 | 15.4 | 235 | 15.9 | 199 | 13.5 |
| | 2-Moderate | 148 | 10.0 | 153 | 10.4 | 129 | 8.8 |
| | 3-Light | 79 | 5.3 | 82 | 5.6 | 70 | 4.7 |
| Attack of Position | 1-Heavy | 176 | 11.9 | 183 | 12.4 | 170 | 11.5 |
| | 2-Moderate | 114 | 7.7 | 119 | 8.1 | 111 | 7.5 |
| | 3-Light | 62 | 4.2 | 64 | 4.3 | 60 | 4.1 |
| **Part D. 8-in Howitzer (Divisional)** | | | | | | | |
| Covering Force | 1-Heavy | 360 | 47.3 | 361 | 47.4 | 207 | 27.2 |
| | 2-Moderate | 234 | 30.7 | 235 | 30.8 | 135 | 17.7 |
| | 3-Light | 126 | 16.5 | 126 | 16.5 | 73 | 9.6 |
| Defense of Position | 1-Heavy | 177 | 23.2 | 164 | 21.5 | 90 | 11.8 |
| | 2-Moderate | 115 | 15.1 | 107 | 14.0 | 59 | 7.7 |
| | 3-Light | 62 | 8.1 | 57 | 7.5 | 32 | 4.2 |
| Attack of Position | 1-Heavy | 130 | 17.1 | 127 | 16.7 | 56 | 7.4 |
| | 2-Moderate | 85 | 11.1 | 83 | 10.9 | 36 | 4.7 |
| | 3-Light | 46 | 6.0 | 45 | 5.9 | 20 | 2.6 |
| **Part E. 8-in Howitzer (Nondivisional)** | | | | | | | |
| Covering Force | 1-Heavy | 446 | 58.5 | 448 | 58.8 | 257 | 33.7 |
| | 2-Moderate | 290 | 38.1 | 291 | 38.2 | 167 | 21.9 |
| | 3-Light | 156 | 20.5 | 157 | 20.6 | 90 | 11.8 |
| Defense of Position | 1-Heavy | 177 | 23.3 | 164 | 21.5 | 90 | 11.8 |
| | 2-Moderate | 115 | 15.1 | 107 | 14.0 | 59 | 7.7 |
| | 3-Light | 62 | 8.1 | 57 | 7.5 | 32 | 4.2 |
| Attack of Position | 1-Heavy | 161 | 21.1 | 158 | 20.7 | 69 | 9.1 |
| | 2-Moderate | 105 | 13.8 | 103 | 13.5 | 45 | 5.9 |
| | 3-Light | 56 | 7.4 | 55 | 7.3 | 24 | 3.2 |

APPENDIX: Extract from FM 101-10-1 (Artillery Expenditure Rates) (cont'd)

C1, FM 101-10-1

*Table 7-4. Daily Artillery Ammunition Requirement-Rounds Per Weapon and Short Tons (STON)*-Continued

| Type of operation | Level of operation | First day Rounds | First day STON[3] | Succeeding days[1] Rounds | Succeeding days[1] STON | Protractrd period[2] Rounds | Protractrd period[2] STON |
|---|---|---|---|---|---|---|---|
| | | **Part F. 175-mm Gun (Nondivisonal)** | | | | | |
| | 1-Heavy | 372 | 51.2 | 481 | 66.2 | 221 | 30 4 |
| Covering | 2-Moderate | 242 | 33.3 | 313 | 43.1 | 144 | 19 8 |
| Force | 3-Light | 130 | 17.9 | 168 | 23.1 | 74 | 10.2 |
| Defense | 1-heavy | 166 | 22.9 | 180 | 24.8 | 64 | 8 8 |
| of | 2-Moderate | 108 | 14.9 | 117 | 16.1 | 42 | 5 8 |
| Position | 3-Light | 58 | 8.0 | 63 | 8.7 | 22 | 3.0 |
| Attack | 1-Heavy | 113 | 15.6 | 113 | 15.6 | 53 | 7 3 |
| of | 2-Moderate | 74 | 10.2 | 74 | 10.2 | 35 | 4 8 |
| Position | 3-Light | 40 | 5.5 | 40 | 5.5 | 19 | 2 6 |

[1]Succeeding days are the second, third, and fourth days of the battle. For the fifth-day ammunition requirements, take the average of the succeeding days rate and the protracted rate.

[2]Protracted period refers to days 6 through 15. For estimating ammunition requirements for periods greater than 15 days, use rates provided in SB 38-26, as amended by OA message 262258Z Aug 76, subject: FY 77 USAREUR Ammunition-Theater Combat Rates.

[3]STON are computed on total weight per complete round: 105-mm-68.5 lb/rd
155-mm-135.7 lb/rd
175-mm-275 4 lb/rd
8-mm-262.5 lb/rd

*Table 7-6. Daily Antitank Guided Missile Requirements-Rounds Per Weapon/Launcher and Short Tons (STON)*

| Type of operation | Level of operation | First day Missiles | First day STON[3] | Succeeding days[1] Missiles | Succeeding days[1] STON | Protracted period[2] Missiles | Protracted period[2] STON |
|---|---|---|---|---|---|---|---|
| | | **Part A. TOW (Mounted/Unmounted) Ground System** | | | | | |
| | 1-Heavy | 9 | 39 | 10 | 44 | 4 | 17 |
| Covering | 2-Moderate | 5 | 22 | 6 | 26 | 2 | 08 |
| Force | 3-Light | 2 | 08 | 3 | 13 | 1 | 04 |
| Defense | 1-Heavy | 9 | 39 | 10 | 44 | 4 | 17 |
| of | 2-Moderate | 6 | 26 | 7 | 30 | 2 | 08 |
| Position | 3-Light | 4 | 17 | 4 | 17 | 1 | 04 |
| Attack | 1-Heavy | 7 | 30 | 8 | 34 | 4 | 17 |
| of | 2-Moderate | 4 | 17 | 5 | 22 | 2 | 08 |
| Position | 3-Light | 2 | 08 | 3 | 13 | 1 | 04 |
| Recon | 1-Heavy | 5 | 22 | 6 | 26 | 4 | 17 |
| and | 2-Moderate | 3 | 13 | 4 | 17 | 2 | 08 |
| Security | 3-Light | 2 | 08 | 2 | 08 | 1 | 04 |
| | | **Part B. TOW Aerial System** | | | | | |
| | 1-Heavy | 11 | 48 | 12 | 52 | 1 | 22 |
| Covering | 2-Moderate | 6 | 26 | 7 | 30 | 3 | 13 |
| Force | 3-Light | 2 | 08 | 3 | 13 | 1 | 04 |
| Defense | 1-Heavy | 12 | 52 | 13 | 57 | 5 | 22 |
| of | 2-Moderate | 7 | 30 | 8 | 34 | 3 | 13 |
| Position | 3-Light | 3 | 13 | 4 | 17 | 1 | 04 |
| Attack | 1-Heavy | 9 | 39 | 10 | 44 | 5 | 22 |
| of | 2-Moderate | 5 | 22 | 6 | 26 | 3 | 13 |
| Position | 3-Light | 2 | 08 | 3 | 13 | 1 | 04 |
| Recon | 1-Heavy | 7 | 30 | 8 | 34 | 5 | 22 |
| and | 2-Moderate | 4 | 17 | 5 | 22 | 3 | 13 |
| Security | 3-Light | 2 | 08 | 2 | 08 | 1 | 04 |

APPENDIX: Extract from CGSC Battle Book

# CHAPTER 8
# FIELD ARTILLERY CAPABILITIES

## Section I. AMMUNITION ALLOCATION AND EXPENDITURE

### 8—1. BASIC LOADS

The basic load is that quantity of nonnuclear ammunition that is authorized and required to be on hand by an artillery battalion. It is expressed in specific types of rounds per tube. The theater commander determines the basic load requirements. For instructional purposes at the CGSC, basic loads are as follows:

| | *155-mm battalion* | | *203-mm battalion* | | *MLRS btry* | |
|---|---|---|---|---|---|---|
| | Per tube | Per bn | Per tube | Per bn | Launcher | Btry |
| HE | 18 | 432 | 28 | 504 | | |
| RAP | 24 | 576 | 16 | 288 | | |
| AP-ICM | 5 | 120 | 3 | 54 | | |
| DP-ICM | 135 | 3,240 | 93 | 1,674 | 48 | 432 |
| Illum | 5 | 120 | | | | |
| Smoke | 7 | 168 | | | | |
| WP | 5 | 120 | | | | |
| RAAMS | 19 | 456 | | | | |
| ADAM | 7 | 168 | | | | |
| Copperhead | 9 | 261 | | | | |
| Totals | 234 | 5,661 | 140 | 2,520 | 48 | 432 |

### 8—2. EXPENDITURE RATES

The average expenditure rates shown below are expressed in rounds per weapon per day for assigned or attached artillery.

**DIVISION ARTILLERY**

| | *First day* | | *Succeeding day* | | *Protracted period* | |
|---|---|---|---|---|---|---|
| | 155-mm | 203-mm | 155-mm | 203-mm | 155-mm | 203-mm |
| *Covering force* | 254 | 360 | 274 | 361 | 174 | 207 |
| *Main battle area* | 203 | 177 | 207 | 164 | 183 | 90 |
| *Offense* | 146 | 130 | 153 | 127 | 140 | 56 |
| | **CORPS ARTILLERY** | | | | | |
| *Covering force* | 309 | 446 | 333 | 448 | 212 | 257 |
| *Main battle area* | 227 | 177 | 235 | 164 | 199 | 90 |
| *Offense* | 176 | 161 | 183 | 158 | 170 | 69 |

The above rates represent operations conducted against heavy resistance. For moderate or light resistance rates use figures in ST 101—2, *Planning Factors*, table 2—15.

## ENDNOTES

1. Soviet Military Power 1987, (Washington, D.C.: US Government Printing Office, 1987), p. 97. The actual numbers portrayed represent the USSR versus NATO. Another good indicator is on p. 121 which shows the procurement of artillery weapons since 1977. It shows a Soviet procurement rate ten times greater than the US.

2. Joseph A. Adelman, "Preparedness for Counterfire." M.M.A.S. thesis, U.S. Army Command and General Staff College, 1984, p. 25.

3. Ibid., p. 26.

4. Ibid., p. 33.

5. Conrad H. Lanza, "Counterbattery in the AEF," The Field Artillery Journal, September-October 1936, p. 457.

6. Adelman, pp. 36-39.

7. Trevor N. Dupuy, The Evolution of Weapons and Warfare. (Fairfax, VA: Hero Books, 1984), p. 237.

8. Raymond L. Garthoff, Soviet Military Doctrine, (Glencoe, IL: The Free Press, 1953), p. 303. See also Raymond L. Garthoff, "Significant Features of Soviet Military Doctrine," Military Review, March 1955, p. 10. See also A.A. Sidorenko, The Offensive (A Soviet View), translated by the United States Air Force (Washington D.C.: Government Printing Office, 1970), p. 29.

9. Charles Bartlett, Soviet Artillery Modernization - "What Does It All Mean?" (U), (Washington, D.C.: Defense Intelligence Agency, March 1978), p. 1.

10. See note 8.

11. Military Intelligence Service, War Department, "Massed Artillery in the Attack: Soviet Methods," Military Reports, November 1944, p. 11. This preparation concentrated initially on the forward edge of the battle area, worked its way towards the rear, and then forward again. It focused on every known or suspected enemy position. The success of these tactics in the Soviet mind are revealed in the statistics they compiled. Soviet artillery figures show that enemy casualties resulting from artillery increased from 49.5% in World War I to 61% in World War II. See A.A. Sidorenko, The Offensive (A Soviet View), Translated by the United States Air Force, (Washington, D.C.: Government Printing Office, 1970), p. 20.

12. James S. Jones, "Deployment of Soviet Cannon Artillery," CGSC Individual Research Project, AY 74-75, p. 2.

13. William P. Baxter, Soviet Airland Battle Tactics, (Novato, CA: Presidio Press, 1986), p. 205.

14. Levidov (a Soviet Colonel), "Artillery Counterpreparation." The Field Artillery Journal, November 1943, pp. 811-812.

15. During World War II, the amount of unobserved fire was estimated to be between 50-75% of all missions fired. Approximately 20-30% of all missions were observed, or moved onto the target by the observer. See Dorothy K. Clark, Incidence of Predicted Field Artillery Fire, (Washington, D.C.: The Johns Hopkins University, 30 October 1950), p. 2.

16. Adelman, pp. 39-40.

17. Ibid., pp. 41-42. What artillery they did possess was placed primarily in the Demilitarized Zone and it was mainly medium in caliber (105mm, 130mm, 152mm). See also David E. Ott, VietNam Studies: Field Artillery, 1954-1973, (Washington D.C.: HQ, Department of the Army, 1975), p. 13.

18. David E. Ott, VietNam Studies: Field Artillery, 1954-1973, (Washington, D.C.: HQ, Department of the Army, 1975), p. 156. During Operation PEGASUS in April 1968, the 1st Cavalry Division Artillery attacked enemy artillery systems that previously had been able to shell Khe Sanh at will. With the silencing of those systems, the enemy artillery ceased to be a deterrent to maneuver.

19. Ian V. Hogg, British & American Artillery of World War II, (New York: Hippocrene Books, Inc., 1978), pp. 12-17. The US history of self propelled weapons is sporadic. During World War II there was some mechanization primarily in the evolution of the tank destroyer units. The chassis was found usually to be inadequate. When World War II ended, tank destroyer units were disbanded as the logic "it takes a tank to kill a tank" prevailed. During the Korean war, the tank destroyer came back but it was too light and insufficiently rugged for the army. A Multiple Rocket Launcher (MRL) was also tried but its range was too short, it was inaccurate and was deemed not worth the effort. Later in the 1950's, armored artillery was attempted. The 105mm was successful. The larger calibers, 155mm and 203mm, were thought to be too heavy. They were finally introduced in the 1960's. In the 1970's, new towed artillery systems were introduced as a means to reduce costs over the increasingly expensive SP artillery. Since the current SP weapons had no chemical protection and very little armor protection, reverting back to a towed (and unprotected)

system did not degrade the overall system effectiveness too much. Also, the MRL was revived and finally fielded in the 1980's. See also Jerry B. Orr, James B. Campbell, and Joe R. Capps. Net Technical Assessment - Ground Tactical Warfare, Project Tenet II, Fire Support Assessment - Self Propelled Weapons and Munitions Technology (U), (McLean, VA: General Research Corporation, September 1974), pp. 15-19.

20. Baxter, p. 181.

21. K.P. Kazakov, Always With the Infantry, Always With the Tanks, translated by Leo Kanner Associates, (Washington, D.C:, US Army Foreign Science and Technology Center, 1973), p. 236.

22. Bartlett, pp. 1-3.

23. Dupuy, p. 237. See also Harold J. Gordon, "Artillery," in The Red Army: The Red Army - 1918 to 1945, The Soviet Army - 1946 to the Present, edited by B.H. Liddell Hart, (New York: Harcourt, Brace and Company, 1956), p. 354. See also Alexander McGregor Jr, Multiple Launch Rocket System (MLRS) 1982-2000 System Threat Assessment Report (STAR) (U), (Washington, D.C.: Department of the Army, US Army Intelligence and Security Command, US Army Intelligence and Threat Analysis Center, August 1980), p. 1.

24. Bartlett, p. 43.

25. Kevin H. Filgrim, "Analysis of the Soviet Artillery Norms Methodology," Thesis, Air Force Institute of Technology, March 1985.

26. C.N. Donnelly, "The Wind of Change in Soviet Artillery," International Defense Review, Volume 6, 1982. (Extracted from United States Army Command and General Staff College "Selected Readings in Soviet Army Operations," P310, pp. 71-79), p. 74.

27. Trevor N. Dupuy, Numbers, Predictions & War: Using History to Evaluate Combat Factors and Predict the Outcome of Battles, (Indianapolis, IN: The Bobbs-Merrill Company, Inc., 1979), p. 17.

28. Combined Arms Combat Development Activity (CACDA), Division 86 Final Report with June 83 Addendum, (Ft. Leavenworth, KS: Combined Arms Center, October 1981), p. 2-1.

29. FM 6-20, Fire Support In Combined Arms Operation, (Washington, D.C.: HQ, Department of the Army, 31 December 1984), p. 1-10.

30. Ibid., p. 3-8.

31. FM 6-141-1, Field Artillery Target Analysis and Weapons Employment: NonNuclear, (Washington, D.C.: HQ, Department of the Army, 15 February 1978 with Change 1 dated 24 September 1980), p. 4-9. ST 100-3, CGSC Battle book, which is not approved doctrine but which is used widely throughout the college further defines them as:

> SUPPRESSION. ...limits the freedom of enemy personnel in the target area. It causes tanks to button up ... obscures ... cumulative effect ...allows direct fire weapons to effectively place fires on targets. The effects ... usually last only as long as the fires are continued. Most targets on the battlefield can be suppressed.
> NEUTRALIZATION. ...knocks it out of the battle temporarily. The unit will become effective again when the casualties are replaced and damage is repaired...normally occurs when it suffers 10-percent casualties or damage. It is delivered with the aim of hampering or interrupting the firing of weapons. Assets required vary...
> DESTRUCTION. ...out of action permanently. Direct hits are required to destroy hard material targets...considered destroyed when it suffers 30-percent casualties...assets vary, but usually require a large expenditure of ammunition. Destruction of tanks and BMPs or dug-in targets is not economical except with the 155-mm Copperhead.

32. Valentin Y. Lebedev, Field Artillery Officers Handbook, Translated by Foreign Broadcast Information Service, 1984, p. 6.

33. United States Army Intelligence and Threat Analysis Center, Soviet Army Operations, (Washington, D.C.: HQ, Department of the Army, 1978), pp. 5-6. See also Allan S. Rehm, Monographs on Soviet Military Theory, Analysis and Practice: Soviet Artillery Planning Factors (U), Ketron, Inc., August 1978, p. 26.

34. The artillery capability to kill systems today has not improved upon the historical record. This can be seen from the lethal areas for a typical artillery shell, today. A 155mm high explosive projectile today has a lethal radius of 15 meters for standing personnel and a lethal radius of 2 meters for a tank. In other words, to achieve a 95% probability of killing personnel or systems, the round must explode within that distance from them. A Dual Purpose Improved Conventional Munition (DPICM) projectile has lethal radii that are somewhat improved: 38 meters for standing personnel and six meters for a tank. The DPICM bomblet also can penetrate up to 2.75 inches of armor. It can be seen that artillery effects, though lethal, are less than is

perhaps commonly believed. See United States Field Artillery School, Fire Support Mission Area Analysis (U), (Ft. Sill, OK: USAFAS, 31 January 1980), p. 8-II-9 and p. 8-II-12.

NOTE: This does not suggest that RAAM, ADAM, Copperhead, etc. have not provided a quantum leap in killing capability. There are two cautions. Field artillery remains an area effect weapon; point target missions are harder to execute, detract from other missions, and are of limited utility for other than high payoff targets. Second, HE still comprises the larger amount of ammunition in the inventory, and by extension, the basic load.

35. United States Field Artillery School, The Fort Sill Fire Suppression Symposium Report (24-25 July 1979), (Ft. Sill, OK: USAFAS, 4 January 1980), p. I-1.

36. Ralph M. Cline, et al., Net Technical Assessment: Effect of Soviet Artillery Fire Support on US Infantry Anti Tank and Artillery Counterfire Capabilities (U), (Arlington, VA: System Planning Corporation, April 1977), pp. C-5 thru C-6.

37. John Ellis, The Sharp End: The Fighting Man in World War II, (New York: Charles Scribner's Sons, 1980), pp. 62-63.

38. F.W. Niedenfuhr, et al., Counterfire Campaign Analysis, Volumes I-III (U), (McLean, VA: MITRE Corporation, September 1979), p. 133.

39. FM 6-20, p. 1-4.

40. Stephan M. Gallagher, "United States Divisional Artillery: A Study of Vulnerability to Soviet Counterfire," M.M.A.S. thesis, U.S. Army Command and General Staff College, 1976, p. 72.

41. FM 6-20, p. 4-24.

42. Ibid. pp. 1-10 thru 1-11. Italics added.

43. Niedenfuhr, p. 2. See also USAFAS, Fire Support Mission Area Analysis (U), (Ft. Sill, OK: USAFAS, 31 January 1980), p. 3-9.

44. Niedenfuhr, p. 17.

45. FM 100-2-1, The Soviet Army: Operations and Tactics, (Washington, DC: HQ, Department of the Army, 1984),p. 9-12.

46. Kerry Hines and John Hines, Soviet Front Fire Support, (Washington, D.C.: Soviet/Warsaw Pact Division, Directorate

for Research, Defense Intelligence Agency, September 1982), p. 27. See also FM 100-2-1, p. 9-21.

47. Allan S. Rehm, Monographs on Soviet Military Theory, Analysis and Practice: Soviet Artillery Planning Factors (U), Ketron, Inc., p. 65.

48. Richard B. Culp, Defense Intelligence Estimates Memorandum: Soviet Non Divisional Artillery Trends to 2000 (U), (Washington, D.C.: Defense Intelligence Agency, 30 June 1982), p. 3.

49. Hines, p. 33.

50. United States Field Artillery School, Fire Support Mission Area Analysis(U), (Ft. Sill, OK: USAFAS, 31 January 1980), p. 6-9. See also FM 6-20, pp. B-4 through B-5.

51. CACDA, p. 5.

52. This concept has been demonstrated throughout history including Civil War use of balloons to try and determine the enemy location. In World War I the US Army first used counterbattery fires in its St. Mihiel (September 1918) offensive. The fires were extremely effective. This was due primarily to a long term intelligence collection scheme focussing on the location of the enemy artillery. The second time counterbattery was attempted was in the Meuse Argonne offensive. This time the German artillery was not neutralized despite a twelve hour bombardment. Little prior targeting information had been available. See Adelman, p. 33.

53. FM 6-141-1, pp. 4-10. These include the weapons available, the amount and type of ammunition required versus what is available, the type of target (personnel, hardened, or materiel), the size of the target, friendly troop safety criteria, accuracy of the delivery systems, the impact of adverse effects in the target area (such as the emplacement of mines where friendly forces hope to maneuver), weather and the time requirements. TC 6-20-4, Field Artillery Counterfire, (Ft. Sill, OK: USAFAS, 1975), p. 23, allows for commanders guidance on how to attack targets. It provides the priority of fires, the current and projected ammunition constraints, and the required relative survivability. See also Clark, p. 2.

54. Dorothy K. Clark, "Incidence of Predicted Field Artillery Fire," (Washington, D.C.: Operations Research Office, The Johns Hopkins University, 20 October 1950), p. 19. During World War II it was observed that the most limiting factor for engaging predicted artillery targets was ammunition stringency. The concern was whether or not the

accuracy of the target location was sufficient to respond to some tactical emergency.

Another source contended that ammunition stringency contributed materially to lengthening the war. It contended that artillery ammunition shortages resulted in increased casualties, and delayed or jeopardized minor operations. See The General Board, United States Forces, European Theater, "Study Number 58: Report on Ammunition Supply for Field Artillery," (Washington, D.C.: The War Department, 4 February 1947), p. 79.

55. CACDA, p. 3-6.

56. James E. Schall, et al., "The Effectiveness of 155mm M109A2 8 Gun Howitzer Battery in the Counter-Battery Role (U)," (Aberdeen Proving Ground, MD: US Army Armament Research and Development Command, April 1980), p. 22.

57. Gallagher, p. 28.

58. Hines, p. 3.

59. Lebedev, p. 5.

60. Baxter, p. 183.

61. Ibid. See also Keith W. Dayton, "Field Artillery Survivability: The Soviet Perspective," Field Artillery Journal, September-October 1981, p. 50.

62. Hines, p. 3.

63. Rehm, p. 62.

64. Ibid., p. 70.

65. Niedenfuhr, p. 160.

66. Lebedev, p. 280.

67. See Baxter, p. 206. Their resupply effort is not based on individual projectiles. It is based on fire units. A fire unit is a measure of ammunition storage and carrying capacity. The fire unit is used to procure, package, transport, stock and deliver ammunition. It is not an expenditure rate. From the definition of a fire unit, it is obvious that logistics drives, in no small measure, the amount of ammunition that they intend to deliver upon a target.

Also see Niedenfuhr, pp. IV-32 thru IV-32. Soviet norms call for two Units of Fire (UOF) to be on hand before combat begins. Providing for this amount of ammunition is no small task, but they have built into their organizations the capabilities to do so. Niedenfuhr also has an excellent

classified discussion of their ammunition resupply capabilities and techniques in Section 2, Appendix IV, Volume II.

68. Harold J. Gordon, "Artillery," in The Red Army: The Red Army - 1918 to 1945, The Soviet Army - 1946 to the Present, edited by B.H. Liddell Hart, (New York: Harcourt, Brace and Company, 1956), p. 365.

69. Jones, p. 8.

70. The FIREFINDER system is composed of the Q36 counter-mortar and Q37 counter artillery radars. The Q36 locates targets at a minimum range of 750 meters and a maximum range of 24 kilometers. The Q37 is 3 kilometers and 50 kilometers respectively. Both have a 1600 mil sector of scan and can locate up to ten targets firing simultaneously from multiple locations. Additionally, it is able to tell the operator when it is being jammed and from which direction. It can correlate previously reported locations and automatically stop tracking targets that have been previously located in order to locate new ones. It can be used by friendly forces to plot the fall of shot of outgoing artillery, as well as detect those enemy incoming rounds.

71. FM 100-2-3, The Soviet Army: Troops, Organization and Equipment, (Washington, D.C.: HQ, Department of the Army, 1984), p. 4-55.

72. Cline, p. 24.

73. This is not unreasonable. It is in keeping with the assumption made at the beginning of the paper - that this was not a breakthrough sector.

74. The tactics employed are not an issue as they are dependent on so many other variables.

75. FM 6-20, p. B-13.

76. Ibid.

77. This was demonstrated in the Division Exercise conducted by the School of Advanced Military Studies during the week of 20 September 1987. Within the parameters and algorithms of the game, the Red artillery was effectively defeated. With its defeat, greater freedom of maneuver and eventual victory was realized by Blue forces.

78. CACDA, p. B-2.

79. First Battle simulations at SAMS confirms this. During the simulations, artillery was usually not played since the algorithms did not allow it to kill nor suppress. Without

artillery on either side. Blue forces were usually able to win the direct fire battle. However, it must be recognized that this was a simulation, just as any other simulation. It confirmed a proposition's validity; it did not conclusively prove the hypothesis.

80. USAFAS, "Counterfire I," Field Artillery Journal, November-December 1975, p. 15.

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