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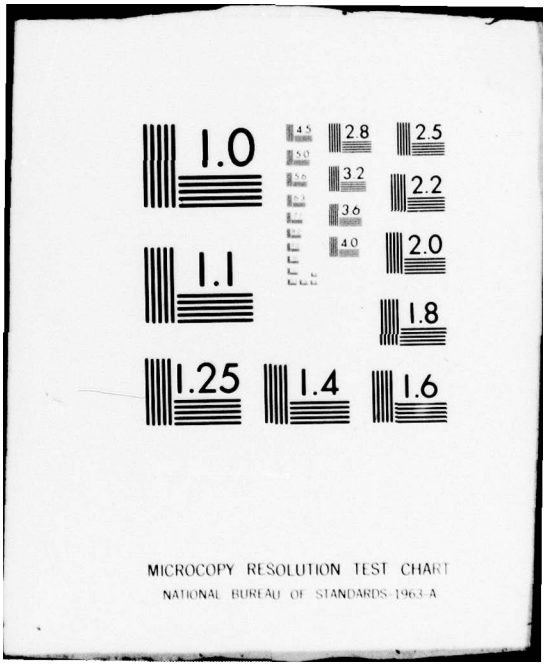
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LEVEL II

Research Product 79-6

Small Combat Arms Unit Leader Training Techniques:

Rules of Play for Combined Arms Mapboard Game

Engagement Simulation Technical Area

January 1979

U.S. ARMY RESEARCH INSTITUTE for the BEHAVIORAL and SOCIAL SCIENCES

U. S. ARMY RESEARCH INSTITUTE
FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the
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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER: RP-79-6	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER: ARI	
4. TITLE (and Subtitle): Small Combat Arms Unit Leader Training Techniques: Rules of Play for Combined Arms Mapboard Game	5. TYPE OF REPORT & PERIOD COVERED: 15 Jan 74 to 31 May 78
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Shriver, Edgar L., Griffin, Glenn R., Hannaman, David L., Jones Donald R.	8. CONTRACT OR GRANT NUMBER(s): DAHC19-74-C-0025, DAHC19-75-C-0030, DAHC19-76-C-0024
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Kinton, Inc. 1500 N. Beauregard Alexandria, VA 22311	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 2Q763743A773
11. CONTROLLING OFFICE NAME AND ADDRESS: US Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Ave., Alexandria, VA 22333	12. REPORT DATE: Jan 79
	13. NUMBER OF PAGES: 70
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): Edgar L. /Shriver, Glen R. /Griffin, David L. /Hannaman Donald R. /Jones	15. SECURITY CLASS. (of this report): UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Engagement simulation	War games
Tactical training	Tactical training systems
REALTRAIN	Infantry training
Board games	Combined arms training

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The objective of this project was to develop and evaluate simulation techniques for training small unit leaders which would provide maximum tactical decision-making training while minimizing the unnecessary, and often wasteful, participation of lower level troops. The fundamental approach of this research effort has been to take some of the basic instructional principles underlying engagement simulation and to develop abstractions of field exercises for leader training.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

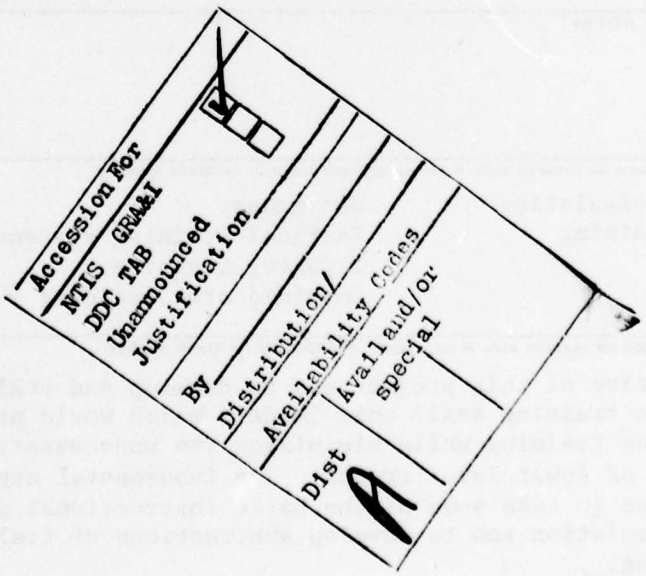
20. Initial efforts led to the development of a mapboard game. The "board game" initially developed was a two-sided, free-play map exercise for teaching infantry tactics to small unit leaders at the platoon level. As originally conceived, junior officers could play the game to develop tactical skills which they would subsequently apply during REALTRAIN exercises with troops.

It was found, however, that for the benefits of this training to be fully realized, leaders had to have an opportunity to learn to work with their NCOs and then to practice what they had learned in the field both with and without troops. A variation of the basic game simulation was developed which would permit the unit leader team (platoon and squad leaders) to work together on the game board as they would during an actual engagement.

Concurrently with the development of the multiperson infantry mapboard game, the development of a field training technique that would further focus on leader/subordinate interaction processes was explored. A small unit leader field opposition exercise involving only key leader personnel (without troop support) on each side was developed. The rationale for the development of the exercise was that it would provide training for leader/group interaction processes in a way that the mapboard games did not and could not.

Current Army doctrine emphasizes the importance of the integration of mechanized infantry, armor, and anti-armor elements in conducting successful tactical operations against a deployed enemy. Therefore, a combined arms mapboard game that would provide junior officers with the opportunity to become familiar with the nature of these combined arms operations was also developed.

The products of this research have been: (1) an infantry squad/platoon level game for two-player or multiplayer use; (2) an infantry squad/platoon level field opposition exercise; and (3) a combined arms platoon/company level mapboard game. This report contains documentation on the combined arms platoon/company level mapboard game. Separate reports documents the other two training techniques. ARI Research Report 1219 summarizes the research activities conducted in the development of these research products.



Research Product

SMALL COMBAT ARMS UNIT LEADER TRAINING TECHNIQUES: RULES OF PLAY FOR COMBINED ARMS MAPBOARD GAME

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January 1979

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Department of the Army

Army Project Number
2Q763743A773

Tactical Skill Acquisition & Retention

FOREWORD

The US Army Training and Doctrine Command (TRADOC) has identified small unit tactical engagement simulation training as one of its highest behavioral science research priorities. Research initiated by the US Army Research Institute for the Behavioral and Social Sciences (ARI) in 1972 has led to the development of a family of tactical engagement simulation training techniques, including Squad Combat Operations Exercises (Simulation) (SCOPES) and REALTRAIN.

Early in this research program it became evident that special tactical training techniques were necessary for training the leaders of small combat arms units. Often field exercises requiring full units were found to provide training mainly for officer and senior NCO personnel and to provide little effective training for lower level troops. This led to the development of tactical training techniques specifically directed at the training of small unit leaders. The first techniques developed were a board game and a field opposition exercise involving only leader personnel (using engagement simulation procedures) for infantry squads and platoons.

Army doctrine emphasizes the importance of the integration of mechanized infantry, armor, and anti-armor elements into a combined arms force. Therefore, a combined arms mapboard game that would provide officers with the opportunity to become familiar with the nature of these combined arms operations was also developed.

This research was part of a larger research program designed to improve tactical training in units. The entire program has been responsive to the requirements of RDTE Project 2Q763743A773 and, at its inception, the Combat Arms Training Board (CATB) which is now the TRADOC System Manager for Tactical Engagement Simulation (TSM-TES) of the TRADOC Training Support Center. The research reported here augments board game developments accomplished by the Combined Arms Training Developments Agency, Fort Leavenworth, Kansas.

JOSEPH ZEIDNER
Technical Director

INTRODUCTION

Armywide introduction of SCOPES and REALTRAIN engagement simulation as tactical training techniques provided the Army methods for tactically training small infantry, armor, and anti-armor units under conditions approaching those of real combat. In engagement simulation tactical training exercises, platoon, squad, or combined arms team size units can engage in free play exercises, actively opposing forces that have been given a conflicting mission in order to insure contact between the two forces.

The simulated combat environment provided by SCOPES and REALTRAIN places on the small unit leader many of the heavy behavioral demands of actual combat. Leaders must make decisions quickly regarding events that are occuring in real time as a joint function of the actions being taken by both sides. Individual tactical skills that must be learned by the small unit leader include: anticipation of enemy actions, planning concerted actions against the enemy, placing personnel in locations most likely to give them an advantage over the enemy, planning for use of the most effective weapons in a given situation, command and control, and contingency planning as more information about enemy and friendly actions is received. Simulation of combat provides a series of specific situations for small unit leaders to learn what are and what are not effective tactical behaviors.

Even during the initial development of the first engagement simulation techniques by a joint ARI, TRADOC and contractor team, it became evident that the training of small unit leaders required special research attention.

While earlier REALTRAIN developments provided effective and motivating tactical training for troops, research was needed to develop related techniques for unit leaders in the maneuver arms. Often field exercises requiring full units provide training only for officer and senior NCO personnel and may be counterproductive in terms of lower level troop training and motivation.

The objective of this research project was to develop and evaluate simulation techniques for training small unit leaders which would provide maximum tactical decision-making training while minimizing the unnecessary, and often wasteful, participation of lower level troops.

The fundamental approach of this research effort has been to take some of the basic instructional principles underlying the REALTRAIN method and to develop abstractions of field exercises for leader training.

Initial efforts led to the development of a mapboard game. The concept of "board games" has a great deal of intuitive appeal:

o They may be used to simulate (to varying degrees of abstraction) "real world" situations.

o They minimize the requirement for equipment resources.

o They minimize the requirement for "expensive" personnel resources.

o They may be reproduced relatively inexpensively.

o They may be used as part of formal training or informally during a soldier's free time, if he so desires.

o "Games" are inherently motivating because of their competitive aspects and the interpersonal interactions involved.

The "board game" initially developed was a two-sided, free-play map exercise for teaching infantry tactics to small unit leaders at the platoon level. As originally conceived, junior leaders could play the game to develop tactical skills which they would subsequently apply during REALTRAIN exercises with troops.

Preliminary tests of this gaming technique showed it to have value in providing infantry officers an opportunity to practice tactics in response to realistic, real-time demands of combat situations. It was found, however, that for the benefits of this training to be fully realized, leaders had to have an opportunity to learn to work with their NCOs and then to practice what they had learned in the field both with and without troops. Therefore, a variation of the basic game simulation was developed which permitted the unit leader team (platoon and squad leaders) to work together on the game board as they would during an actual engagement.

Concurrently with the development of the multiperson infantry mapboard game, the development of a field training technique that would further focus on leader/subordinate interaction processes was explored. A small unit leader field opposition exercise involving only key leader personnel (without troop support) on each side was developed. The rationale for the development of the exercise was that it would provide training for leader/group interaction processes in a way that the mapboard games did not and could not. It was recognized, however, that the conduct of the field opposition exercise would be somewhat more expensive in terms of time and resources than would either of the two mapboard games, although less expensive than full-scale engagement simulation exercises.

Current Army doctrine emphasizes the importance of the integration of mechanized infantry, armor, and anti-armor elements in conducting successful tactical operations against a deployed enemy. Therefore, a combined arms mapboard game was also developed that would provide junior officers with the opportunity to become familiar with the nature of these combined arms operations.

The products of this research have been: (1) an infantry squad/platoon level game for two-player or multiplayer use; (2) an infantry squad/platoon level field opposition exercise; and (3) a combined arms platoon/company level mapboard game. This report contains documentation on the combined arms platoon/company level mapboard game. Separate reports document the other two training techniques. ARI Research Report 1219 summarizes the research activities conducted in the development of these research products.

TABLE OF CONTENTS

1.0 OVERVIEW

The Combined Arms Tactical Opposition Exercise (CA-TOX) is played by four people--two players and two controllers. The two players face each other at two 3-dimensional playing surfaces separated by a visual barrier. The playing surfaces are exactly alike and are oriented the same way. The two players represent a defense leader and an attack leader. Each commands an army unit with normal TO&E and weapon capabilities, represented by movable plastic playing pieces. A 3:1 ratio of offense to defense is used. The players have conflicting missions, and each attempts to accomplish his mission through movement of his pieces and use of his weapons. Armor, anti-armor weapons, and mechanized infantry are represented, making it a combined arms game.

The controllers position themselves at the barrier where they can see both maps, and the moves of the players. The controllers determine when pieces would be seen or heard by opponent pieces, when weapons would be used, and whether hits would be achieved. They impact indirect fire on request.

The game moves by time intervals established by the controllers. Each player is allowed to move any piece a distance on the mapboard which is within the capabilities of the piece for the terrain it is on. The moves of both sides are simultaneous during each time interval. Encounters while moving which result in fire fights cause halts in that spot until the engagement is resolved. Figures are provided in this document which indicate personnel movement rates, detection, and weapon capabilities.

When a player has accomplished his mission or destroyed a sufficient number of his opponent's pieces to render the opponent ineffective, he has won the game. The controllers usually stop the game at a point when the outcome would be obvious to all concerned; however, players often like to play to the last man. After the game there is an after-action review in which the three participants discuss the tactics each side was trying to use, and the engagement that resulted.

Inexperienced players usually begin by applying what they have been taught about offensive and defensive tactics. As they gain experience, they become more imaginative, and try a variety of techniques which they believe will facilitate their winning. Techniques which work are remembered and used again; others are quickly dropped. After a good deal of game experience, players learn to interpret enemy moves as the beginning of a certain tactic or technique, and attempt to counter the action of the opposition player.

Before attempting to play the game, a novice should read through the material presented here, and become very familiar with the capabilities of men and weapons and the rules of the game. Before attempting to control a game, personnel must become thoroughly familiar with the rules of the game and the responsibilities of the controllers.

The sections which follow provide a detailed description of the game materials and how to play. The rules do not dictate doctrine or tactics, but are based on the effectiveness and capabilities of men and equipment on real missions in the field.

They have been reviewed and accepted by many experienced Army personnel. It is further recommended that participants review FM 71-1 and FM 6-40-5 prior to game play.

2.0 GENERAL DESCRIPTION

2.1 Participants

The game requires two players who fulfill the roles of defense and offense "leaders", and at least two other persons, called controllers. The primary or direct fire controller plays a variety of roles for the players: superior, subordinate, umpire, etc. A second controller is utilized to assume the fire direction center and indirect fire responsibilities.

2.2 Game Time Frames and Action Sequence

Game play is divided into segments called time frames. These are usually one minute in length, but can be increased or decreased to suit game conditions. During a given time frame both players can move any of their pieces a distance that is within their capabilities, or take any action that could occur within such a time period.

Game action occurs in the following sequence:

- Movement of personnel and equipment
- Exchange of "cue" information between player leader and subordinate. (The controller acting as subordinate relays situation information to the player leader, based on what a playing piece might hear or see--but the controller forwards the information only if the piece has the communication capability to make such a report.)

- o Direct fire weapon firing and assessment of casualties.
- o Indirect fire impact, assessment of casualties, and evaluation of suppression.

2.3 Game Force Size

Force size is somewhat flexible and can be adjusted to the objectives of the training officer. However, it is usually composed of a defensive mechanized infantry platoon with a TOW section and two tanks attached, and an offensive mechanized infantry company with six tanks and two AVLB attached.

The TO&E of these opposition forces is at Figure 1.

3.0 GAME MATERIALS

3.1 Playing Surfaces

Two 3-dimensional playing surfaces are provided. They are identical, representing an area 3000 meters wide by 10,000 meters long. The playing surface scale is approximately 1:4,000 where 1 inch = 100 meters. These playing surfaces are displayed in a container which exposes an area 3000 x 3000 meters. The remainder of each playing surface is rolled under each container. On the playing container surface are a number of playing aids, including:

- o Rate of movement charts--infantry, mechanized vehicles
- o Detection distance chart
- o Indirect fire casualty assessment chart
- o Action sequence chart
- o Organization and equipment chart

COMBINED ARMS GAME ORGANIZATION & EQUIPMENT

Figure 1

Description	Symbol	Personnel Represented	Platoon	Company
M-16		1	2	See Fire Team
M-16/TA-1		1	6	
M-16/M-203 (30 rds ea)		1	6	
M-16/M-72 (LAW)		1	18	
M-16/Starlight Scope		1	2	
M-16/Squad Radio		1	4	
M-16/PRC-77		1	1	
M-16/Mine Detector		1	-	
M16A1/M18A1 AP Mine		-	30	
M-21 AT Mine		-	30	
M-60 MG (1000 rds)		1	2	
M-47 Dragon (3 rds ea)		1	3	9
M-220 TOW (10 rds ea)		3-4	2 (attached)	2
Hand Grenade M-33		-	3 per man	3 per man
WD-1 Wire		-	6000 meters	-
Concertina Wire			250 meters	-
M-60A1 Tank (M-551 optional)		4	2 (attached)	6 (attached)
AVLB		4	-	2 (attached)
APCs: M-114 Trp Carrier		5-10[a]	4	11
APCs: HQ		4-6	- } 6	1 } 18
APCs: TOW Mounted		6	2	2
APCs: 81 Mortar		9	} 6	3 } 18
Troop Carrier towing rocket projected line charge sled		5-10[a]		1
Fire Team[c]		5	-	12[b]
M-50[d]		-	-	-

[a] Player will indicate to game controller the number of individuals in APC.

[b] Since attack force is mounted on tracked vehicles, it is unnecessary to portray each individual attacker to play combined arms game. For more detail reference para 3.2.1 in game manual.

[c] Containing

[d] Each tracked vehicle mounts an M-50

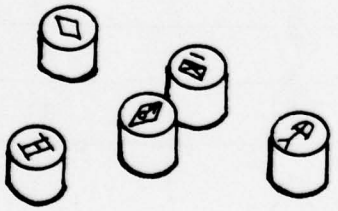
- o Indirect fire request example chart
- o Smoke screen guidance chart

The playing surface has been developed to represent rolling European terrain which, while generally open, is traversed by numerous streams, a major roadway, built-up areas, and occasional areas of heavy forest. In game play the two major streams are swimmable by tracks; tanks must cross using bridges or AVLBs.

A pictorial of the playing surfaces, player and controller positions is at Figure 2.

3.2 Playing Pieces

The playing pieces are made of plastic. Each represents a man or vehicle and bears a military symbol used to represent equipment and weapons carried by the playing piece. Where possible, the symbols were taken from FM 21-30. Where none existed for a particular weapon, a new symbol was created[1]. The pieces are color coded to distinguish between defense and offense playing pieces. Examples of playing pieces follow:



[1] For example, M-203, fire team.

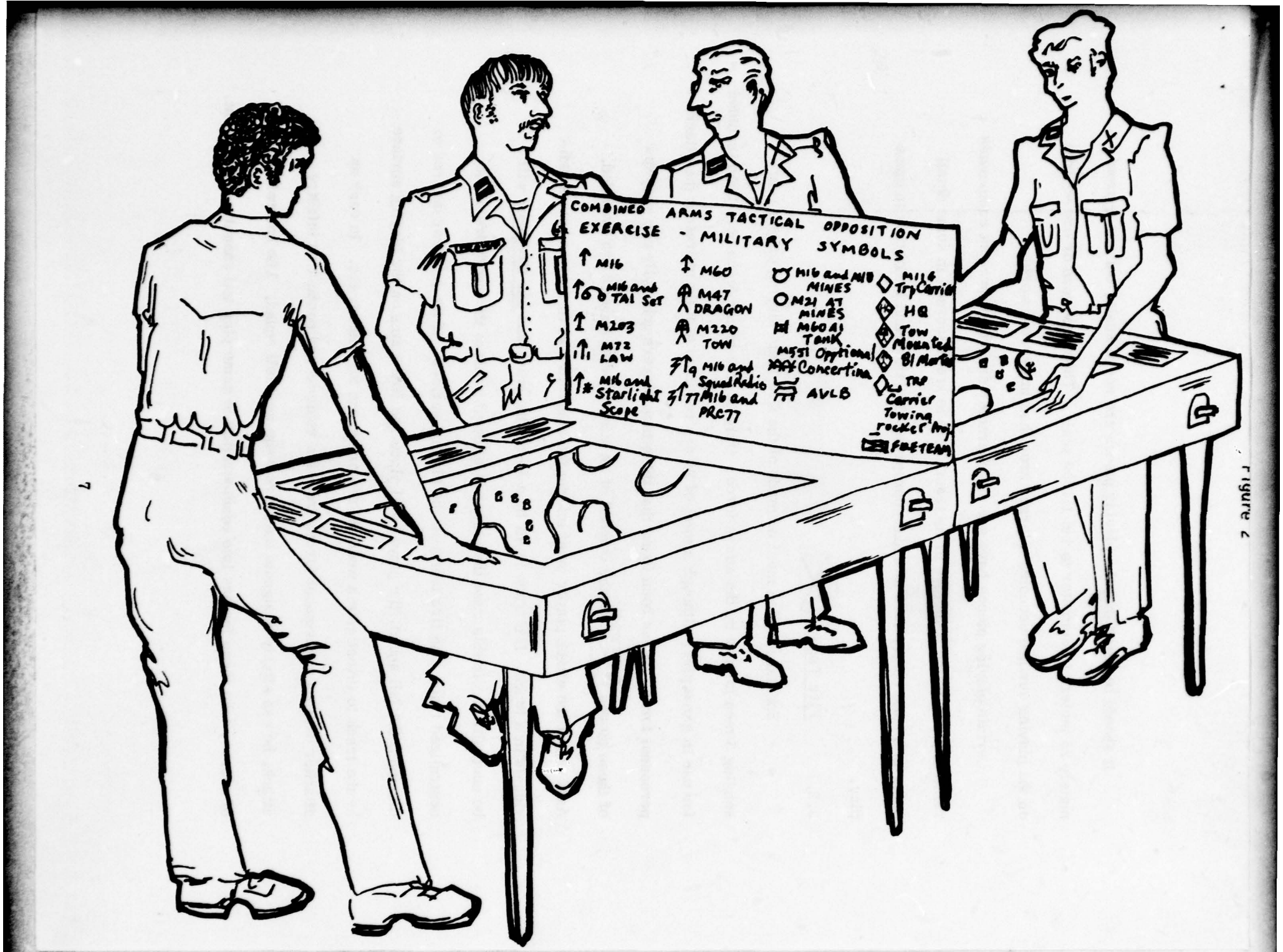

COMBINED ARMS TACTICAL OPPOSITION EXERCISE - MILITARY SYMBOLS
M16
M16 and TAI Set
M203
M72 LAW
M16 and Starlight Scope
M60
M47 DRAGON
M220 TOW
M16 and Squad Radio
M16 and PRC77
M16 and M18 MINES
M21 AT MINES
M60 A1 Tank
M551 Optional Concertina
AVLB
M16 Trp Carrier
HQ
TOW Mounted BI Mortar
TRP Carrier Towing rocket Proj
FIRETEAM

Figure 2

It should be noted that the playing pieces are not to scale, but are approximately 25 meters in diameter to the 1:4000 scale. Thus, one man or one vehicle on the playing surface occupies a larger area than in the real world.

Certain playing pieces have special characteristics or represent equipments relatively new to the combined arms team. These are discussed in some detail below to enable controllers to make appropriate decisions and judgments in game play.

3.2.1 Fire Team 

Special mention must be made of the fire team playing pieces represending 5 men for use by the attack force. Only 12 fire team pieces have been included for use in game play, although a total of 24 are required to fully represent the attack personnel force. It has been found that the attack players generally use very few of these pieces  in the conduct of an attack and so only 12 are provided. As a result the attack player must inform the controller as to the number of individuals in a track. If a track is hit by a LAW, the track and one fire team will be neutralized. In this case the player is allowed to place the survivors of the neutralized track (one fire team) on the playing surface. If the attacker desires to dismount the full squad, the player will place two fire teams on the playing surface by the track to investigate a wooded area or search for mines, etc. In case an attacker desires to dismount forces from his vehicles and conduct an infantry attack, he can simply designate each fire team as a full squad. The controller must, of course, take these factors into consideration in game play and casualty assessment.

3.2.2 AT/AP Mines

Each mine playing piece has a number printed on it to designate the number of mines in a 25-meter area--the area to scale of the playing piece. For example 4 indicates 4 AT mines in an area of 25 meters. The probability of tracks detonating one of the mines in this configuration is very high. (See 3.5, Hit Casualty and Detection Probability Table.)

3.2.3 AVLB

The AVLB or Armored Vehicle Launched Bridge has the capability to span an area of approximately 60 feet. In game play the AVLB can span the major rivers without difficulty. Since the rivers are non-fordable, the tanks (APCs can swim the rivers, of course) must cross at bridges or on the AVLB. Since the brdiges are likely to be destroyed (see paragraph 4.22 - Demolitions) the AVLB is an important piece of equipment for the attack forces. IMPORTANT: The area to be crossed must be reconned before AVLB emplacement. It will take 3 minutes for the AVLB to emplace. Once emplaced the carrier vehicle detaches from the bridge, goes across and reattaches to the other side, remounts the bridge, and continues. When reattaching the bridge to the carrier vehicle, one individual must dismount to align the bridge and carrier. In game play an AT mine, TOW, or Dragon will completely neutralize the carrier (which is a tank M60A1 body) and its occupants. A TOW, Dragon, or LAW on a bridge in the process of launch will damage the hydraulics of the system to prevent its extension or subsequent use.

3.2.4 M-16/Mine Detector ↑AO

The mine detector used in game play (AN/PRS-7) detects any significant change in the density of the ground--mine, rock, void, etc. In game play the controller will generally allow the ↑AO playing piece to detect mines if he is utilized by the player to actively search for mines. Neutralization of mines, after their location is known, is a time-consuming process. Also, current practice indicates that they should be blown in place rather than dismantled. If a player indicates that he will attempt to neutralize mines, the controller should allow at least 5 mines per neutralization. The controller will indicate "explosions" to both players if they have personnel in the area. Obviously the neutralization of mines by hand is a slow and risky business.

3.2.5 Rocket Projected Line Charge (M-173)[1] ◇ح

The M-173 is a completely self-contained (within the M-3 skid) piece of equipment which is attached to an M-113 track in game play. The rocket projected line charge can be operated completely from within the APC in remote control fashion. In use the skid is maneuvered to the edge of the mined area, oriented in the right direction by the track. The skid is separated from the track by an explosive charge. The track maneuvers to a safe position (within 250 feet) and fires the line charge through the use of a still-connected electrical power line. The charge is projected

[1]Consult TM 9-1375-202-10 for more detailed information

across the mined area and then detonated by the operator within the APC. The line charge, upon detonation, will clear an area approximately 6 meters wide and 90-100 meters long. The operational equipment to fire the line charge is within the APC. Thus the line charge cannot readily be fired or attached to another track if the original track is damaged or neutralized. The line charge can be emplaced and activated in one minute in game play.

3.2.6 81mm Mortar 

The three vehicular mounted mortar playing pieces will normally be employed as a unit. When firing on a target the pieces will be aligned side by side.

3.2.7 M-220 (TOW) Playing Pieces

Two types of TOW playing pieces are provided. The  indicates a track vehicle with a TOW weapon system mounted thereon. The  is the playing piece normally used in game play. Extra TOW playing pieces  are provided if a player desires to utilize his TOW weapon system(s) in a dismounted configuration.

3.3 Cue Pieces

Cue pieces are small beads or plastic pieces used by the controller to provide a player with information about the detection of enemy personnel. These are placed on the playing surface and moved by the controller to indicate an enemy force which has been detected by the opposition. The use of the cue pieces minimizes the amount of written or verbal information exchange necessary between players and the controller.

Special red plastic cue pieces have been provided to indicate the location of destroyed vehicles. The various cue pieces and their meaning are indicated below.

Infantry FT ——— Pink

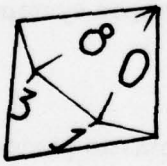
Track APC ——— Green

Tank ——— Amber

Destroyed Track Vehicle ——— Red

3.4 Number Randomizer

A 10-sided die that displays numbers in a random order is provided for use in determining casualties and weapons detection. Players are allowed to roll the die themselves to determine the outcome of a particular situation. The number in the up-position is the one used. The number randomizer is used in conjunction with the Hit, Casualty, and Detection Probability Table.



3.5 Hit, Casualty, and Detection Probability Table

This device is used by the controller to determine weapon hits, assess casualties, and determine the probability of detecting weapons that have been fired. This aid consists of two parts--one for infantry weapons and one for anti-armor weapons. Detailed instructions for using this aid are contained on the aid itself. Figure 3 (A and B) depicts the Hit, Casualty, and Detection Probability Table.

Figure 3A

INFANTRY WEAPONS

CASUALTY HIT AND DETECTION PROBABILITIES

M-16

DISTANCE: 0-50, 50-100, 100-150, 150-200, 200-250, 250-300

☐ **WEAPONS FIRING** (Single or 3 round bursts)

A. Double detection probability if weapon fires on auto. Casualty probability remains the same!
B. If targets have cover reduce casualty probability by 1/2.

M-203

DISTANCE: 0-50, 50-100, 100-150, 150-200, 200-250, 250-300

☐ **ROUNDS FIRED** (Point or area targets per minutes)

A. Parapet foxhole — hit on parapet will not normally result in casualties.
B. Tanks stationary, double hit probability, however tanks will not be neutralized, or immobolized.
C. APC stationary, double hit probability, for APC occupant casualty assessment reduce figure by 1/2. M-203 will not normally immobilize an armored vehicle.
D. For moving targets, Tanks, APC.s; reduce hit probability by 1/2.

M-67
Hand Grenade

DIST: 0-30, 30-50

☐ **GRENADES THROWN** (At a specific target)

A. If target has cover reduce Hit and casualty probability by 1/2.

M-60

DISTANCE: 0-100, 100-200, 200-300, 300-400, 400-500, 500-600

☐ 50 SLOW ☐ 100 SUSTAINED ☐ 200/500 RAPID **ROUNDS PER MINUTE**

A. Casualty probability is for exposed targets without cover.
B. Hit probabilities double for large targets, Tanks, APC's, etc. But casualties are not assessed (unless men are exposed).
C. For targets with cover reduce casualties by 1/2.

50 Cal.
M2 (APC)
M85 (Tank)

DISTANCE: 0-200, 200-400, 400-600, 600-800, 800-1000, 1000-2000, 1200-1400, 1400-1600

☐ 40 SLOW ☐ 100 SUSTAINED ☐ 200/500 RAPID **ROUNDS PER MINUTE**

A. Casualty probabilities are for exposed personnel and APC occupants within 600 meters.
B. Hit probabilities double against large targets . . . Tanks APC's etc. However casualties are not assessed beyond 600 meters (unless men are exposed).
C. APC's can be neutralized by large quantity of 50 cal. fire at close range — (within 600 meters).

INSTRUCTIONS

SINGLE WEAPON ENGAGEMENT

1. Select the number of weapons, or weapon rounds and the Distance to the target.
2. Read the hit probability. If equal to or more than 1.0 use the hit probability estimate to assess casualties to the target. If the hit probability is less than 1.0 spin the die for determination of hit. For example if hit probability is 0.6 then a roll resulting in numbers one (1) through six (6) is a hit. Numbers 7, 8, 9, equals a miss 0 a missfire! Assess one (1) casualty for a hit.
3. If the number of targets is less than the number of casualties implied by the hit/casualty probability then all targets are neutralized!
4. The detection probability of the weapon firing is the hit and casualty probability.
5. Consult guidance information associated with each weapon for help in assessing casualties.

SIMULTANEOUS ENGAGEMENT...Two opposed forces, varied and multiple weapon engagement.

1. Select the number of weapons, weapons rounds and Distance.
2. Read the hit probabilities and casualties occurring by weapon type.
3. Add the casualties incurred for each opposed force.
4. For forces with cover reduce their casualties 1/2 (from figures associated with casualty probabilities).
5. Continue until one sides casualties equal its personnel force!

AMBUSH . . . Two opposed forces, varied and multiple weapons one side engages first.

1. Assess casualties to the engaged infantry group first.
2. Then proceed as above in Simultaneous Engagement rules for remaining forces!

Figure 3B

ANTI-ARMOR WEAPONS

DEFINITION OF TERMS:

HIT PROBABILITY
A proportion expressing the chance of *hitting a specific target based on weapon* type, number of weapons and or rounds fired with consideration for target size, hardness, target distance and daylight visibility conditions.

CASUALTY PROBABILITY
A proportion expressing the number of casualties expected based on *weapon type, weapon characteristics, number of weapons or rounds fired* with consideration for target size, target hardness, target distance and daylight visibility conditions. For the M-16, M-203, M-60, 50 Cal. and M-67 hand grenade the hit probability equals the casualty probability when the former is 1.0 or more.

DETECTION PROBABILITY
A proportion expressing the likelihood *that a specific weapon firing* is detected by the target or other personnel groups in the target area. Detection means identification of the weapon firing location.

HIT AND DETECTION PROBABILITY

Mines

DETONATION PROBABILITY — NUMBER OF MEN/VEHICLES

	AP		AT
	M	V	V
1-2			
3-4			
5-6			
7-8			
9-10			

Mines
AP M-18A1, M-16A1 (Tripmode)
AT M-15, M-19, M-21 (Pressure)

☐ **MINES** (Per 25 Meters)
A. Personnel: If detonation, 50% of men in mine casualty overlay area are casualties. For Command detonated AP mines, assume detonation, assess casualties as above.
B. *AP mines will have no effect on personnel in Tanks/APC's.*
C. AT mines will completely neutralize Tanks, APC's and all occupants.
D. Remember to deduct detonated mines from original total for succeeding personnel/vehicles.

Law

DISTANCE

	S.	M.	D.
0-50			
50-100			
100-150			
150-200			

Law
M-72-A2

☐ **LAWS FIRING** (At identical targets)
A. The M-72 law is a one shot weapon.
B. 1 Law hit will immobilize a tank; 2 Laws needed to neutralize tank completely.
C. 1 Law hit will destroy an APC and 50% of occupants will become casualties. 2 Law hits needed to neutralize all occupants.
D. 2 Law hits required to neutralize parapet foxhole and occupants.

Tow

DISTANCE

	S.	M.	D.
0-500			
500-1000			
1000-1500			
1500-2000			
2000-2500			
2500-3000			

Tow
M-220

☐ **TOWS FIRING** (At identical targets)
A. Projectile rate of speed 200 m/sec.
B. Reload time 30 sec.
C. Warhead will defeat any known armor, resulting in total destruction/neutralization of APC/Tank and occupants.

Dragon

DIST

	S.	M.	D.
0-500			
500-1000			

Dragon
M-47

☐ **DRAGONS FIRING** (At identical targets)
A. Projectile rate of speed 100 m/sec. Reload time and warhead capabilities as per tow.
B. 1 Dragon hit will destroy parapet foxhole and occupants.

Tank

DISTANCE

	S.	M.	D.
0-500			
500-1000			
1000-1500			
1500-2000			
2000-2500			
2500-3000			
3000-4000			

Tank
M-60 Series and Sheridan

☐ **TANKS FIRING** (At identical targets)
A. *For 50 Cal. and M-60 Co/Ax use M-60 - 50 Cal. data on reverse side.*
B. Probabilities are for HE, ADS rounds.
C. Assume neutralization of target and occupants if hit.
D. For Shillelagh missile use tow hit probabilities.

INSTRUCTIONS

1. Select the weapon type and the target distance. (In the case of AP/AT mines select the number of mines emplaced in a 25 meter area and the number of men and or vehicles crossing that specific area.)
2. Read the hit probability (or detonation probability for mines). If less than 1 roll die. For example if the hit or detonation probability is 0.6 then any number 1 through 6 resulting from the roll indicates a hit or mine detonation. Resulting numbers 7, 8, 9, indicate a miss, overcorrection, 0 a missfire. Assess casualties/per the guidance information associated with each weapon type.
3. For Detection of weapon firing a separate roll of the die should be executed!

*Exercise Detection probability for each major weapon firing.

ABBREVIATIONS

MINES:
AP Anti Personnel
AT Anti Tank
M Men
V Vehicles

LAW, TOW, DRAGON, AND TANKS:
S Stationary Target hit probability
M Moving Target hit probability
D Detection probability of weapon firing

3.6 Indirect Fire Sheafs

Plastic indirect fire overlays are provided to indicate the casualty area for various indirect fire weapons and sheafs. Areas of coverage (to scale) of indirect fire sheafs are depicted at Figure 4.

3.7 Mine Casualty Overlay

The mine casualty overlay is a device used in association with the Hit, Casualty, and Detection Probability Table to assess personnel casualties resulting from the detonation of anti-personnel mines. (For convenience the indirect fire sheafs and the mine casualty overlay have been combined into a single playing aid.)

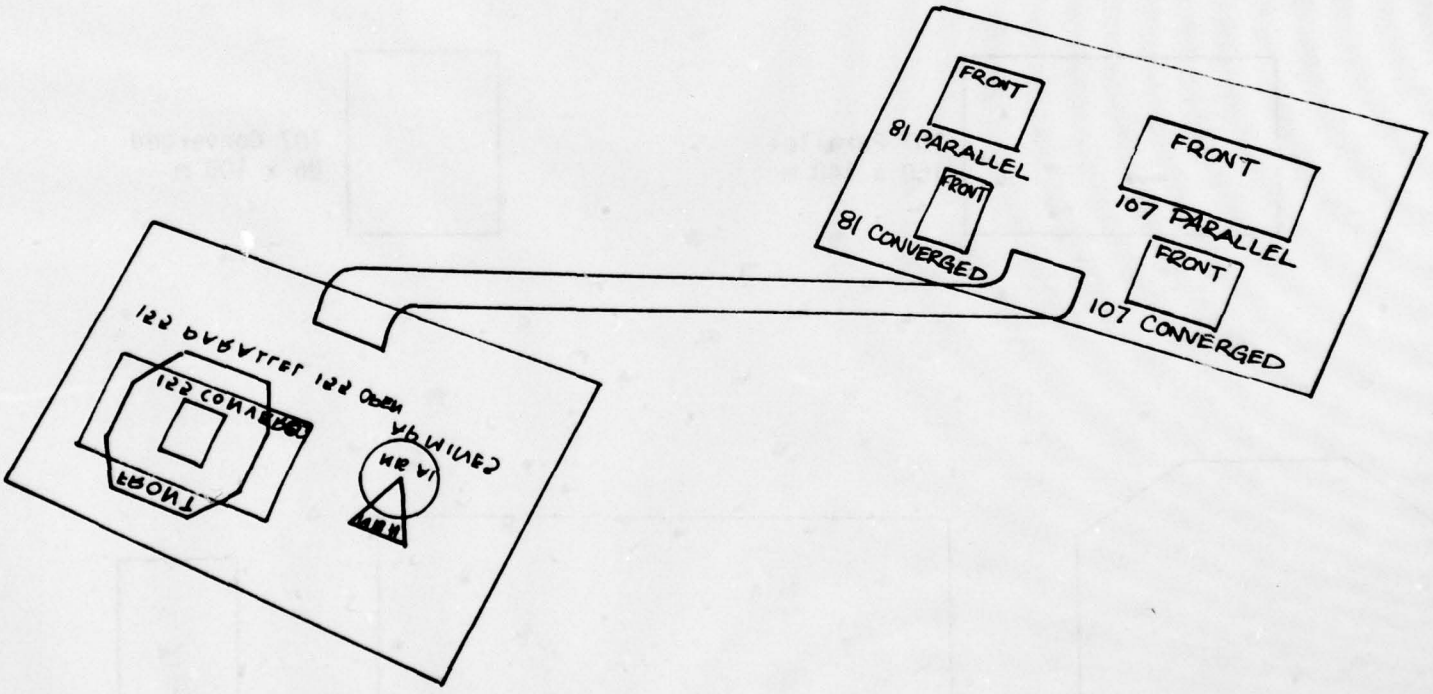
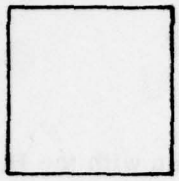


Figure 4

81,107, 155 Indirect Fire Sheafs
±2 Probable Errors, Range and Deflection [a]

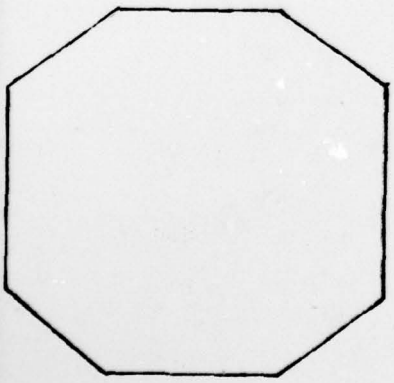


81 Parallel
95 x 90 m

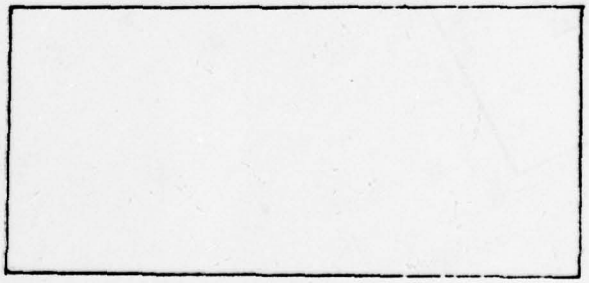
81 Converged
45 x 90 m

107 Parallel
150 x 140 m

107 Converged
86 x 100 m



155 Parallel
210 x 205 m



155 Open
320 x 150 m

155 Converged
70 x 100 m

[a] ±2 probable errors account for 82% of the probable error

3.8 Smoke Screens

Smoke screens made of "foam" one inch in thickness have been devised for game play. These playing pieces depict the screening capabilities of 155 and 107 weapon systems--one battery, one section, respectively--under various wind directions and speed. Smoke screen areas of coverage are depicted at Figure 5.

3.9 Player's Aid

An aid is provided for each player to assist him in game play and to help him keep track of indirect fire rounds used (see Figure 6, A and B). It is encased in plastic and may be written on with grease pencil. Notes or fire requests written on this aid may be shown to the controller, thus facilitating the game communication process. On the back of the playing aid is a 1:25,000 scale map of the playing surface.

3.10 Controller's Aid

This aid is provided to assist the controller in organizing fire requests and in keeping track of their impact location, rounds used, and game time. This aid is also encased in plastic so that grease pencils may be used (see Figure 7, A and B). On the back of the controller's aid is a 1:25,000 map of the playing surface and a conversion of indirect fire percentages to number of casualties. An example of the calculation of indirect fire casualties is also provided.

3.11 Visual Barrier

A barrier is provided to separate the two players so that they cannot see each other's moves or deployment. Symbols used in the game are displayed on the barrier for ready reference. The barrier is depicted in Figure 2.

Figure 5
155/107 SMOKE SHEAFS.(½ actual size)

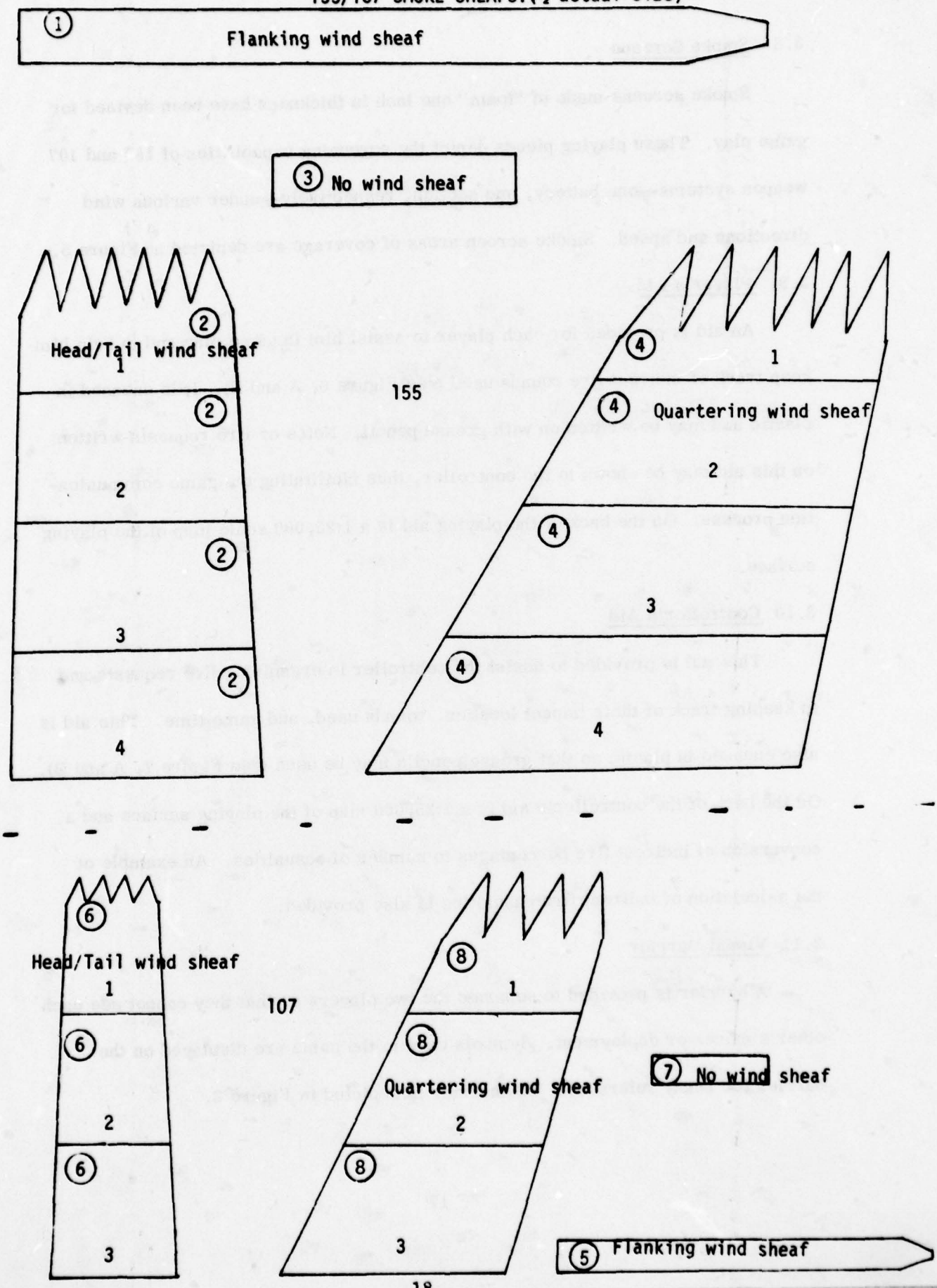


Figure 6A

COMBINED ARMS
TOX PLAYER'S AID

Indirect Fire	155 rds	107 rds	81 rds
Initial Allocation			
Rounds Utilized:			

FIRE REQUEST

for: A ☐ 155 Rounds _____ (Multiples of Batteries)

B ☐ 107 * Rounds _____ (Multiples of Sections)

C ☐ 81 * Rounds _____ (Multiples of Sections)

1. Identification: This is _____
2. Warning: Fire Mission(s)
3. Location (Coordinates or Adjustment)

   A _____

   B _____

   C _____

   Direction - Azimuth: _____

   If smoke indicate Attitude _____

4. Target Description

ABC	Troops in Open	ABC	Marking Round (WP)
ABC	Enemy Bunkers	ABC	H & I
ABC	Suspected Enemy Positions	ABC	Smoke Mission (HC-155, WP 107)
ABC	Armoed Vehicles	ABC	Other _____

5. Method of Engagement

ABC	Point Detonating (PD)	ABC	Delay (DE)
ABC	Variable Time (VT)	ABC	Other _____

6. Method of Control

ABC	Adjust Fire	ABC	At my command
ABC	Adjust Fire - Fire for Effect	ABC	Other _____

Figure 7A

COMBINED ARMS
TOX CONTROLLER'S AID

Offense Indirect Fire						Defense Indirect Fire						Time Increment	
Location	Fuse Type	Time Due	155 #	107 #	81 #	Location	Fuse Type	Time Due	155 #	107 #	81 #		

3.12 Playing Piece Container and Casualty Recording

A playing piece container is provided for both attack and defense playing pieces. These contain all of the attack and defense playing pieces (Figure 1) and some cue pieces (3.3). These containers are placed on the playing surface in the space provided. At the start of the game the playing pieces are removed from the container and utilized in game play.

When casualties are incurred the controller should remove the neutralized playing pieces from the playing surface and place them in the appropriate cell in the container to designate the weapon inflicting the casualty. For example, if a TOW fires and hits (destroys) an APC, the APC playing piece should be removed from the map surface and placed in the TOW cell of the container. A red cue piece is played on each playing surface to designate a destroyed vehicle. This information will prove useful in conducting the After-Action Review (7.0).

4.0 GAME PLAY

4.1 Player Responsibilities

Players utilize their personnel and weapons systems to obtain a military advantage in neutralizing enemy forces while attempting to minimize friendly casualties. For example, defenders can achieve an advantage by placing defense personnel in parapet foxhole positions with overhead cover for added protection from indirect fire. In game play nothing more sophisticated than parapet foxholes with OHC should be allowed.

4.1.1 Achieving an Advantage

The defender generally cannot successfully defend the entire width of the playing surface against the highly mobile attack force by utilizing a linear defense.

The defender who can play observer/fighting elements in forward positions to determine the axis of advance of the attack force and who can subsequently position scatterable mines or mobile AT defense teams along the attack route of advance can successfully neutralize the attack force. The successful defender also uses the forward observers to pinpoint the advancing enemy for neutralizing by indirect fire, and for positioning mobile AT weapons (TOWs, Dragons), mounted on APCs and tanks.

The successful attacker pinpoints the location of defensive positions with small, highly mobile forward elements in overwatch formation for neutralization by indirect fire. Ultimately he must force through. He uses smoke to screen his forces from danger areas, and utilizes his great mobility to attempt to bypass and penetrate into the depth of the defense rather than attempting to neutralize defensive strong points with direct fire weapons systems.

4.2 Controller Responsibilities

The controller's role is crucial to the successful use of the Tactical Opposition Exercise. The controller coordinates all the elements of the game, and is an active but impartial part of the game environment for player participants. He relays information that would be acquired by any of the playing pieces representing men and

equipment. He assumes the roles of commander and subordinate for both players. He delivers indirect fire on both playing surfaces, and assesses casualties according to the rules of the game. He acts to prevent either player from violating the rules of the game, and attempts to keep the pace of the game at an acceptable tempo.

In summary, the duties of the controller are many and varied. The basic functions he must perform before, during, and at the conclusion of each game, are listed below and discussed in detail in the following paragraphs and later subsections.

- o Issuing OPORDS
- o Establishing weather conditions
- o Evaluating defense and offense plans
- o Advancing time frames
- o Evaluating movement
- o Evaluating and reporting detections
- o Assessing direct fire and mine casualties
- o Impacting indirect fires
- o Assessing indirect fire casualties, and suppression
- o Conducting After-Action Review

In game play two controllers are recommended. The direct fire controller is the chief controller. The second or indirect fire controller assumes the role of FDC for both player participants, impacts indirect fire requests, and assesses indirect fire casualties. He must interact with the direct fire controller to make certain that time frames for problem play coincide with the times for impact of indirect fire.

4.2.1 Issuing OPORDS

Prior to the start of each game, one player must be assigned the role of offense leader and one the defense role. The controller must then issue informal OPORDS to each player. At this time he ought to specify how many minutes the players have to plan their individual operations. This is especially applicable in the case of the defense leader--if he were given as much time as he wished, he could conceivably take up to an hour to establish his defense. It is recommended that, in initial games, players be given no more than 30 minutes in which to plan their operations. In later games, as players become more proficient, preparation time should be limited to 15 or 20 minutes. Finally, the controller should set a time by which the attack leader must complete his assigned objective or mission. For planning purposes the defense leader should assume that he has approximately 12 hours to prepare a defense.

4.2.2 Operations Orders

Operations Orders (OPORDS) are not provided with the game. If they are desired, they should be prepared by the unit commander or his designee. Normally, however, they are left to the controller, who provides enough information orally to set the stage for the game.

Missions can be varied from game to game, but the initial games should be a meeting engagement or movement-to-contact mission for the attack player and a simple defensive mission for the defense player. In issuing the defense and offense missions the following elements should be considered:

- Area of Operations (AO or zones) - It is recommended that the defense AO include the entire width of the playing surface (e.g., 3,000 meters), and that the FEBA for the defense be placed no further forward than 7,000 meters from the defender's end of the map. The offense's AO should also be the width of the map (3,000 meters) and the entire length of the map (10,000 meters).
- LD & LC - The offense's line of departure (LD) and line of contact (LC) should both be at his end of the playing surface, i.e., the line past which he will initially move his playing pieces. The attack player moves his pieces from the playing container onto the playing surface at his LD/LC (end of the attack playing surface) at the start of the game.
- Offensive Mission Objective - This should be a prominent terrain feature located at the extreme opposite end of the playing surface from the offense leader. This will insure contact between defensive and offensive forces. The attacker's objective is not related to the defender, who establishes his defensive positions where he thinks best. The attack goal is to penetrate the zone or AO in sufficient strength to consolidate its objective.
- Defense Mission - This should include the entire defensive area of operations; the defense goal is to prevent any enemy penetration through the defensive zone or AO of sufficient strength to consolidate the attack objective.

- o **Indirect Fire Support** -
  - o **Assignment of Fires** - The following number of indirect fires are suggested for the attack and defense players.

Player	155	81	107
Attack	300	100	100
Defense	150	100	100

  - o **Number of Preplanned Fires** - Allow the attacker 10 preplanned fires, the defender five preplanned fires or registration points.
  - o **Type of Support** - One battery 155 and one section 107, 81 mortar are in direct (but not dedicated) support of the attack and defense player.
- o **Dedicated Battery (A Game Option)** - A dedicated 155 battery for the attack or defense may be the exception rather than the rule. However, a dedicated battery may be played easily in the conduct of the Combined Arms Game. When using a dedicated battery all registered or preplanned fires will impact in one minute. Allow the attack force 10 preplanned fire points--only five preplanned or registration points for the defense. Limiting the number of preplanned/registered fires to these figures will enable responsive fire with careful player planning but will not greatly overload the FDC controller.

- o Smoke and Scatterable Mines - These munitions can be extremely useful to the attack and defense, respectively, in the conduct of their missions.
  - o Smoke - The attack forces should be allowed to utilize 1/3 of its 155, 107-round allocations as smoke. A thorough discussion of the procedures for employment of smoke is at paragraph 5.3.
  - o Scatterable Mines (A Game Option) - The defender may be allowed two concentrations of scatterable mines--available from 155 weapons systems in support. Each concentration will be roughly the size of a 155 open sheaf. Mine density is one AT and two AP mines per meter. These concentrations may be preplanned or requested through normal fire mission request procedures. Delivery time will be three minutes. A thorough discussion of their effects and controller guidance for casualty assessment is provided in paragraph 5.4 The concentrations will have an SD (self destruct) of 24 hours. The mines will arm one minute after impact.
- o Other Equipments (not on the TO&E) -
  - o Demolitions (A Game Option) - Assign the defense sufficient demolitions to destroy the bridges to his front if he so

desires. If the defender indicates that he will destroy specific bridges provide this information as intelligence to the attack player.

Other missions may be given in subsequent games, such as delay, retrograde, exploitation, etc. The unit commander, however, must be careful in specifying victory conditions, or the game may result in an unresolvable situation.

4.2.3 Establishing Weather Conditions

Weather conditions (including wind strength and direction) should be based on the actual weather conditions outside on the day the game is played. This will allow variation and objective determination of weather conditions in game play. Exact weather data can be obtained from the local phone company. Wind strength and direction are especially important to the use of smoke screens.

4.2.4 Evaluation of Defense and Offense Plans

In order to control the game objectively, the controller needs to know both the offense and defense plans, and, particularly what action to take on making contact with the enemy. He must, therefore, confer with each leader individually, but secretly, prior to the start of the game. The controller must also ascertain the cover conditions of defensive personnel — open, parapet foxhole, parapet foxhole with overhead cover, etc.

4.2.5 Advancing Time Frames

The controller begins the game by stating to both players - "The time is now 1400 hours" (example). This may be the current time, or one selected

by the attacker or specified in his OPORD. The controller then specifies a time increment of between 1 and 5 minutes by stating, "The time is now 1402--take 2 minutes worth of moves." It is recommended that the time increments be longer (2 to 5 minutes) when it is obvious to the controller that there is no possibility of an engagement or detection or other action (don't forget artillery), and shorter (1 minute, or even 30 seconds) when engagements or detections are imminent. The longer time increments will tend to expedite game play, and the shorter time increments will increase play objectivity. However, the controller should be cautious not to give clues inadvertently, i.e., long time increments should not always be indicative of no detection or contact, nor short increments of imminent engagement.

In game play the direct fire controller must consider the impact times for indirect fire in advancing game time frames. When both a direct fire and an indirect fire controller are controlling the game, the direct fire controller must collaborate with the indirect fire controller to make certain that a given time frame does not exceed the impact time of incoming rounds.

The controller must record each time increment so that he will not lose track of game time, or fail to impact an indirect fire mission. This can be done by marking each time increment on the controller playing aid, Figure 7.

4.2.6 Evaluating Movement

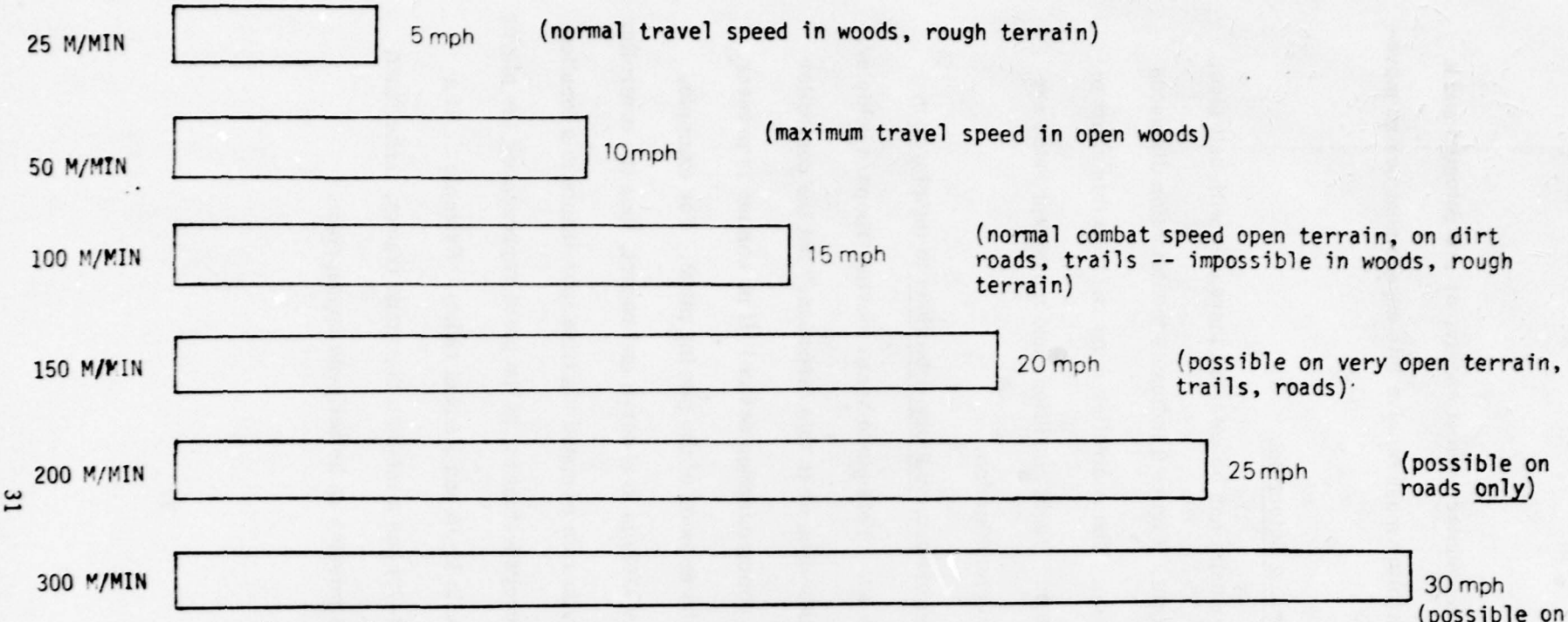
After a time increment has been given, the offensive player and the defensive player may move his playing pieces if he so chooses. When movement is complete, the controller must determine whether a player has exceeded the maximum distance any playing piece could have moved during the time increment. This is

done by referring to the Rate of Movement Table, Figure 8. Rates of movement indicated in the table have been tested in the field and reviewed by experienced infantry and armor officers. Speeds should be reduced by one-half in darkness.

The controller must watch the players carefully to be sure that they do not exceed the acceptable speeds. His eyeball judgment is generally accurate enough, though he may use a ruler if he is unsure. However, constant measurements will tend to slow the game, and the controller should learn to rely on his unaided judgment as soon as possible.

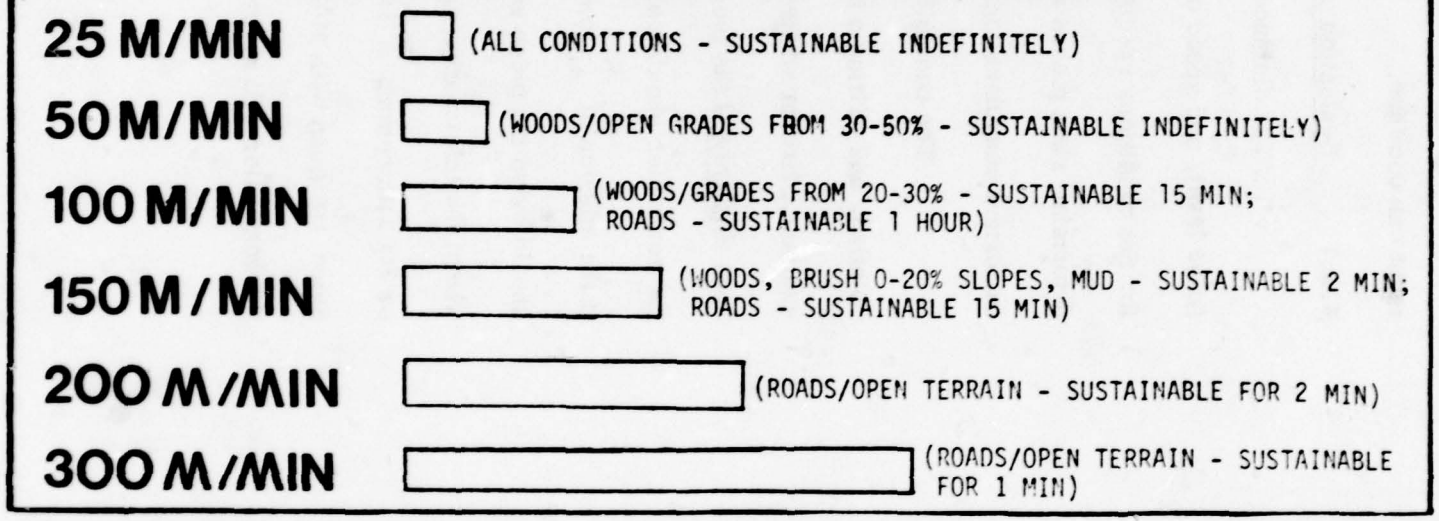
If a player chooses to move his pieces less than maximum distance, the controller should ascertain how the pieces are moving. For instance, after a short skirmish, the offensive player may choose to have his infantry crawl. If the player does not inform the controller of his action, the controller may incorrectly assume that the men represented by the playing pieces are in an upright position, and therefore easier to detect than if they were crawling. The controller should be apprised not only of how a player's vehicles and personnel are moving but in what formation they are moving (i.e., bounding overwatch, file, or column), and he should know the distance between advancing elements. The manner of movement is extremely important when determining whether any pieces could be detected by the opposing force, or when assessing casualties from direct fire, indirect fire, or anti-personnel/anti-tank mines. If either force could have detected any movement or sounds of the enemy, the controller conveys this cue to the appropriate player by placing appropriate cue pieces (3.3) in the proper location on the detecting player's playing surface.

MECHANIZED VEHICLES - RATE OF MOVEMENT Figure 8



Top speed of tracks/jeeps on paved roads (approximately 40 mph) is 1080 meters per minute.

INFANTRY RATE OF MOVEMENT a/



a/ Reduce movement rates by ½ in darkness.

When moving pieces encounter, detect enemy, or are detected and a fire engagement begins, the controller must resolve this engagement before movement can continue.

4.2.7 Evaluation and Reporting Detections

The distance at which units can be detected increases with unit size, noise level, and speed of movement. Figure 9 indicates the detection distances for the conditions specified therein. The controller must refer to this chart to determine when pieces are detected. Light conditions and movement rates are important considerations in this determination.

The controller should indicate auditory detections to the player by pointing, and writing a note such as: "This piece hears moving troops/a vehicle/automatic fire/or whatever, in this area or in this direction," but the controller does this only if the piece has a communication device! If no commo is present, the controller should carry out the mission of the playing piece. For example, if the mission of  (man with M-203) is to observe and report, then the controller should move the piece at a realistic rate of speed via time increments to a location where the information can be conveyed--that is, to the piece representing the player or FO with commo  (man with M-16 and 1 squad radio). Example 2: If a piece  (man with M-16 and M-72) has a mission to engage tracks, tanks, then the controller will carry out this mission as he believes appropriate.

DETECTION DISTANCES [a] Figure 9

VISUAL AND SOUND

MECHANIZED VEHICLES

RATE OF TRAVEL [b]		VEHICLE TYPE		
Mile/ Hour	Meter/ Minute	Track	Mech Plt	Tank Plt
		Detection in WOODS (Meters)		
5	135	535	700	1300
10	270	725	900	1600
15	405	830	1000	1900
20	540	900	1100	2100
25	675	1000	1300	2300
30	810	1200	1400	2400
		Detection in OPEN, GRASS, BRUSH (Meters)		
5	135	2000	3000	3000
10	270	2500	3500	3500
15	405	3000	4000	4000
20	540	3200	4200	4200
25	675	3400	4400	4400
30	810	3600	4600	4600

INFANTRY

RATE OF TRAVEL	Number of Men				
Meter/ Minute	1	3	Fire Team	Squad	Platoon
	Detection in WOODS (Meters)				
0 - upright/ not moving	5	15	25	35	48
25 - crawling	30	40	50	70	100
50 - normal rate of movement	55	65	75	95	150
75	80	90	100	120	150
100	100	107	120	135	150
200	130	135	150	150	150
	Detection in OPEN, GRASS, BRUSH (Meters) [c]				
0 - upright/ not moving	100	150	200	300	400
25 - crawling	60	80	100	150	200
50 - normal rate of movement	550	650	750	950	1700
75	800	900	1000	1200	1800
100	1050	1150	1250	1450	1850
200	1250	1325	1350	1600	2000

[a] These are daylight detection distances. Reduce visual detections by 1/2 at night, or in dense fog. Sound detection remains the same at night.

[b] If not moving reduce 5 mile/hour rate by 1/2 in woods and in open, grass, brush.

[c] Sound detection of infantry will not exceed 300 meters.

The controller indicates visual detections of tracks, tanks, and infantry by placing cue pieces on the player's map at the proper location. Use of these pieces expedites information transfer. The controller, without speaking, simply places these cues in their exact location, if the opposing player would be able to detect them under field conditions. Remember it is impossible to see through forests and hills! To determine line of sight, use a long ruler as an additional controller aid.

It is important to note that at night visual detection distances are reduced by one-half, but sound detection remains the same.

4.2.8 Direct Fire and Mine Casualty Assessment, and Detection of Firing Weapon Location

Controllers should refer to the Weapons Characteristics/Effects Chart, Figure 10, to determine the normal effectiveness range of direct and indirect fire weapons. This chart also contains effectiveness data for anti-personnel mines and hand grenades. This information is provided for planning purposes and to acquaint personnel with the effectiveness of weapons in normal use. It must be remembered that effectiveness is downgraded under conditions of limited visibility for man-fired weapons, and in wooded areas. The ranges provided in the figure are based on the real experience of infantry and armor personnel.

Probability of hitting the target decreases as the range increases. This was taken into account in the design of the Hit, Casualty, and Detection Table (Figure 3). To determine the probability of a hit (or detonation of trip-wired mines), the controller must use the Hit, Casualty, and Detection Probability Table in

Figure 10

NORMAL WEAPON CHARACTERISTICS EFFECTS AND RANGE

Normal Effective Range

Weapon	Daylight	Night Normal Condition	Night Artificial Illumination	Night Starlight Scope	Rounds/ Minute	Approx. Burst Diameter
M-16	300 m	50 m	100-150 m	100-300 m	NA	NA
M-60	600 m	50 m	150 m	300 m	200 cyclic 100 sustd.	NA
M-203	Area-300 m Point-150 m	50 m	Area-150 m	NA	7	HE=7 m
M-72	200 m	50 m	100 m	NA	NA	10 m
M-47 DRAGON	1000 m	--	300 m	1500 m	2/min(approx)	20 m
M-220 TOW	3000 m	--	300 m	1500 m	2/min(approx)	20 m
Hand Grenades						
M-33	45 m	45 m	45 m	NA	NA	15 m
M-50	1200 m	50 m	200 m	500 m	400 cyclic 100 sustd.	NA
M-118A1 Claymore	50-100 Meters, all conditions			NA	NA	Front-50m Rear-16m
M-16A1	30-meter radius, all conditions				NA	30 m
M-60 Tank	2000 m	1500 m	1500 m	1500 m	3-5	60 m
M-551 Tank	3000 m	1500 m	1500 m	1500 m	3-5	30 m
81 mm	4,747				6	20 m
107 mm	Approx 6,000 m depending on elevation angle & charge				9	34 m
155 m	14,600				4 (for 3 minutes) then 1 per minute	50 m

conjunction with the 10-sided die (paragraph 3.4). Specific directions for use of the table are on the aid itself. The table also shows how to determine whether the location of a firing weapon has been detected by forces receiving fire.

4.2.9 Controller Judgment

Much effort has been devoted to the development of controller aids to increase game objectivity. There will be occasions, however, when controllers must make personal judgment decisions concerning weapon effectiveness, detection, and engagement outcomes. Such judgments must be based on controller experience and will become a part of the discussion in the After-Action Review (paragraph 7.0).

4.2.10 Communications

Communications between the controller and players are necessary throughout the game. Communications on each side must be secure from the opposition. The best method, considering security and cost, is writing notes. These may be written with grease pencil on the backs of the two plastic-encased planning maps. On occasions when the opposition is already aware of the information, it can be given by word and action. For example: "You are receiving fire from here" (accompanied by pointing).

The controller must provide only that information which the pieces could hear or see, and then only if the communications equipment would be available to relay the information to the commander.

PRC-77 radios may be used as an alternative method of game and communications. In that case four radios are needed: one for each player (on different NETS) and two for the controller(s) (one on each of the player's NETS). This

configuration requires the controller(s) to shift from one radio to the other throughout game play. Should the player want the controller to come up on his push, he must signal the controller. Cues can be given to players by the controller over the radio, as can indirect fire missions. Because of the close proximity of the radios being used, the frequencies must be as far apart as possible to eliminate the possibility of overriding frequencies. It is also recommended that players use PRC-77 headsets as opposed to handsets. This will free the players' hands to move playing pieces, etc. Ear plugs or a radio playing music as background noise should also be used to lessen the likelihood of players hearing one another's communications. When radios are being used, the controller should give cues using callsigns which represent the player's playing pieces. Fire mission requests should be delivered and received using normal SOP. This exercises and reinforces the learning of commo procedures.

5.0 INDIRECT FIRE, CASUALTY ASSESSMENT, AND INDIRECT FIRE SUPPRESSION

5.1 Normal Indirect Fires

A number of 81mm, 107mm mortar, and 105mm artillery rounds are provided in the informal operations order for supporting each assault or defense operation (paragraph 4.2.2). The player can obtain this support by requesting it from the controller, who also acts as the fire direction center for each side. The request must be complete, or delivery may be delayed while the controller asks for missing elements.

Fire requests are carried out by the controller, who places the appropriate fire sheaf on the playing surface at the location specified in the request. He does this immediately after any direct fire engagements have been resolved for that time frame. Pieces within the sheaf may become casualties and surviving pieces may be suppressed.

5.2 Normal Fire Impact Times

An ordinary mission specifying target location by coordinates will be delivered in three minutes. Previously planned or registered targets or adjustments from a registered target will be delivered in two minutes; repeats of the last mission or subsequent adjustments will be delivered in one minute. If so desired, targets can be registered before game time. Fires "held on command" will be delivered in one minute upon final request.[1] If the dedicated 155 Battery option is being utilized, all preplanned or registered fires will be delivered in one minute. Of course, shifts and adjustments from the preplanned or registered fires will also be delivered in one minute.

Fire requests should contain all the essential elements of Figure 11. However, unless the game is being used to exercise the correct procedure, the requirements can be relaxed.

Adjustments are made with reference to the observer-target line and the impact point. In these games, the OTL is estimated in degrees by the player leader, and the point is also given via a 6-digit coordinate or a previously registered

[1] Times calculated from FM 6-40 (these times consider time of flight of rounds).

Figure 11

FIRE MISSION REQUEST EXAMPLES

INDIRECT FIRE REQUEST

Applicable to 155, 107, 81

Observer Identification
Fire Mission
Grid 723 459
Direction 1680 mils or 94° magnetic
Squad in Open
VT in Effect - 6 rounds
Adjust Fire

QUICK SMOKE MISSION

Generally applicable to 155, 107, 81 (155 fires HC, 107, 81 WP). Reduced number of guns of 107, 81 and characteristics of WP reduce smoke screen coverage and effectiveness.

Observer Identification
Fire Mission (6 guns)[a]
Grid 123 456[b]
Direction 1260 mils or 71° magnetic
Screening 10 minutes
Linear[c] 1200, attitude[d] 1750 mils or 98° magnetic
Adjust Fire[e]

---

[a] Identification of number of guns to fire and hence number of points.

[b] Grid reference of the up wind point (point 1 for adjusting gun).

[c] Indicates desired front or length of screen and distance between impacting smoke rounds. 6 guns, 1200 meters front = 200 meters between each round. The grid reference is always point 1. Point 2 is 200 meters from point 1 on the specified attitude.

[d] Indicates direction of desired screen, i.e., 1200 meters front along an azimuth of 98° from grid point 123 456. (1200 meters front possible only with a flanking wind in reference to attitude direction. See chart on smoke screen frontages.)

[e] Adjusting round will normally be 1 round HE.

target. In the latter case, a typical adjustment might be: "From registration delta direction 180° add 300 meters left 300 meters." It may be necessary for a player to point out his observer so that the OTL will be correct.

Number of rounds is given in multiples of a battery or sections (such as Artillery Battery 2, 12 rounds; 81 Mortar Section 2, 6 rounds; or 107 Section 2, 8 rounds) immediately after the warning element.

Fires are delivered by the controller placing the fire overlay (see Figure 12) down on the playing surface. Make sure "front" is forward; this will insure proper sheaf orientation. The battery is assumed to be behind the player, firing parallel with the sector boundaries. Both players should be told where the rounds come down if they have men with communication capability in a position to see the explosions. Also, the number and type of rounds impacting should be identified.

5.2.1 Range of Indirect Fire Weapon Support. The indirect fire controller will accept any 81 fire mission request impacting within 4,700 meters of the attack player's 81 playing pieces or within 4,700 meters of the end of each player's playing surface. The range of the 107 weapon system requires acceptance of any 107 mission request within 5,000 meters of the end of each player's playing surface. The 155 fires may be utilized throughout the entire length of the playing surface by either player due to its extensive range.

Calculation of casualties has been simplified through the use of a table and calculation example on the reverse side of the controller playing aid. Casualties are assessed by entering Figure 13 with the multiple of a battery or mortar section, fuse-type, and cover condition. The intersection of these indices will be the

Figure 12

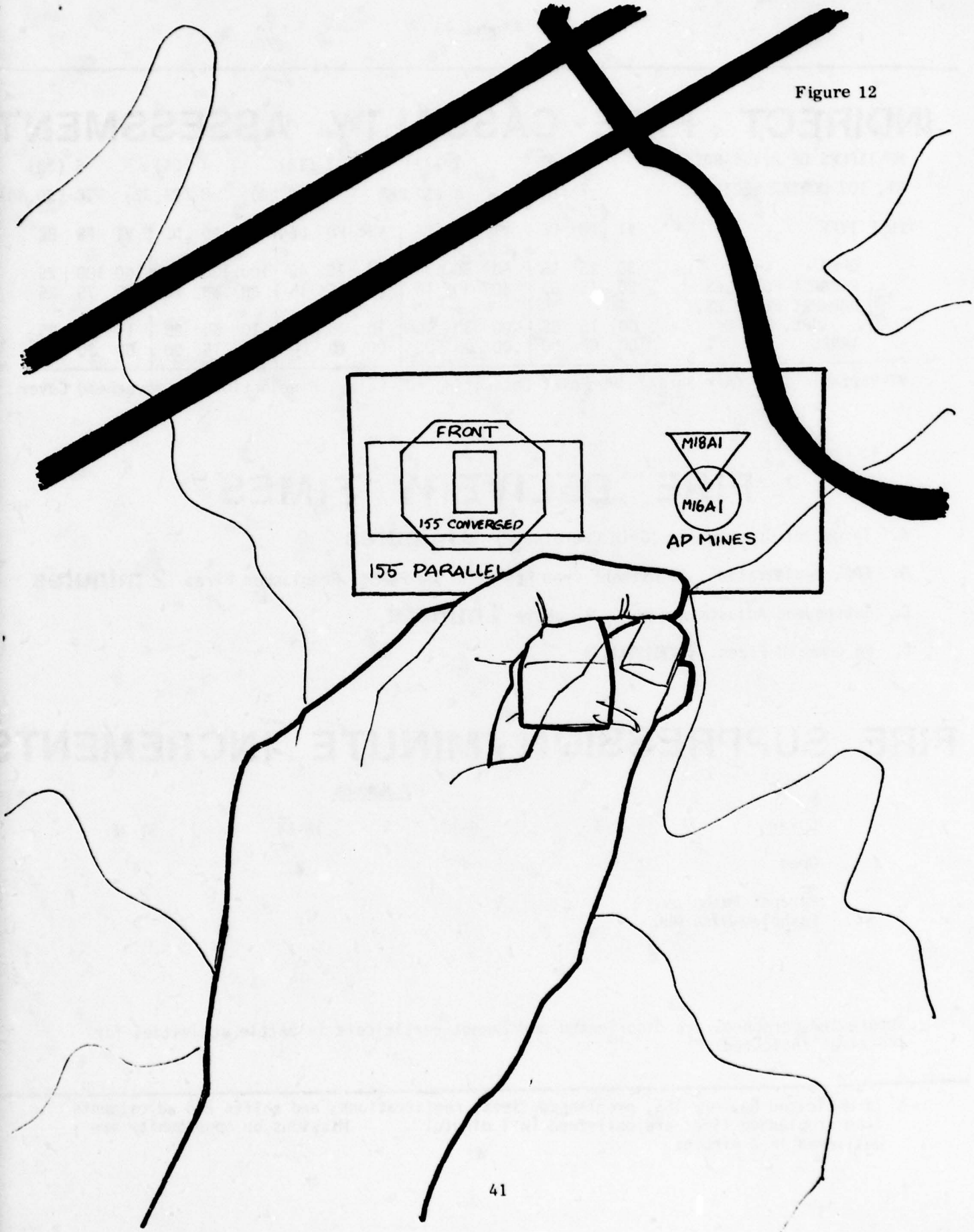


Figure 13

INDIRECT FIRE CASUALTY ASSESSMENT

MULTIPLES OF A 155 BATTERY	1 (6)			2 (12)			3 (18)			4 (24)			5 (30)		
81, 107 MORTAR SECTION	2 (6,8)			4 (12,16)			6 (18,24)			8 (24,32)			10 (30,40)		
FUSE TYPE	VT	PD	DE	VT	PD	DE	VT	PD	DE	VT	PD	DE	VT	PD	DE
Cover: OPEN	30	25	15	60	50	30	90	75	45	100	100	60	100	100	75
Cover: PARAPET FOXHOLES	20	15	05	40	30	10	60	45	15	80	60	20	100	75	25
Cover: PARAPET FOXHOLES, OHC, & APCs	00	15	05	00	30	10	10	45	15	10	60	20	15	75	25
Cover: TANKS	00	00	00	00	05	00	00	10	00	00	15	00	00	20	00

VT=Variable Time (Air Burst) PD=Point Detonating DE=Delay, Mine Action OHC=Overhead Cover

FIRE DELIVERY TIMES [a/]

A. Target of Opportunity (Grid Coordinate) **3 minutes**

B. FPF, Registration, Adjustment from Registration Point, Preplanned Fires **2 minutes**

C. Subsequent Adjustments to A, B, above **1 minute**

D. On Command Fires **1 minute**

FIRE SUPPRESSION* /MINUTE INCREMENTS

	# Rounds			
Cover	1-3	6-12	18-24	30-36
Open	-	1	2	4
Parapet Foxholes, Foxholes with OHC	-	-	1	2

*Suppressed personnel are disoriented and cannot participate in battle activities for the times indicated.

a/ If dedicated battery 155, preplanned fires, registrations, and shifts and adjustments from preplanned fires are delivered in 1 minute! Missions or opportunity are delivered in 2 minutes.

percentage of those personnel under the overlay who become casualties. A simplified method of calculating casualties is on the back of the controller playing aid (Figure 7), together with a calculation example.

After indirect fire casualties are assessed, the controller must apply suppression effects (Figure 13) to those personnel under the indirect fire sheaf who do not become casualties. Suppressed personnel are disoriented and cannot participate in battle activities for the times indicated in Figure 13. Suppressed personnel will not respond to commander's orders, will not advance or fire their weapons in combat, and will surrender if given the opportunity. Suppressed personnel are allowed to retreat and/or use communication equipment not destroyed.

5.3 Vulnerability of Indirect Fire Weapon Systems

The sophistication of modern weapon systems enables quick and accurate location of firing artillery weapon systems through the use of countermortar and counterbattery radar. In fact, it is presumed (FM 6-40-5) that a firing battery may expect to fire only 3 volleys before receiving counterfire. To minimize their vulnerability, artillery weapon systems must shoot and move. In game play, indirect fires are assumed to be from one battery or section at any moment in time. However, when a given battery or section is required to move, the fire requests are handed off to another battery or section which theoretically would be in a position to support the attack or defense force.

5.4 Indirect Fire Effects

- o Special Importance - WP results in casualties - However, casualty rate proportion--Figure 13 open VT conditions--should be reduced by one-half. WP will not normally penetrate overhead or hard cover, or adversely affect buttoned-up armored vehicles. However, it will burn vehicle tires. Illumination and HC will not result in casualties in game play.
- o Anti-personnel Mines - Indirect fires (HE/PD) falling on AT/AP mines will adversely affect some mines. Mines which are within the overlay will be multiplied by one-half the PD/open proportion to determine the number of mines activated or neutralized. Generally, there must be at least 6-12 rounds to affect the mines. The controller indicates secondary explosions to players if they are in a position to hear/observe rounds.
- o Wire Barriers - An extreme amount of artillery is required to breech wire. Thus, in game play, wire will not normally be breeched by mortar or artillery.
- o Casualties - Any proportion .30 or above will result in an individual, track, or tank being assessed a casualty and removed from game play.
- o Illumination, 81/107/105 - Illumination round will illuminate a 1200 meter diameter area on a clear night. On foggy/rainy nights the area illuminated will decrease to a 400 meter diameter area.

- Projectile Signature Characteristics

  HE, Quick, Point Detonating Fuse - Black smoke discolored by dirt. Loud blast may be heard for miles.

  HE - Mine Action - Delay Fuse - Eruption of a vertical column of earth, very little smoke, explosion is muffled, audible for 3-5,000 meters.

  HE - VT - Flash, sharp explosion, puff of black smoke above the ground.

  WP - Fountain of brilliant white smoke, burning phosphorous. Small particles of phosphorous are spread upward and outward as a pillar of smoke forms and rises. May be visible for great distances at night. Is audible to 1000 meters.

5.5 Special Controller Notes

- When a player requests fire, wait the required time inverval, then deliver the rounds on the opposing player's board. Next, deliver the rounds on requesting player's board and indicate "Splash!" Assess casualties to both sides as appropriate. Indicate general number of rounds to each player.
- If a player decides to withdraw an artillery request, he must do so more than one minute before it is to be delivered. Otherwise, splash the rounds.
- If a player does not indicate number of rounds, type, fuse setting, etc., provide one marking round, WP, at the requested position.

- o If a player asks for only 1 or 2 rounds, assume that impact will be at the center of the indirect fire overlay.

5.6 Utilization of Smoke

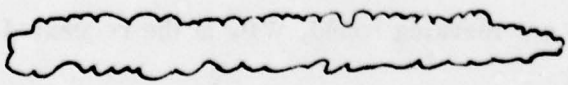
155 HC and 107 WP rounds are available for developing and using smoke screens in the play of the combined arms game. While the 81mm mortar section has a smoke capability (WP), smoke screen playing pieces for the 81 have not been provided because the 107, 155 weapons systems have greater capabilities, and to reduce the number of smoke screen playing pieces.

In game play the controller should allow only one third of the 107, 155 indirect fire allocation as smoke HC or WP.

Since most individuals are unfamiliar with fire requests for smoke and its employment, a detailed example of a Quick Smoke Mission was provided at Figure 11. This information was extracted from FM 6-40 and should be studied closely by both the players and controllers prior to its use in game play.

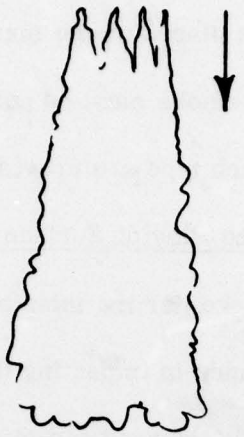
Figure 14 provides a guide to the capabilities of a Battery 155 and a section 107 in providing screening missions relative to wind direction and speed. The direction of the wind relative to the area to be screened makes a great difference in the shape of the smoke screen and the screening front area.

A flanking wind relative to the smoke screen front or attitude will produce a linear screen of narrow width but of great length.

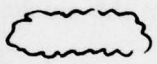


← wind direction

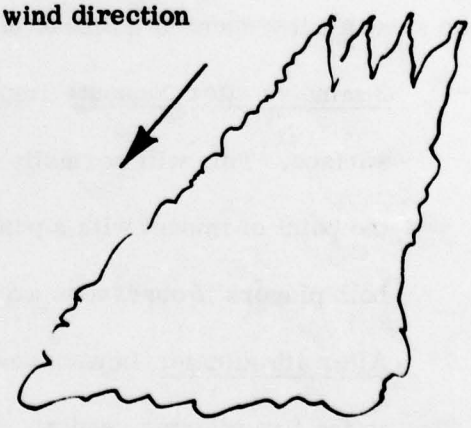
A head or tail wind relative to the smoke screen front or attitude produces a smoke screen as follows:



With no wind conditions the smoke sheaf is basically similar to the coverage area of a normal parallel 155, 107 sheaf.



A quartering wind relative to the smoke attitude produces a smoke screen as follows.



The smoke screens for game play are included as game playing pieces (paragraph 3.8). These should be placed on the marked area of the playing surface for use in game play. Since smoke must be portrayed on each player's surface, two smoke screens of each type are provided.

5.6.1 Impacting Smoke on the Playing Surface

A player requests smoke per the mission request parameters of Figure 11. Of particular importance in impacting the smoke and in selecting the appropriate screen playing piece is the wind direction and wind speed relative to the attitude or "front" of the screen. The wind direction and speed are obtained from the phone company on a given day of game play. Note that winds in excess of 20 miles an hour will so disrupt the smoke HC/WP that it will be practically impossible to develop an effective screen. Under these conditions the controller will impact the smoke rounds but will not place a screen playing piece on the playing surface.

The following procedures indicate controller actions in the formation of a smoke screen subsequent to a Smoke Mission Fire Request.

3 minutes after request: Impact an adjustment round on the playing surface. This will normally be an HE round. The controller indicates the point of impact with a pencil or pointer, indicates 1 round HE to both players if observers are present with commo.

After 4th minute: Impact smoke rounds along the attitude specified in the fire mission request. The controller indicates the general line or direction along which the rounds are impacting; he indicates smoke

rounds impacting to both players if observers are present with commo. The area of impact (linear front) is taken from Figure 14 relative to wind direction and strength.

After 5th minute: The controller places the appropriate sheaf--relative to wind direction and strength--on the playing surface. The appropriate sheaf is numbered per Figure 14. For example, if the wind direction is 10 mph and flanking relative to the smoke attitude, use smoke sheaf #1 for 155 (Battery 1), #5 for 107 (Section 1).

With certain screens--those of a head-tail or quartering nature--the screen builds over time. That is, the one associated with the screen indicates the size of the screen after the 5th minute. For each succeeding minute the controller will add to the screen sheaf until the full screen is established. That is, the 6th minute portion #2 of the screen is added, in the 7th minute portion #3 is added, etc.

5.6.2 Dissipation of Smoke Screens

In the combined arms game a smoke screen will remain established for 1 minute after the impact of the last rounds along a specified attitude for flank or no wind screens. Screens resulting from head/tail or quartering wind dissipate in order of their formation. That is, section 1 is removed first, then after the next minute section 2, etc. until the entire screen is removed.

5.6.3 Number of Rounds Utilized

Figure 14 also provides a means for the controller to estimate the number of rounds utilized in a given smoke mission by indexing the proper wind speed and

Figure 14

SMOKE SCREENS

Linear Smoke Screen Front in Meters (Average)

	Wind Speed	4-19 mph	4-19 mph	0-3 mph	4-19 mph
	Wind Detection to Screen Attitude	Flanking Wind ⟷ front	Head-Tail Wind ↕ front	No Wind —— front	Quartering Wind ↗ —— front
Weapon	Bat 155	1200 1*	400 3*	400 5*	600 7*
	Section 107 (4.2)	600 2*	150 4*	150 6*	300 8*

*Number associated with linear fronts indicates sheaf to be used for a specific mission.

Average # of Rounds Needed to Establish and Maintain a Smoke Screen by Wind Speed

Wind Velocity (MPH)	Weapon System 107(4.2)		155	
	Establish	Maintain	Establish	Maintain
0-3	2 First Minute	1 per minute	1 First Minute	1 per 2 minutes
4-14	4 First Minute	2 per minute	2 First Minute	1 per minute
15-19	6 First Minute	3 per minute	4 First Minute	2 per minute

weapon system. Numbers provided are multiplied by the time of screen duration for a total number of rounds expended. For example, a 155 screen of 5 minutes' duration with a wind velocity of 4-14 mph will utilize a total of:

2 x 6 guns - first minute	= 12
1 x 6 guns - next 4 minutes	= 24
Total	36 rounds

The total number of rounds is tabulated by the controller and given to the player to subtract from his total 155, or 107 allocation. The controller should not allow more than one third of the total allocation to be used as smoke.

5.6.4 Casualty Effects

HE smoke rounds will not produce casualties. WP rounds will create casualties to exposed personnel in the open. In assessing casualties, use one half the proportion specified under the artillery casualty assessment table, Figure 13, Open Conditions, VT.

5.7 Scatterable Mines - A Game Option[1]

Many advances have been made in recent years in the development and delivery of scatterable mines. Scatterable mine concentrations used in the combined arms game will be delivered upon request by 155 tube artillery. The mines are dispersed above ground level and fall to the ground in a random dispersion format. In game play the density of mines in the mine concentrations will be 2 AP and one AT mine

[1]Consult FM 20-32A for more detailed information

per meter. These mines are easier to detect than mines buried in the ground and camouflaged. However, scatterable mines with built-in self-camouflage are not easily detected visually.

In game play scatterable mines will not be detected by personnel in tracks which are moving.

5.7.1 Request of Mine Concentrations

Normal indirect fire request procedures will be used in the request of mine concentrations. The time-to-impact of a requested mission will be 3 minutes in game play. The term "Scatterable Mine Concentration" will be used in place of round type and fuse.

5.7.2 Impacting Mine Concentrations

Three minutes after request the controller will indicate falling objects and some dust (created by objects hitting the surface if in an open area) in the area of impact. The mines are visually hard to detect. However, the controller should very lightly outline (with grease pencil) the main concentration (an area the size of a 155 open sheaf) on the defensive playing surface. This will enable the controller to determine whether attack (or defense) forces are to be affected by the employment of the mines. Normally the mines do not arm immediately on impact (to prevent detonation on impact). In game play the mines will arm one minute after impact.

5.7.3 Casualty Assessment

For the purpose of game play one half of equipment and one half of infantry on foot will be immobilized (track vehicles) or neutralized (infantry) by a scatterable mine concentration. The scatterable mines all have anti-handling devices and cannot readily be neutralized by infantry, though hand grenades and small

arms fire can be used to detonate some mines. The AP mines will not harm the tracked vehicles but the AT mines will break the tracks and road wheels, immobilizing the vehicle.

In summary, one half of the tracked vehicles entering an armed scatterable mine concentration (1 minute arming time after impact) will be immobilized; one half of the dismounted infantry entering an armed area will become casualties. In certain cases a concentration will fall on advancing forces. Casualties will not be assessed until after the 1-minute arming period. Thereafter, one half of all vehicles or infantry attempting to leave the area will become immobilized or casualties. Forces and vehicles which do not move will not be assessed as casualties.

5.7.4 Self-Destruct Characteristics

Scatterable mines have a self-destruct feature. In game play the self-destruct time will be 24 hours.

5.7.5 Neutralization of Scatterable Mines

In game play the rocket projected line charge will clear a path through the mine concentration--100 meters in depth, 6 meters wide.

IMPORTANT: It should be noted that many types of mines can be delivered as scatterable mines. Different types may detonate by pressure, while others have multi-pressure fuses or detonate by magnetic influence. The rocket projected line charge is generally effective only against the pressure type mines. As a result the best tactic is to avoid or go around mined areas.

Scatterable mines are listed as a game option since the capability to deliver the mines through the use of the 155 weapon system is not universal. Also, the munitions are in limited supply.

6.0 VICTORY CONDITIONS

The game should continue until there is no doubt in the controller's mind as to the outcome of the battle activity. Categories of outcomes are depicted as follow:

Combined Arms Platoon Defense vs Combined Arms Company Attack

WIN	WIN
o Destruction of the attacking force and/or retreat of the attacking force	o Destruction of the defending force with the survival of at least 1 platoon (personnel and equipment) of the attack force. or o Penetration and/or bypass of the defensive force with survival of at least one half (personnel and equipment) of the attack force.

As a general rule the attacking force should withdraw (if possible) when two thirds of its personnel and equipment become neutralized in the conduct of the attack. Outcomes where both sides are destroyed can be termed a tie.

7.0 AFTER-ACTION REVIEW (AAR)

At the conclusion of each game, an After-Action Review must be conducted by the game participants. The normal sequence of this review follows:

- Once the game is called, players leave their playing pieces on the map surface and the visual barrier between the two players is removed.
- Each player briefly describes his intended tactics.
- What actually happened during the course of the game is then reviewed by the players and the controller(s). This is done by discussing the

major occurrences in sequence. Alternative actions and potential outcome should be reviewed at this time to reveal better tactics, i.e., "What else could you have done and what might the outcome have been?"

- o The pros and cons of the tactics and indirect fire missions employed by each player should also be discussed.

The After-Action Review is an important part of the effectiveness of this training technique. The direct fire controller is responsible for leading the review, facilitating the exchange of information and promoting discussion by posing appropriate questions, e.g., "Why did you take this action instead of that?" Without his overall picture of the game, the review has a tendency to be brief, and a lot of information which should be exchanged by the players can be overlooked. If the training is to be effective, the review must be considered as an integral part of the exercise, and must be conducted as seriously as the actual playing of the game.

The controller should be aware of a potential serious pitfall in the conduct of the AAR. It should be remembered that unit success (mission accomplishment) is not always the product of good tactical planning and execution. Likewise, unit failure (heavy casualties) is not invariable the result of poor tactical planning and execution. Casualties may occur in any engagement when an individual or unit commits a tactical error. This is particularly likely in initial training exercises which are characterized by mistakes on both sides. When higher levels of training have been

attained, casualties may be inflicted by one force or the other because of exceptionally effective execution of tactical skills. It is possible, then, for the results in a given situation to be attributed to either good execution by one force, poor execution by the other, or a combination of the two. Failure to recognize these subtle distinctions can reduce the effectiveness of the AAR.

Using mission accomplishment as the single criterion for evaluating tactical decisions can be equally dangerous. For example, suppose the leader of a unit, in a movement to contact, quickly deploys his force across a large open area in order to occupy a piece of key terrain. This excellent position allows him to subsequently defeat the opposing force. A superficial evaluation of this situation might lead the senior controller to conclude the AAR by reinforcing the leader's decision and the unit's aggressive movement. However, the analysis would not be complete without a discussion of the risk that accompanied the decision. The unit probably sacrificed security to increase speed. In the example situation the decision resulted in success. On another day with slightly different terrain and against a different enemy, the unit might have been destroyed crossing the open area.

A good AAR should make all participants aware that there are no "doctrinal" solutions that always work. Every decision involves trade-offs. The goal in training is to provide leaders with an understanding of these risks coupled with a knowledge of what has been successful (or unsuccessful) in similar situations.

8.0 ALTERNATIVE PLAYER MODULES

It is possible to increase the number of players without increasing the number of controllers or increasing the difficulty level of the controller's duties. The

alternative suggested below incorporates 2 additional player participants, emphasizing the problems of command and control for the defensive player. It is recommended that this alternative not be attempted until players and controllers are familiar with the more standard combined arms game.

8.1 Attack

An FO player participant is provided to the attacking player leader. In game play the leader can spend more time coordinating fire and movement and is freed from the task of computing his own fire missions. The player leader simply orders the FO player - "I want smoke on that ridge line" - to provide smoke or fire. It is then up to the FO player to provide fire mission request specifics and details to the FDC controller.

8.2 Defense

A subordinate player is utilized in the defense in addition to the defense leader. In this play environment the defense leader is not allowed to view the playing surface directly, and must coordinate action by relying on information provided by the subordinate player and use of a 1:25,000 playing map of the game surface.

The normal play configuration of the Combined Arms TOX allows player participants to assume all the personnel roles associated with the accomplishment of a defense mission. Thus in normal play each leader is in a "know-all, see-all" position relative to game action and actions of subordinate personnel. At this level the game greatly facilitates the development of tactical concepts and the effective employment of indirect fire and direct fire weapon systems.[1]

[1]Normal play as depicted by paragraphs 1 through 7.

This recommended alternative emphasizes the problems in combat associated with:

- o communications
- o control and coordination
- o leadership and subordinate interaction
- o danger (inaccuracy) of indirect fire

In game play the two defensive players jointly develop their defense plan, including the physical placement of playing pieces and weapon systems on the playing surface. Upon the start of the game the subordinate player executes the leader's plan. The defense leader is not allowed to view the playing surface directly and should sit in a chair behind the defense playing surface with his back turned away from the playing surface. This will tend to prohibit his viewing the actual surface. The defense leader must accomplish his mission by communicating with the player subordinate ("enemy tank on ridge line at 363 891") and his playing aid and 1:25,000 map of the playing surface.

In this module all indirect fire missions must be transmitted by the defense leader to the FDC controller. The fire missions are splashed on the actual playing surface as in a regular game. The defense leader should communicate with his subordinate to determine whether fire missions impact accurately and to adjust his fire.

To be successful the defense leader must effectively use the intelligence provided by the subordinate player to counter the attack force.

Communication between the defense leader and the defense subordinates may be any of the alternatives specified at paragraph 4.2.10. Since the defense leader must depend on the 1:25,000 map of the play ing surface, it is recommended that he use a compass and a 1:25,000 grid rule to expedite his game play actions.

As players rotate through this alternative defense playing module, all personnel can become familiar with the complexity of communicating with and controlling subordinate forces in a rapidly moving combat environment.

The alternative player module recommended here is only one of several feasible alternatives. It is recommended that imagination be used to develop other play alternatives to enhance the training of both officer and subordinate personnel.