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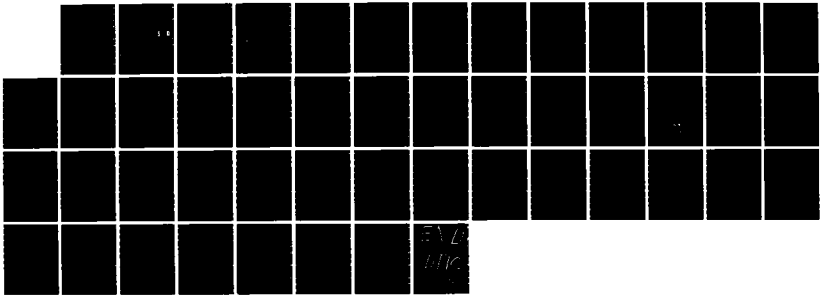

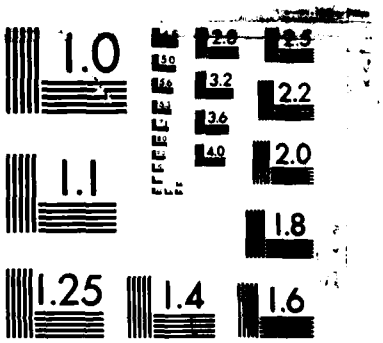

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Causes of Combat Stress in the Artillery Firing Battery Supporting High-Intensity Conflict in the European Theater

by

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Field Artillery

School of Advanced Military Studies
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ABSTRACT

CAUSES OF COMBAT STRESS IN THE ARTILLERY FIRING BATTERY SUPPORTING HIGH-INTENSITY CONFLICT IN THE EUROPEAN THEATER, by Major James D. Coomler, USA, 42 pages.

This study investigates the causes of combat stress in the artillery firing battery supporting high-intensity conflict in the European theater and identifies four primary causes of stress with special uniqueness or application to artillerymen. The study focuses on fatigue, fear of becoming a casualty, isolation, and absence of leadership as causes of stress that affect the artillery soldier the most. The study concludes that diagnosis and awareness of artillery stress inducers is an important first step in stress reduction and manpower maintenance efforts.

The study finds that practically all studies and books on combat stress are dated to the point that their applicability to a modern high-intensity war is in question or deal with the subject in too broad of a scope or, most likely, both. The significance of this lack of adequate attention to modern combat stress and its effects on special units, e.g. artillery, is that the Army and soldiers continue poorly to understand stress.

The study concludes that combat stress will be one of the most significant causes of loss of manpower in the artillery. The U.S. Army needs to renew emphasis on soldiers in combat and their preservation from combat stress, to go beyond rediscovery and have new research on stress, to develop and implement a basic doctrine on the prevention and treatment of stress, and to formulate training programs on combat stress.

Table of Contents

Introduction

"In war, the moral is to the material as three is to one."[1]

Napoleon Bonaparte

A major conventional war in Europe between the Warsaw Pact and the North Atlantic Treaty Organization would bring together the two strongest military forces ever assembled on earth. The conflict would be intense, quick, and very destructive as both sides would attempt to maximize the capabilities of their forces and doctrine. The battlefields would be dense with high quality, complementary weapons of all types fighting together in a combined arms fashion against the opponent endeavoring to do the same. One of the most significant and powerful weapons of this possible future war, as in past wars, would be the field artillery. The side with the more effective, continuously available artillery would have a significant, possibly decisive advantage.

But what makes artillery effective and available? Appel and Beebe wrote in "Preventive Psychiatry," "The ultimate limiting factor for the maintenance and endurance of organized and competent forces on the battlefield is man."[2] Therefore, if man is one of the primary limiting factors in determining the success or failure of military operations, what then decreases man's effectiveness? U.S. Army Field Manual 26-2, Management of Stress in Army Operations, cites stress on soldiers and on their combat performance as a matter of far-reaching significance for effective operations.[3] Manpower is obviously important to the conduct of wars and so is

the protection of that manpower. Preventing, limiting, and treating the effects of stress on soldiers is equally as important as preventing diseases or treating war wounds. As in any medical problem, an understanding of the causes and effects is necessary before treatment can be prescribed.

The purpose of this study is to determine some of the causes of combat stress in the artillery firing battery supporting high-intensity conflict in the European theater. S.L.A. Marshall's Men Against Fire describes the moral and physical effects of battle stress on soldiers in general but, more specifically, deals with the infantryman. While many of Marshall's observations may be true in general, combat stress is not the same for all groupings of men performing combat tasks. The B-29 bomber crew of World War II faced different stresses than did the tank driver or signalman. Artillerymen are subject to a different combat environment than the rifle soldier and accordingly must endure some different degree of battle stress. There are, then, two questions. What stresses affect artillery soldiers? Does combat stress influence the performance of the artillery firing battery? The answers to these questions should provide a better understanding and mastery of the effects of stress. The end result is more combat power, i.e. artillery, to support the conflict.

The focus of this study is limited to the 155mm self-propelled artillery battery in Europe. The 115 man battery is the smallest artillery unit that provides cannon fire support as an entity although tactical command and control is provided by its battalion headquarters. The predominant mission of a 155mm battery, as an

element of its parent battalion, is direct support artillery fire for maneuver units. To accomplish this the battery commander normally deploys the eight howitzers of the battery in two four-gun platoons separated by approximately 1,000 meters in order to increase the battery's survivability to enemy targeting efforts. While the 155mm battery provides a base for study, the research and conclusions of the study are applicable with appropriate modification to other artillery units as well, and may be of benefit to the general artillery community. Before we can focus on the artillery firing battery, however, we need a general understanding of combat stress.

An Overview of Combat Stress

> "One might say that the physical seem little more than the wooden hilt, while the moral factors are the precious metal, the real weapon, the finely-honed blade."[4]
>
> Clausewitz

Combat stress is a reaction of the mind and body to extreme demands placed on it in combat. Its causes can be divided into three categories: individual, situational, and organizational. Individual causes of stress include fear, fatigue, and grief; situational causes of stress include casualties, combat task demands, and uncertainty; organizational causes of stress include incompetent leadership, inadequate training, and ill-defined mission requirements.[5] These examples are by no means all inclusive.

Combat stress affects soldiers to varying degrees. Some can cope better than others, but all combatants are susceptible. All will eventually show disabling stress symptoms given prolonged exposure to sufficiently intense combat. As time in combat increases, all men show progressively increasing detrimental effects.[6] Severe symptoms of combat stress, those that disable or prevent a person from performing his job, can make the soldier a medical casualty.

The name "battle fatigue" is recognized by soldiers and is commonly used for stress casualties. Combat exhaustion is another term for the same condition. Military medical personnel in World War II agreed upon the name battle fatigue, not because it adequately described the situation, but as a way not to stigmatize the victim as having a mental illness. War neurosis, battle neurosis, or combat neurosis more accurately describes a combat stress casualty.

FM 26-2 lists seven major sources of stress in continuous operations: fatigue, mental stress, light level, battlefield demands, isolation, adverse conditions, and day/night rhythms. Other books and authors cite additional causes of stress but LTC Brian Chermol of the U.S. Army's Academy of Health Sciences simplifies it all by saying, "the major cause of psychiatric casualties will be the dangers and fatigue associated with the daily activities of the typical combat soldier."[7]

Stress symptoms are as numerous and varied as the causes and can range from an increased heartbeat to uncontrolled shaking and trembling to extremely aggressive, irrational, or depressed behavior. As noted previously, combat stress affects all people

to different degrees. The initial alarm reaction to stress lasts only a short time as the body and mind adapt to the stress situation. A long period of stress resistance follows as the individual copes and maintains control. This resistance stage may last only a few hours in some individuals to as long as 200 days, as was experienced by some men in World War II. Eventually the soldier reaches the last stage, exhaustion, when he can no longer resist stress.[8] It is at this point that the individual becomes a stress casualty.

Treatment of stress casualties should begin immediately within the unit with only the most severe cases being evacuated to the battalion aid station. Experiences of both world wars and wars fought since 1945, to include the 1973 Yom Kippur War, indicate that the battle stress casualty's chances for recovery are greatest if he is treated quickly, near the front line, and as a soldier rather than a patient.[9] Experience further suggests that once soldiers are evacuated beyond the divisional level, few will ever return to their units and many will become chronic psychiatric problems. In contrast, 80 to 90 percent of the soldiers treated at company or battalion may return to duty.[10] Adequate treatment for most battle stress casualties comprises nothing more than five or six hours of uninterrupted sleep in a safe place, a warm meal and an opportunity to clean up. A critical component of the recovery process is the need for friends to tell the soldier that he is needed in the unit.

Combat stress can lead to large manpower losses. U.S. Army World War II data suggests a relationship of one combat stress

casualty to four or five wounded in action casualties.[11] As wounded in action casualties increase, so do combat stress casualties. Israeli experience in the Yom Kippur War of 1973, a continuous and mobile war in a high-intensity environment closely matching a possible European conflict, reveals a combat stress/wounded in action casualty ratio of 1:3. Even in the Israeli Lebanon Operation of 1982, one battalion involved in high-intensity combat experienced 31 of 36 casualties as being caused by combat stress (86%). Two other battalions under less combat pressure had 39% and 10% combat stress casualties.[12] LTC Brian Chermol, in an article on combat stress, predicts that in a high-intensity conventional war one psychiatric casualty will occur for every four battle casualties during a 30-day period. In a nuclear or chemical war, he states the ratio could go to one-to-two and after 30 days of continuous combat, combat stress casualties may reach a one-to-one ratio. He further adds that most combat arms personnel would be psychologically ineffective after no more than 60 days of high-intensity combat, based on World War II data.[13] The sum of stress, killed, and wounded casualties will quickly drain manpower away from a unit and, additionally, if combat stress casualties cannot be returned quickly to their unit they will cause a severe disruptive impact on the already overburdened medical support system.

Only within the past five years does there appear to be a new emphasis within the military community on combat stress as evidenced by the number of recent articles in military journals and with the printing of FM 26-2, Management of Stress in Army Operations. The Israelis, no doubt, deserve some credit for this renewed

attention to battle fatigue as a result of their studies on combat stress in their 1973 war. Many of the studies and books listed in the bibliography are from the World War II and Korean Conflict era. While many are excellent, such as Fear in Battle, Psychiatry in a Troubled World, and Breakdown and Recovery, most are now dated to the point that their applicability to a modern high-intensity war is in question. Most, as already noted with S.L.A. Marshall's Men Against Fire, deal with walking infantrymen and, while still useful, certainly do not discuss new stresses and their impact on specialized soldiers. Several recent books include a general discussion on combat stress but fail to provide a comprehensive, up-to-date examination of the subject. The significance of this lack of adequate attention to combat stress and its effects on special units, e.g. artillery, air defense, is that the U.S. Army and soldiers continue poorly to understand stress. Emphasis should continue on combat stress as it applies to the Army in general, but the Army should direct new emphasis to specialized areas so that increased manpower effectiveness in all branches and military specialties is maintained during combat.

A Stressful Environment: The Artillery Battery Korea 1950

> "...though...the improvement in weapons has almost infinitely extended the range of a general's reach, the predicament of the individual on the battlefield has...still to be measured on one quite short scale: that of the physical and mental endurance of himself and his group."[14]
>
> John Keegan

The following historical example introduces and draws attention to some of the combat stresses found in an artillery unit. The seven days of combat A Battery, 17th Field Artillery (8", Towed) saw in Korea in November 1950 does not represent an ideal case study for one to see the full spectrum of combat and related stresses of artillery. No one example could. The experience of A Battery does show the dangers and fatigue associated with the daily activities of an artillery unit in combat.

In the fall of 1950, Eighth Army had crossed two thirds of North Korea and was advancing to the Yalu River when the Chinese Army attacked. The 17th Field Artillery Battalion was attached to the 2d Infantry Division and was ordered into positions in the vicinity of Kujang-dong on 24 November to fire missions for the defense. At this time A Battery's strength was 74 of the 135 men authorized. After emplacing its guns in the edge of the village and firing registration missions, reports were received that two hundred enemy soldiers were three thousand yards to the front, with the 23rd Infantry Regiment in-between. Routine fire missions continued even though stragglers from forward artillery and infantry units started arriving at 2300. They reported that the 61st Field Artillery Battalion, which was to the immediate front of A Battery, had been overrun. The A Battery commander placed everyone on alert, but the Chinese did not attack.

The following morning the 2nd Infantry Division Artillery ordered the battalion back several miles but the roads were so jammed by vehicles moving to the rear that it was not until 2330 that A Battery pulled onto the road south. During the day the

battery continued to fire missions at short ranges while observing a continuous flow of 2nd Division men and equipment through the town. There was no way of knowing what was in front of the battery for a defensive line and, consequently, the unit maintained a manned perimeter defense while firing the howitzers.

At the new position, in addition to the fatigue of literally manhandling the howitzers to emplace them, the cannoneers had to contend with zero degree temperature and a strong wind. The unit immediately started to fire missions without registering. At this point the men had been awake for at least 48 hours engaged in heavy manual labor at the howitzers or on outpost duty. On 27 November, they had a relatively quiet day although it was too cold for men to sleep. Anyway, all men not absolutely needed on the firing line were either on outpost duty or loading and hauling ammunition from the ammunition supply point thirty miles away. Enemy pressure continued throughout the day and night. Before moving again at 0745, 28 November, A Battery could hear the sound of small-arms fire. Shortly after arriving in its new location five miles south and emplacing the howitzers the unit was again ordered to move back. The battery knew at this point that all units of the 2nd Division were moving back.

The battery completed its move, and welcomed the first quiet night in 90 hours and the opportunity to sleep that it provided. It did not last long. By early morning 29 November the battery was again firing missions to the north and continued to do so throughout the day. While firing north, the men of the battery could see the southward movement of the division's three direct

support 105mm battalions. They also knew the enemy had blocked the main road south causing a vehicle jam several miles long. During the day, the direction of fire gradually shifted to the east at a range of 18,000 yards, but by morning on 30 November the range had shortened to 1,300 yards. The soldiers felt the situation was critical but they continued to fire. Throughout the night, the slow moving division convoy continued its movement south after infantry units had cleared the roadblock. In early morning, a withdrawing tank company told A Battery that all infantry units to the north had withdrawn and the tanks were the rear guard of the division. Although this was not an accurate report, the battery commander assigned zones for direct fire to each of the 8" gun sections. Even firing at 1,300 yards, the sections could already see the shell bursts.

At 0930 the 17th Artillery Battalion ordered A Battery to move and to have all men prepared to fight as infantrymen if necessary. While on the road the unit passed the three direct support artillery battalions firing in several directions. No longer did the cannoneers know in which direction to look for the Chinese. While the battery road-marched south at a speed of five miles an hour, infantrymen climbed up on A Battery's vehicles for the ride. On occasion, enemy machine guns fired from opposite sides of the road causing the column to stop until they were silenced. After nightfall it was difficult to distinguish moving vehicles from abandoned vehicles and in one case an A Battery driver pulled up behind a jeep and waited several minutes before realizing both men in the jeep were dead. For the next seven miles the road was

under enemy fire. Only after passing the site of the roadblock where a destroyed bridge forced a dangerous stream crossing was the battery safe. During this last road-march A Battery passed the bodies of at least four hundred friendly troops that were lying on the road, received light casualties, and lost ten trucks.[15]

The opportunity for stress to overcome the men of A Battery was constant and ever-present; it is remarkable that it did not. A short sentence from the Army Historical Series account of the unit states, "The men were tired and tense."[16] This can only be an understatement of the situation. All seven of FM 26-2's major sources of stress in continuous operations were present and reacting on the minds and bodies of the soldiers.

. Fatigue - The unit had to maintain continuous operations and vigilance for seven days with only one short period where sleep was possible. Fire missions were constant and, consequently, so was the need to maintain ammunition supply. (Each 8" projectile weighs 200 pounds.) Throughout this period the battery had only fifty percent of its personnel causing increased work for the men.

. Mental Stress - Several times, the battery found itself in situations that weigh heavily on artillerymens' minds: watching the division pass it by, being told there were no friendly units to its front, preparing for direct fire with the 8" howitzer, shooting missions at a distance of only 1,300 yards, hearing the only escape route was blocked by enemy.

. Light Level - The battery had to work at night under blackout conditions yet retain visual precision for artillery technical procedures and routine military operations.

. Battlefield Demands - The unit had to move often, provide for its own defense, and still provide fire support while facing an uncertain combat situation.

. Isolation - Several times A Battery was the last unit facing the enemy although, at other times, it was required to move but could not due to congestion on the road.

. Adverse Conditions - Throughout the period weather was near zero degrees and windy with many activities taking place in darkness, making it more difficult to man the guns.

. Day/Night Rhythms - The battery could not develop normal rest schedules or cycles.

The actual stress levels of the men of A Battery, 17th Field Artillery on the morning of 1 December 1950 are not known, but as a unit they resisted the sources of stress and remained effective throughout the withdrawal operation. Perhaps the unit withstood stress so well because of group cohesion, leadership, discipline, training, and morale. Another explanation is that the unit was conducting a retrograde operation, which causes fewer battle stress casualties because the men know that becoming a casualty to stress would result in their death or capture. World War II experience shows that slow moving, high casualty-producing offensive or defensive operations against a determined enemy produce much higher battle fatigue rates. Pursuit operations that are fast moving, usually with high morale, cause fewer cases.[17] The knowledge of what caused A Battery to resist stress as well as it did would be useful to today's artillery units, but it is not known.

The U.S. Army sent many teams of soldiers, military doctors, psychologists, and civilian scientists to the front lines in World War II and the Korean Conflict to study battle fatigue. Colonel S.L.A. Marshall is probably the best known of these individuals because of his books' popularity, but many reports were compiled and can still be found in the military libraries. Most emphasis in World War II and the Korean Conflict dealt with battle fatigue in the broad sense or, specifically, with the infantry. No study of stress on the artilleryman can be found, but that is not unreasonable. A World War II artilleryman was much safer with less direct exposure to the enemy than his infantry counterpart. In Europe infantry casualties of all types were much higher than artillery casualties. Artillery battle casualties in the European Theater were small, six percent, compared to those suffered by the infantry. (artillery 26,480:infantry 435,048)[18] As a result, infantry stress casualties received the most study.

Future wars may not treat the artillery as kindly; therefore, it would be beneficial to the Army and artillerymen to know some of the specific causes of stress to better prepare against them. It is now time to turn attention from the past to the present.

Causes of Stress with Special Uniqueness or Application to a Field Artillery Battery in Europe

> "On the battlefield the real enemy is fear and not the bayonet or bullet. All means of union of power demand union of knowledge."[19]
>
> Robert Jackson

The challenge for the U.S. artillery is to fulfill its mission of providing close support fires, counterfires, and interdiction while fighting a larger force intent on destroying the artillery.

Of vital concern to the U.S. Army Field Artillery, then, is how to survive and in sufficient enough numbers to provide responsive, accurate and sustained fire support. Artillery survivability is obviously important; it is discussed and debated often in the Field Artillery Journal, but very few of the articles deal in detail with the subject of the survivability and maintenance of manpower by stress reduction. The cannoneer is one of the primary limiting factors in determining the success or failure of artillery support. In order to employ him effectively, it becomes essential to understand the causes for his rate of deterioration of effectiveness in battle. Besides the causes of stress applicable to all soldiers, are there any causes of stress with special uniqueness or application to an artilleryman? If there are, should not artillerymen be aware of them and take them into account? The Russians do. A Soviet operational plan includes an allowance for combat degradation because of battle stress just as it does for killed and wounded casualties. Ask a forward-deployed U.S. artillery battery commander what are the causes and effects of stress to his unit and he more than likely will answer with little more than "the problem of maintaining continuous operations." But there are more stressors than just 24 hour fire missions. Dr. Ellis Johnson, an Army research scientist, wrote in 1953 upon his departure to Korea, "In studying stress we have run into a lack

of basic knowledge, a situation not unusual in this stage of Army operations research."[20] Little has changed since 1953. The discussion that follows addresses some of the artillery unique stress inducers.

Fatigue is an immense reducer of human efficiency and can be brought on by lack of sleep, physical exertion, or psychologically induced because of stress. In combat, fatigue is inevitable as a soldier is pushed beyond his mental and physical endurance with little or no time to recover. For the cannoneer, physical exertion caused by ammunition handling is a primary cause of fatigue as he manually moves around 100 pound projectiles and 62 pound powder cannisters. The same complete round is handled at least three times within the battery before it is fired, but could be moved around several more times as it is shifted and relocated for storage purposes. The artillery section unloads the ammunition from trucks directly into a self-propelled ammunition carrier that is a companion vehicle to the howitzer. Currently used vehicles do not provide any labor saving material handling devices to assist in this operation; it is all done by hand. When needed for firing or restocking of the on-board howitzer supply, the ammunition is again moved by hand to the cannon. Finally, a crew member will prepare the projectile for firing and load it into the breach. Artillery usage projections for a 155mm howitzer, based on the U.S. Army Training and Doctrine Command Approved Standard Scenario, Europe I, Sequence 2A, are 300 rounds per howitzer per day and 500 rounds per howitzer per day during surge conditions.

Using the 500 round figure for the initial days of war, one howitzer crew will handle in 24 hours 243,000 pounds or 121.5 tons of ammunition. Each crew member, assuming a full crew of nine with equal burden sharing, will move 27,000 pounds or 13.5 tons a day. Improved ammunition vehicles with labor saving devices being fielded now and new packaging material for ammunition will provide some relief. The new Field Artillery Ammunition Support Vehicle is estimated to improve crew work performance by 13 percent, but the individual cannoneer whose load has been reduced to 23,490 pounds daily may be too tired to appreciate the 3,510 pounds of liftsaving the new vehicle provides him.[21] A 1978 study by Walter Reed Army Institute of Research determined that cannoneers were capable of continuous operations for approximately 36 hours, plus or minus 26 hours.[22] The cannoneer will be exhausted from just ammunition handling alone, but that is only a part of his duties.

A high-intensity war ensures an abundance of targets with little opportunity for the artillery to catch its breath. Constant fire missions, position movements, and routine fighting and sustainment tasks such as security, reconnaissance, camouflage, maintenance and personal needs leaves little time for the soldiers to rest. Army war gaming results with a European scenario conclude that no more than two howitzers from an eight gun battery will be operational after 16 hours because of counterfire if the battery only moves two or three times a day. The same computer war game determined that the best protection against counterfire is moving after firing 30 volleys from the same location which equates to

approximately once every hour.[23] Even moving a battery every four hours (displacing, moving, emplacing, and location improvement) leaves no time for crew members to rest or sleep since it takes the entire crew to accomplish all the tasks necessary in the limited time available.

The Army of Excellence division manning organization for a 155mm self-propelled howitzer authorizes nine men as a crew, a decrease of one from the H-series table of organization and equipment. But a 1984 Army Research Institute study showed that even a ten-man howitzer section, trained in accordance with duties as the Field Artillery School recommends, could not perform both the war fighting duties and support tasks required to provide fire support and survive in 24-hour per day intensive combat operations. They simply said, in a word, that it was "impossible." One additional finding of the study is worthy of note. It revealed a fourteen man section would be required to do all tasks necessary for continuous operations.[24] Nine men doing the work of fourteen will cause fatigue, but seldom do howitzer sections even have nine men. Actual assigned strength on the gun rarely exceeds seven soldiers in peacetime and will probably decrease quickly in war because of casualties and secondary tasks such as manning outposts. A unit today will quickly find itself in the same situation as A Battery, 17th Field Artillery did in 1950, manned at half strength.

The experience of the British Royal Artillery in the Falkland Islands, as reported by Major Jonathan Bailey, highlights the effects large ammunition expenditures and small crews had

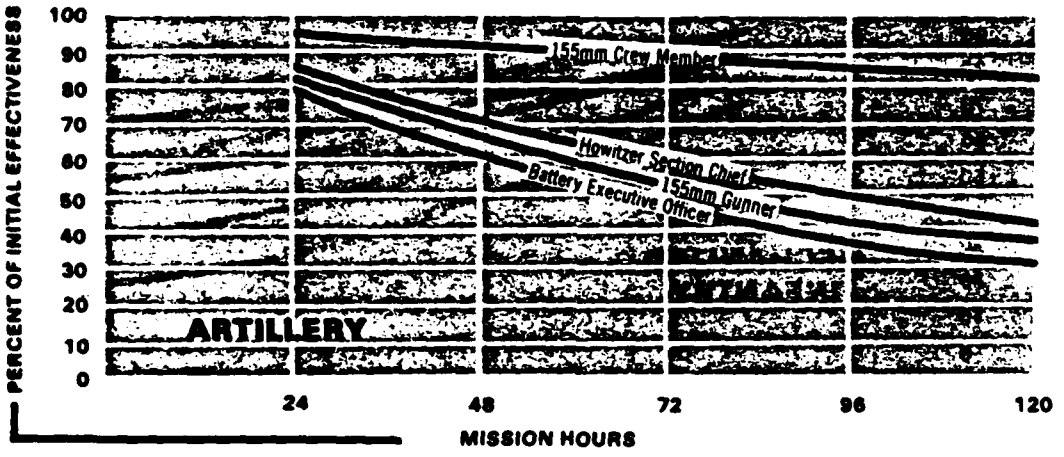
in a low-intensity conflict.[25]

> "The intensity and duration of operations and the workload imposed...revealed serious deficiencies in manpower. Besides the demands for local and air defence, digging, cooking, and sleep, gun detachments encountered the novel experience of receiving large quantities of ammunition, preparing it, and dealing with salvage. A gun detachment of seven for a 105mm light gun is inadequate; it should be nine. Had operations continued for several more weeks or even light casualties been sustained, the batteries could not have provided the support the infantry expected and deserved... All aspects of life on the gun positions were dominated by the demands of ammunition flow."

Artillery firing batteries no longer are self contained units with assigned personnel to perform supply, maintenance, administrative, ammunition, and subsistance preparation. The battery, by design, is lean with all its focus aimed at providing artillery fire. Assistance and support for the mentioned areas comes from service or headquarters battery on an as needed basis. The Army of Excellence TOE 6-367J4 authorizes a total of 115 artillerymen to man the eight gun battery. Practically all slots are in either the headquarters section, the firing sections, or the two fire direction sections. There is a four man communications section that is vitally important in emplacing and maintaining internal wire communications within the battery and an eight man ammunition section with four vehicles that will probably be constantly on the road delivering ammunition. Any battery needs for manpower for security outposts, reconnaissance of new positions, guard duty when firing from villages, casualty assistance, or tray-pak food serving takes personnel away from their primary

tasks. Those few that remain in the sections must then work that much harder. Fatigue and stress will weaken the men even more quickly as a result.

Nor is it just manual labor that fatigues the body as psychological exhaustion will take its toll too. Cognitive tasks performed by battery leaders and fire direction center personnel deteriorate quickly; these people are even more susceptible to the stress of continuous operations than those with more labor-intensive jobs.[26] Gross mental mistakes of commission or omission can lead to drastic consequences but so can the gradual transition of tired, slowed fire direction personnel doing only the perceived "most important tasks" first but never getting around to computing final protective fires and no fire zones, updating meteorological corrections, plotting targets, or keeping the situation map posted. The following chart from FM 22-9, Soldier Performance in Continuous Operations, shows the relative quicker decrease of effectiveness of the battery executive officer and others with high mental demands compared to the 155mm crew member.



The effects of mental fatigue in battery leaders and fire direction personnel may be less obvious but more dangerous. While an armor or infantry company may still perform well with tired leaders, a firing battery cannot with an exhausted FDC. Without the brains the muscle of the guns is no good; without the muscles of the cannoneers, the guns are still no good. The effects of fatigue and the stress it causes will have devastating impact on the capability of the artillery to do its job; before the fires can be sustained, the men must be.

Fear of being killed or wounded or of seeing others become casualties is a mental stress of distinctive applicability to the field artillery battery as it is the number one priority target of the Soviets. The cannon unit receives this privilege by virtue of its nuclear capability which the Soviets intend to destroy quickly and because the Soviets see opposing artillery as the greatest threat to their own artillery. Consequently, if found and targeted, the Soviets intend to destroy it. Casualties are inevitable.

The USSR has always considered a numerically superior artillery force as a critical factor in the conduct of combat. Stalin called artillery Russia's God of War.[27] Little has changed. The Soviets still strive for a six to one artillery advantage in the main attack sector. Confronting a U.S. division, with 156 artillery tubes of assigned and habitually attached field artillery, could be a combined arms army with 720 artillery tubes. The exact ratio of tubes opposing each other depends on the actual organization

for combat and the placement of artillery by the forces disposed against each other; however, it is certainly possible for the Soviet Union to meet their desired strength levels.

The Soviets will attack artillery batteries with aircraft, ground forces, but primarily with their own artillery to either suppress or destroy it. In either event, firing norms for the number of rounds to be fired are used to insure the desired results are achieved. If the ammunition is available, the Soviets do not hesitate to fire the called-for rounds. For example, the norm for attacking an artillery battery is in excess of 600 cannon-delivered artillery rounds in a five minute attack with expected results being the destruction of three or four howitzers and 30% personnel.[28] To point out the contrast in ammunition expenditure, it is interesting to compare the Soviet definition of neutralization and destruction of artillery targets as opposed to the U.S. Army's. The Soviets assume a target is neutralized if it receives 30% destruction while the U.S. expects neutralization to occur at 10%. To destroy a target the Soviets require between 60% to 70% destruction, the U.S. 30%.[29,30]

In a TRADOC 1978 computer simulation used to determine field artillery force requirements in the 1981-1986 timeframe (Legal Mix V), U.S. artillery was able to overcome the Soviets advantage in tubes (4.89 to 1) by using currently fielded tactics and equipment. However, units received extremely high personnel losses. In some cases, there were still serviceable howitzers remaining in batteries but no cannoneers to man them.[31] The Israelis lost 112 tubes of 620 during the 1973 Middle East War

with fifty percent of the losses caused by Arab air attacks but with eight percent of Israeli artillery personnel losses caused by counterbattery fire.[32]

Counterfire is going to be a fact of war; and with it will come killed and wounded casualties. To a soldier casualties are the most visible sign of danger. They shock him into awareness that the situation is "real." The stress and shock of seeing fellow soldiers killed or in pain rob men of their sense of unit and personal immortality. A 1959 study of combat veterans caused Eli Ginzberg to conclude, "There were few things as unsettling to a soldier as seeing his buddy hit. He felt that the next bullet would be marked for him."[33]

Soldiers also have a sense that there should be a reason for dying, but that is difficult to see in the artillery battery. The cannoneer receives little real knowledge about what effects and destruction he is causing to an unseen enemy down range, but he knows that he is losing friends. A sense of unfairness develops. He knows he is giving up a lot but doesn't know what he is extracting in return. A German officer fighting in Russia in 1944 described his soldiers as being crushed in spirit after long major engagements with casualties experienced again and again.[34] There is an anger and a need to retaliate but no opportunity to see the results of retaliation.

An artillery section is a close-knit group that eats, sleeps, trains, works, and plays together; it is a cohesive element with strong bonding ties. Because of this, section members are less able psychologically to accept and absorb casualties. The more

a soldier's friends are reduced the more deeply stress will effect him.[35] His resistance will eventually diminish to the point that he then becomes a stress casualty. With regard to casualties, a study of World War II veterans showed the effects of stress were cumulative. Researchers found that in companies with high casualties, fifty-four percent of the men reported feeling the symptoms of stress the researchers were looking for. Only twenty percent of men reported the same symptoms in companies with low casualties.[36] Adding to an individual's stress will be the dilemma of deciding what to do during incoming artillery fire. If the enemy artillery is accurate and if the Soviets are shooting a full counterfire norm, 120 explosions a minute could be impacting in the immediate area. Should a cannoneer continue to man and move or fire the howitzer or should he assist a wounded section member? Incoming artillery is a dangerous event for a man to pause in to decide what to do. Either way, the cannoneer may later regret his actions.

Just as stress builds up in an individual who experiences numerous casualties, the same cumulative effect is possible in a unit. S. Bidwell in Modern Warfare: A Study of Men, Weapons, and Theories concludes that if one-third of a fighting force suffers casualties, the unit will be wrecked psychologically if the experience is repeated. Even those physically unhurt will be battle stress casualties.[37] In the next war in Europe, it will be a lucky battery that is only touched once by the enemy.

Counterfire or incoming artillery can also cause battle stress in and of itself even if there is no physical damage.

The amount of fear in a unit is usually reflected by the intensity of enemy fire power being brought to bear against it. As intensity of fire decreases so does combat stress. Throughout the Twentieth Century incoming artillery has always been a tremendous cause of battle stress. It is best said by studies done on stress:

> "...recent observations made...have shown the devastating psychic effect of prolonged artillery fire or violent air bombardment. According to most reports, it was the offensive power of the artillery and heavy weapons during the stabilized warfare that began during the fall of 1914 that caused the first mass psychic collapse."[38]
>
> WW I

> "It is obvious that such a concentration of artillery fire, especially when continued for a long time, must cause unheard-of psychical tensions. Experience also shows that such concentrated fire can cause the mass occurrence of war neuroses."[39]
>
> WW II

> "The effect of artillery was characterized by two medical officers as most stressful... In estimating the amount of stress to which a soldier has been subjected, one neuropsychiatrist believes that the amount of exposure to artillery fire must be ascertained...In his experience in Korea the majority of psychiatric casualties were caused by artillery fire..."[40]
>
> Korean Conflict

The artilleryman also must face the inner tension and stress of incoming fire with the knowledge that he has little protection against it. If the enemy fire is not particularly heavy or accurate, the battery may stay in location to continue its own support missions and take the risk. If the counterfire is on target and the decision to leave immediately is made by

the chain of command, the required two or three minutes for the section to depart the area still puts the soldiers in great jeopardy. There is no foxhole to jump in since time or priority of tasks will not allow it to be dug. The M109 howitzer and new artillery ammunition vehicle are armored to protect against small arms fire and artillery fragments, but will not protect the crewmen from near misses. For stress reduction it is important to have a feeling of safety and security once in a while so the soldier can relax, but for the artilleryman, who is never in reserve and always giving off signatures to an enemy looking for him, the opportunity to let down the guard just will not happen. Each man's resistance to stress will continue to be eroded by the nature of the artillery mission and the battery's vulnerability to the enemy.

A future European battlefield is going to be busy but also lonely and isolated. Units will be spread out and will take active measures to hide. The actual or perceived absence or invisibility of friendly forces will cause stress to increase as men look to friends and their units for support and protection. This feeling of isolation will be a significant source of stress in future combat. S.L.A. Marshall believed that, where a soldier lacks the consciousness of having comrades close at hand, his demoralization is almost immediate. The soldier will feel almost alone in his hour of greatest danger. Marshall writes, "The battlefield is cold. It is the lonesomest place which men may share together."[41] The battery the artilleryman is so used to in garrison is dispersed during training and combat when it splits

into two platoons (to aid in survivability against counterfire), separated by as much as 1,500 meters. Howitzers in the platoons may be as far apart as 300 meters. Even when at full strength, the four gun firing platoon has only 48 men, but an individual cannoneer will seldom see the unity of the platoon or battery except during movements. A cannoneer will probably never see the battalion again and, so very quickly, the artillery section starts feeling isolated on the "empty" battlefield. Other happenings will tend to further isolate the section. Crewmen will attempt to stay in or extremely close to their howitzer for mission requirements and for protection. Information about the unit, the situation, and the war will seldom make it down in enough detail to keep the section properly informed. Constant movements to unfamiliar locations will keep the men disoriented and without a home base. And, since the guns are a high priority target, few visitors may want to visit what might soon be thought of as a high risk unit. All of these will contribute to the feeling of isolation and loneliness and will psychologically erode the individual's stress resistance.

Effective, competent and strong leadership is essential to a unit in the performance of its varied tasks, one of which is the welfare and maintenance of manpower. FM 26-2, Management of Stress, states it is a command responsibility to take actions to increase the individual soldier's resistance to combat stress and to manage stress in units, but to do so the leader must be present and available to his men. The mere presence of leaders does much

to allay fears but the opposite is also true. A leader's absence can and usually does contribute to stress build-up. Kellett writes, "Men, particularly in dangerous and high-stress situations, desire leadership so that their immediate needs may be met and their anxieties allayed. Well-trained and experienced officers and senior noncommissioned officers confer a sense of protection on their subordinates by virtue of their military skills."[42] Keegan's The Face of Battle cites numerous examples of the important role the presence of leadership had to the battles of Agincourt, Waterloo, and the Somme.

The crux of the problem for the artillery battery is the real or perceived absence of leaders from the battery area. Split battery operations and manning authorizations place one lieutenant and one sergeant first class in control of each gun platoon and another lieutenant and staff sergeant to supervise each of the fire direction centers. With the FDC's job requirements normally consuming the full time of the lieutenant there, the other two leaders on the gun line will be excessively busy. Their fatigue and psychological exhaustion will decrease their performance and availability to the platoon but this is assumed and is expected although not desired. However, with the platoon moving every one to three hours, one of them must be continuously away from the unit looking for another firing location. Artillery still requires an advance party to recon, select, and occupy a position in advance of the howitzer's arrival, and either the lieutenant or platoon sergeant or battery commander does this because of his technical skills. Short survival moves of 1,000 meters may help

this action to be accomplished quickly, allowing possible return to the unit, but longer tactical moves of five to ten kilometers will consume much valuable time and may not allow any time to do firing line duties. The officer or sergeant remaining in the platoon then becomes responsible for its full activities but with no one to help. Working overtime, so to speak, leaves him little time to talk to soldiers, monitor stress, and provide effective leadership to potential or actual stress casualties.

The battery commander and first sergeant also are not as available to the battery as they must split their time and abilities between two separated units. Assessing and keeping in touch with soldiers and providing personal leadership is even more difficult now for them. What was once one "line of metal" supervised by a commander, executive officer, first sergeant, chief of firing battery, and a gunnery sergeant is now two widely dispersed units operating under more difficult conditions with an increase of only one officer.

The leaders' perceived presence also decreases because sections remain in or around their howitzers much more, consequently, there is less opportunity for men and leaders to interact. There are no more battery trains or mess halls to congregate around. There is no firing battery executive's post where cannoneers can "see" the battery leaders directing the activities of the unit.

There is also the distinct possibility leaders will become casualties at a faster rate forcing those officers and NCO's remaining to spread their time among greater and greater responsibilities. With the addition of the armored ammunition carrier,

the gun line and FDC are protected. The only remaining soft-skinned vehicles in the battery area are those of the leaders. They have no place to hide when incoming artillery arrives; their alternative is to quickly leave or face a greater risk of personal harm.

FM 26-2 tells us that in the past leaders have not paid sufficient attention to mental stress. While this is true, it certainly is not becoming any easier in the artillery battery for leaders to be present to address the stress issue and provide psychological first aid.

To this point, stress factors have been discussed in the context of the current organization, equipment, and tactics of the field artillery battery in the 1985 timeframe supporting AirLand Battle doctrine. Howitzers proposed by some contractors for the 1995 period will drastically change the way the field artillery fights and in the process will lessen some causes of stress but will probably add to others. The battery and firing line as it is known today will disappear, replaced by independent roving howitzers continually moving within an assigned sector. Fire missions will be sent digitally to selected cannons by computers. Fires will still be massed, but the dispersion, agility, and mobility of the weapons will greatly decrease their own vulnerability to enemy counterfire. Supposedly, the weapon system will double the targets defeated by a battery and provide twice the survivability of today's system.[43]

This new concept will decrease fatigue stress since the weapon is designed to be capable of 24 hour a day operations for at least ten days at mission frequencies predicted for the future battlefield. The crew will consist of three men but the howitzer can be operated by one in emergencies. The howitzer is self-loading with automatic handling and stowage of ammunition from the ammunition carrier, temperature controlled for crew comfort, outfitted with on-board crew quarters providing sleeping, sanitary and food facilities, and protected against artillery noise and overpressure. The best fatigue reducing feature of the new system is the provision of a three man backup crew in the ammunition carrier which will allow for rotation and crew rest.

Crew members of the independent howitzer will be less susceptible to stress caused by casualties because there should be fewer casualties. Weapon design and tactics consider survivability of the crew and howitzer of paramount importance. Dispersion and mobility and heavier armor improve the crews' risk and resistance to counterfire. Also, the crew will work in a sealed turret to protect them from a chemical environment.

However, stress caused by isolation and lack of leadership will probably increase as there would be little opportunity for interaction with other soldiers or leaders. Some soldiers could remain on the battlefield for days doing their job but with contact limited to only messages over the display terminal. Scheduled returns to the battery (or battalion) by the off duty crew would become necessary for psychological reasons if not operational reasons.

New weapons and tactics hold promise for the field artillery but their impact and relationship to battle stress must be taken into account during weapon development and not left to chance after adoption. The next generation of howitzers will still need fully capable soldiers to man them. Kellett writes, "Inevitably, armies' absorption and application of advanced technology has generated an extensive examination of the man-machine interface, but it has overshadowed the study of the motivations and behavior of the men who must leave the shelter of the technical umbrella: the soldiers alone (or nearly so) in their slit trenches...and the crewmen isolated in their fighting vehicles."[44]

Conclusions

> "We must understand what is going to make that soldier stand and fight, regardless of all the great operation arrows that are drawn on maps by colonels and generals. It still comes down to the team, squad, section in the one APC, tank, or howitzer facing all the onrushing enemy that makes the difference."[45]
>
> Colonel Richard H. Sinnreich

This study sought to look at combat stress in the artillery battery with the hope of providing a better understanding of stress inducers so soldiers can then direct efforts to their reduction. AirLand Battle doctrine, advancing technology, and high-intensity conflict demands increased performance levels of both machines and men. Much improvement has been made in the

past ten years in re-equipping the Army but progress in the study of man's psychological ability and stress limitations has not kept pace. Combat stress is one of the most important causes of non-effectiveness among troops and results in large losses of manpower, yet research for this study shows little advancement by the U.S. Army in stress knowledge. Baseline stress data is from World War II and the Korean Conflict and is of such general applicability to all soldiers or extracted from studies on infantrymen that it becomes questionable for adoption to today's combat environment or to specialized groupings of soldiers. FM 26-2, Management of Stress in Army Operations, is a new manual and is a most noteworthy indication of the U.S. Army's new emphasis on stress. It is a good manual but broad in perspective; the Army needs to be much farther along than it is in the study of and education about combat stress. This, above all else, is the most significant conclusion of this paper. Soldiers should have concern for the lack of progress in the stress field.

Historically, battle stress has caused severe problems for armies in the twentieth century. The Israeli Defense Force realizes this and has made remarkable progress in understanding, preventing, and treating battle stress in modern, short, fluid, high-intensity wars. Why hasn't the U.S. Army made similar progress? Stress is inevitable in war, may match the number of wounded casualties in high-intensity conflict, and will seriously degrade the combat potential of an army. Kellett writes in Combat Motivation, "The need for such an understanding and such an effort is very evident; despite the mechanization of war and its apparently

increasing depersonalization, human motivation and behavior remain the keys to combat effectiveness and to the fullest possible use of the sophisticated weaponry and equipment that technology has placed in the hands of the soldier.[46] The U.S. Army needs to renew emphasis on soldiers in combat and their preservation from combat stress, to go beyond rediscovery and have new research on stress, and to develop and implement a basic doctrine on the prevention and treatment of stress other than saying it is a "command problem." The U.S. Army has kept pace with the times with technology; it has not in the area of combat stress and the moral factors affecting man.

The Field Artillery (taking a cue from the Army) has placed and continues to place emphasis on technology, equipment, techniques, and tactics in an effort to keep up with the progress of the Army in the same areas, but in doing so may have placed the human element too far down the list of important things. For example, a March 1985 five page article in Army tells the Army community that the Field Artillery is meeting the tough challenge of combat in the 1980's with an evolutionary modernization program. New equipment is highlighted; only four paragraphs deals with soldiers and training. Past stress studies offer extremely little to an understanding of causes and effects of combat stress on artillery, therefore, the Field Artillery School should take steps to study artillery-related stress and integrate findings into artillery manuals and teach it to soldiers of all ranks.

Fatigue may be the most critical cause of stress to the artillery but is the least likely to be corrected. Current weapons, ammunition packaging, and material handling devices (although being improved) do not permit a reduction in the soldiers' ammunition handling requirements. Continuous operations, movement, and fire missions by under-manned sections will cause premature fatigue and collapse of men, severe combat stress, and howitzers with no one to man them. Increasing, not decreasing, section size is the quickest solution to fatigue stress but is unlikely in the Army's manpower constraints. Reduced artillery support in combat should be recognized and accepted now by the Army as a result of stress due to crews which are too small.

Fear of being killed or wounded or isolated can be lessened with better training of soldiers. They need to know what to expect in combat, what counterfire can do, and what risk they face. Knowing this in advance will lessen the fear when it happens. If the battery is not prepared beforehand, the unit may have more battle stress casualties than it can handle, putting it out of action even though little physical damage was received. Stress education and training can greatly help the reduction of stress casualties; but, it is not being done now.

Training is the key to limiting the effects of battle stress, but knowledge is necessary to formulate training programs and teach the teacher. That knowledge on artillery stress is not available, except for the general knowledge of FM 26-2. FM 26-2 is a good place for the artillery to start, but more specific understanding of the relationship of stress and artillery is critical

to a better understanding of the causes, effects, prevention, and treatment of it. Each artilleryman is a precious part of the artillery system. We teach him first-aid for wounds; it is time to teach him about battle stress as there may be equal casualties from both in a European conflict. Artillery has always emphasized survival of the battery and now should address the mental survival of the soldier as well.

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