Instructor
Guide

Modular Explosives Training Program

Bureau of Alcohol,
Tobacco and Firearms

ATF P 7550.12 (3/76)
(replaces ATF T 5145-01)

This Modular Explosives Training Program is designed to be used by instructor personnel from the Bureau of Alcohol, Tobacco and Firearms. The program consists of a 15 instructor guide packet. Each guide is a lesson in modular form which presents a one (1) to eight (8) hour block of instruction. Additionally, each guide lists the texts, instructional materials and visual aids which are required. The Student Handouts for each modular lesson are in packet form and must be ordered separately depending on the student requirement.

This program also provides a standard base for training in explosives and the Bomb Threat/Incident. Variations in lesson presentation may be made; however, the basic techniques and concepts will be followed.

Instructor guide #6 is not included in The Modular Training Program due to the sensitive nature and scope of the material concerned with the manufacture of improvised bombs and destructive devices. Part I and II of the National Bomb Data Center slides are available and can be used for a modular lesson depending on the type and level of training desired. A 4 to 45 hour block of instruction may be prepared with practical exercises developed by the instructor. However, where manufactured or improvised explosives are used in a live firing exercise, only ATF personnel certified by The Director will conduct the exercise.

All comments regarding this training program to include requests for materials should be sent to: Director, Bureau of Alcohol, Tobacco and Firearms. ATTN: Training Branch.

CONTENTS

Lesson Plan 5145-1

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Explosions

Objectives:

1. To provide the student with a general understanding of the nature of explosions.

2. To provide the student with the ability to effectively identify and cope with the effects of an explosion.

3. To identify the effects and nature of chemical explosions for purposes of reporting and recording.

Assistants:
None

Total Time
1 hour

Space Required:
Classroom for 30 students. Classroom must have blackout capability.

Methods:

Lecture & conference.

Training Aids:

See Visual Aids Page 1-11. Screen, podium, blackboard, eraser, chalk, pointer.

Student Materials:

Notebook and pencil.

References: NBDC Publication 02 - Introduction to Explosives.
FM 5-25, Explosives & Demolitions
TM 9-1300-214, Military Explosives

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content:

Notes:

Show ATF Badge S2-1-1
T2-1-1

INSTRUCTOR NOTE:

This class may be opened by the showing of Visual Aids S2-1-2 through S2-1-7. These Visual Aids depict various explosions illustrating the fireball and fragmentation effect.

1.0
EXPLOSIONS

Show VA S2-1-8
T2-1-2

1.1
WHAT IS AN EXPLOSION?

(1) An explosion may be broadly defined as the sudden and rapid escape of gases from a confined space accompanied by high temperatures, violent shock and a loud noise.

Content: **Notes:**

(2) The generation and violent escape of gases is the primary criteria of an explosion and is present in each of the three basic types of explosions known to man.

1.2
THE THREE BASIC TYPES OF EXPLOSIONS ARE:

Show VA S2-1-9
T2-1-3

(1) Mechanical explosion

(2) Chemical explosion

(3) Atomic explosion

1.21
Mechanical Explosion - can be illustrated by the gradual build-up of pressure in a steam boiler. As heat is applied to the water inside the boiler, steam, a form of gas, is generated. If the boiler is not equipped with some type of safety valve, the mounting steam pressure will eventually overcome the structural resistance of the boiler and an explosion will occur. Such an explosion would be accompanied by a high temperature, a rapid escape of gases or steam, and a loud noise.

1.22
Chemical Explosion - is caused by the rapid conversion of a solid or liquid explosive compound into gases having a much greater volume than the substances from which they are generated. Such an explosion is accompanied by shock and a loud noise.

Only the Chemical explosion will be discussed.

1.23
Atomic Explosion - is induced by fission, the splitting of the nucleus of atoms or fusion, the joining together under great force of the nuclei of atoms. This explosion releases a tremendous amount of energy, heat, gas and shock.

Content: **Notes:**

1.3
THE NATURE OF THE CHEMICAL EXPLOSION

(1) The explosives normally encountered are chemical in nature and result in chemical explosions. In all chemical explosions, the changes which occur are the result of combustion or burning.

(2) The burning of a log and the detonation of a stick of dynamite are similar because each changes its form and, in so doing, produces the effect of combustion which are:

(a) HEAT

(b) LIGHT

(c) PRESSURE (release of gases)

(3) The real difference between the "burning" of a log and the "detonation" of a stick of dynamite is in the time duration of the combustion process. This combustion process can be categorized into three types:

Show VA S2-1-10
T2-1-4

(a) ORDINARY COMBUSTION - Slow

(b) EXPLOSION - Rapid

(c) DETONATION - Instantaneous

1.31
Ordinary Combustion (slow) - beginning with the lighting of a match, the ignition of paper, then the kindling and finally the ignition of the logs; each layer of materials is ignited at its ignition point. Combustion will continue, heat will be created and gases will be formed and then released. This combustion is a progressive sequence and can be followed visually and is essentially the same process which occurs at a greatly increased rate in a chemical explosion.

Content: **Notes:**

1.32
Explosion (rapid) - an example of explosion or rapid combustion is best illustrated in the internal combustion automobile engine. When a flame from the spark plug ignites the gasoline/air mixture, rapid combustion or explosion occurs. The speed of the burning action of the fuel/air mixture constitutes the difference between combustion, explosion and detonation.

1.33
Detonation (instantaneous) - detonation can be defined as "instantaneous combustion." However, even in detonation the most rapid form of combustion there must be a time interval in order that the combustion action can be transferred from one particle of the explosive compound to the next. The velocity of this "instantaneous combustion" has been measured for most explosives and is referred to as the detonation velocity of the explosives. For example, TNT detonates at a velocity of 21,000 feet per second.

1.4
DETONATION IS CATEGORIZED AS:

1.41
High Order detonation - is a complete detonation of the explosive at its highest velocity and all of the explosive compound is consumed. WRITE ON BB

1.42
Low Order detonation - is either incomplete detonation or complete detonation at lower than rated maximum velocity and all of the explosive compound is not consumed. Causes of lower detonation may be any one or a combination of the following:

(a) Initiator (blasting caps) of inadequate power.

Content: **Notes:**

(b) Deterioration of the explosive.

(c) Poor contact between the initiator and the explosive.

(d) Lack of continuity of shock wave in the explosive (air space in the explosive - air bubbles).

1.5
EFFECTS OF AN EXPLOSION

The detonation will produce several effects. They are:

Show VA S2-1-11
T2-1-5

BLAST PRESSURE (Primary)

BLAST PRESSURE (Secondary)

HEAT (thermal)

FRAGMENTATION

1.51
Blast Pressure (Primary) - When an explosive charge is detonated hot expanding gases are formed in a period of about 1/10,000 of a second. These gases exert pressures of about 700 tons (1.4 million lbs.) per square inch on the atmosphere surrounding the point of detonation and rush away at velocities up to 7,000 miles per hour. This mass of expanding gas rolls outward in a circular pattern like a giant wave, weighing tons, smashing and shattering any object in its path. Of course, the further this pressure wave travels the less power it possesses until it dwindles to nothing. This wave pressure is called the BLAST PRESSURE WAVE.

(1) This blast pressure wave has two phases.

Show S2-1-12
T2-1-6

Content: **Notes:**

(a) POSITIVE PHASE

(b) NEGATIVE PHASE

Show VA S2-1-13 / T2-1-7

Describe the condition prior to an explosion. Here we see a bomb with a fuse burning. A chair, table, a tree and a brick wall.

(2) The first phase of the explosion, called the positive pressure phase, has expanding gases from the detonation of the bomb lifting the chair through the air, the table has been smashed against the tree, the tree is bent, leaves and branches have blown off, as well as bricks on the wall have been displaced.

Show VA S2-1-14 / T2-1-8

(a) The leading edge of the pressure wave is called the shock front. It is this shock front that initially causes the displacement and the pressure wave carries the displaced material in the direction of the wave.

(b) The shock front is sometimes identifiable as a white, rapidly expanding circle. It is only a fraction of an inch thick and is composed of compressed air and is the leading edge of the blast pressure wave.

(3) The second phase of the explosion, called the negative pressure phase, is the broad partial vacuum that was created by the positive pressure phase. This partial vacuum causes the compressed and displaced atmosphere to reverse its movement and rush inward to fill the void.

Show VA S2-1-15 / T2-1-9

(a) The displaced air rushing toward the point of detonation has mass and power. This air does not move nearly as fast inward as the blast pressure wave does outward. However, it does have great velocity

(b) The negative phase is less powerful but lasts three times as long as the positive phase.

Content: **Notes:**

(c) The entire blast pressure wave because of its distinct phases actually delivers a one-two punch to any object in its path.

(d) The blast pressure wave is the most powerful and destructive of the explosive effects produced by the detonation of high explosives.

(4) Conditions after the explosion. Show VA S2-1-16 T2-1-10

1.52
Blast Pressure (Secondary) - Effects are: Show VA S2-1-17 T2-1-11

REFLECTION

FOCUSING

SHIELDING

EARTH and WATER SHOCK

STRUCTURAL FIRES

(1) REFLECTION - Blast pressure waves, like sound or light waves, will bounce off reflected surfaces. This reflection may cause a scattering of focusing of the wave.

(2) FOCUSING - If a large charge is placed inside a large diameter sewer pipe or a long hallway and detonated, the blast pressure wave will be reflected into a focusing condition due to the geometry of the surfaces surrounding the charge.

(3) SHIELDING - occurs when the blast pressure wave strikes an immovable object in its path. If a fine wine glass is placed behind a concrete post, the blast pressure wave will strike the post, leaving the glass undamaged.

Content: **Notes:**

(4) EARTH AND WATER SHOCK - when an explosive charge is buried in the earth or placed underwater and detonated, the same violent expansion of gases, heat, shock and loud noise result. Since the earth is more difficult to compress than air and water is not compressable at all, the detonation will seem less violent, but actually the energy released is exactly the same as would result from an explosion in open air. In this case, the blast wave is transmitted through the earth in the form of a shock wave which is comparable to a short, sharp powerful earthquake. This shock wave, if of sufficient strength, will damage structures, break pipes, buckle walls inward and even heave up concrete floors.

(5) STRUCTURAL FIRES - when an explosion occurs inside a building a fire often results. Generally, the structural fire originates from broken gas or fuel lines, shorted electrical circuits and other debris caused by the explosion.

1.53
Heat (thermal) - effect will vary from one explosive to another. In general low explosives will produce a longer period of incendiary thermal effect than a high explosive. High explosives will produce a much higher temperature but of short duration. This incendiary thermal effect is seen as the bright flash or fireball at the instant of detonation.

(1) If high explosives are placed on dry grass and detonated, only a vacant scorched patch of earth will remain, however, low explosives will more than likely cause a grass fire.

(2) Unless highly combustible materials are involved, the thermal effect plays an insignificant part.

Content: **Notes:**

(3) Incendiary thermal effects are generally the least damaging of the three primary detonation effects.

1.54
Fragmentation - effect is caused by the material encasing the explosive material. A pipe bomb when exploded will rupture the pipe, hurling fragments outward from the point of detonation. The velocity of the average fragment will reach that of a rifle bullet (2,700 feet per second) a few feet from the point of detonation.

Show VA S2-1-18 T2-1-12

Show VA S2-1-19 T2-1-13

(1) About half of the total energy released by the explosion is used up in rupturing the case surrounding the explosive. Initially, the rapidly expanding gases cause the casing to enlarge to about 1½ times its original diameter before it ruptures and breaks into fragments.

(2) Fragments resulting from the detonation of a HIGH explosive filler have a stretched, torn and thinned configuration due to the tremendous heat and pressure produced by the explosion.

Show VA S2-1-20 T2-1-14

(3) Fragments resulting from the detonation of LOW explosive filler would produce fragments which are larger in size and they would not have the same configuration as from a high explosive filler.

(4) Serration or pre-engraving of casing or objects such as nails, ball bearings, staples are referred to as shrapnel. Shrapnel serves the same purpose and has the same effect as fragmentation.

Show VA S2-1-21 T2-1-15

Show VA S2-1-22 T2-1-16

1.6
SUMMARY

(1) The products of an explosion are:

(a) Heat (thermal)

Content: **Notes:**

(b) Light

(c) Pressure (Blast wave)

(2) The blast wave is the most powerful and destructive effect of the explosion.

(3) There are two categories of destruction.

(a) High order - complete destruction.

(b) Low order - incomplete destruction.

(4) The two phases of the explosion are:

(a) The Positive phase

(b) The Negative Phase

(5) The blast pressure wave can be reflected and/or focused depending on the environment surrounding the explosion.

1.61
Relate to Bomb Threat

The above summarizes the effects of an explosion and these are essential considerations where responding to a bomb threat or incident. Additionally, the language is important in recording and/or reporting bomb incidents.

1.7
TIE INTO NEXT LESSON

The next block of instructions will cover the nature and behavior of chemical explosives, how a block of explosives is detonated, firing trains, and characteristics of some commercial and military explosives. We will also discuss the tools and materials allied to explosive blasting, and items that might be left at the scene of a bombing incident.

Content: **Notes:**

1.8
VISUAL AIDS - Unit I - Explosions

The visual aids listed below are for use in lesson plan 5145-1.

Slides		Transparencies
Unit I	Description	Kit #66
S2-1-1	ATF Badge	T2-1-1
S2-1-2	Station Wagon	none
S2-1-3	Fireball	not used
S2-1-4	Fireball with Fragmentation	not used
S2-1-5	Results of Explosion	not used
S2-1-6	Wooden Shack Explosion	not used
S2-1-7	Wood Fragmentation	not used
S2-1-8	What Does A Chemical Explosion Do?	T2-1-2
S2-1-9	Types of Explosions	T2-1-3
S2-1-10	Combustion Process	T2-1-4
S2-1-11	Effects of an Explosion	T2-1-5
S2-1-12	Phases of Blast	T2-1-6
S2-1-13	Conditions Prior to an Explosion	T2-1-7
S2-1-14	Positive Pressure Phase	T2-1-8
S2-1-15	Negative Pressure Phase	T2-1-9
S2-1-16	Conditions After an Explosion	T2-1-10
S2-1-17	Secondary Effects	T2-1-11
S2-1-18	Pipe Bomb	T2-1-12
S2-1-19	Pipe Bomb Fragmentation - Low Explosive	T2-1-13
S2-1-20	Pipe Bomb Fragmentation - High Explosive	T2-1-14
S2-1-21	Serration or Pre-Engraving	T2-1-15
S2-1-22	Shrapnel	T2-1-16

Lesson Plan 5145-2

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Explosives Detonation

Objectives:
1. Familiarize the student with the behavior of a block of explosive during the detonation process and its effects.

2. Provide the student with the capability to identify the various firing trains leading to the detonation of the explosives.

Assistants:
None

Total Time
1 Hour

Space Required:
Classroom for 30 students. Classroom must have a blackout capability.

Methods:
Lecture and conference.

Training Aids:
See Visual Aids Page 2-10. Screen, podium, blackboard, chalk, pointer, eraser. Projector Kodak "Carousel" and/or overhead projector.

Student Materials:
Notebook and pencil

References: NBCD Publication 02 - Introduction to Explosives.
FM 5-25, Explosives and Demolitions
TM 9-1300-214, Military Explosives

NOTE:
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Content: **Notes:**

INSTRUCTOR NOTE:

This block of instruction should be preceded by Lesson Plan 5145-1, Explosions, unless the skill level of the student audience is such that it can be incorporated as a short review to the following lesson.

2.0
WHAT IS AN EXPLOSIVE?

(1) An explosive is a chemically unstable material which produces an explosion or detonation by a very rapid means with the evolution of heat, the formation of gases accompanied by shock and a loud noise.

Content: **Notes:**

(2) The primary requisite of a chemical explosive is that it contain enough oxygen to initiate and maintain extremely rapid combustion. This oxygen must be incorporated into the combustible elements of the explosive. The sources of oxygen are called OXIDIZERS.

2.1 EXPLOSIVE MIXTURES AND COMPOUNDS

(1) Explosive mixtures are exploding substances where the combustibles and the oxidizers are blended mechanically, such as black powder.

(2) Explosive compounds are chemical compounds of tightly bonded combustibles and oxidizers that are chemically blended, such as TNT, nitroglycerin, etc.

2.2 HOW DO EXPLOSIVES DETONATE?

(1) They may be initiated by the shock of a blasting cap.

(2) Let us look at the detonation progress through a block of explosives.

Show VA S2-1-50
T2-1-50
Describe the detonation progress as illustrated in the visual aids.

(3) This visual aid illustrates the detonation progress.

(a) When a shock is initiated to the block of explosive, detonation will occur. This shock wave will propagate through the entire mass of explosive as illustrated by the visual aid.

Show VA S2-1-51
T2-1-51

Content: **Notes:**

(b) This shock wave attains velocities of 8,000 to 10,000 meters (24,000 to 30,000 feet) per second. The entire detonation process takes place in mili-seconds, and is called the detonation velocity.

(c) The velocity of this detonation process will class explosives as high or low explosives.

1. Low explosives detonate at 3,280 feet per second and below.

2. High explosives detonate above 3,280 feet per second and up to 30,000 feet per second.

2.3 EXPLOSIVE WORK

The varying velocities of explosives have a direct relationship to the type of work they can perform.

(1) Low explosives have a pushing or heaving power.

(2) High explosives produce a shattering power, because of the rapid expansion of their gases.

2.4 EXPLOSIVE FORCES

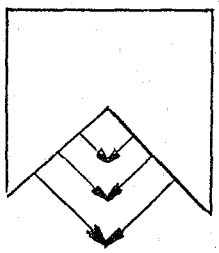
Show VA S2-1-52
T2-1-52

(1) The forces given off by the detonating explosive will be given off at 90° angles from the surface of the explosives.

Content:

Notes:

QUESTION:
Why are we interested in the directional explosive forces?
Draw on blackboard:



(2) Let us examine what is taking place. If a block explosive is cut as illustrated, the explosive force can be focused directionally and will produce an extremely hot, high speed jet, in much the same manner as the white-hot flame of a cutting torch.

(3) This focusing effect led to the development of the shaped charge. This same technique is employed in the warhead of the "BAZOOKA" rocket, first used during WWII.

Show VA S2-1-54
T2-1-54

Discuss Slide:
We can visually see the effect of the directional forces of the explosive. A block of explosive will dent the steel plate while the shaped block of explosive will cut the steel plate.

(4) Let us take a look at the shaped charge jet formation.

Discuss Slide:
Show VA S2-1-55
T2-1-55

(5) There are commercial explosive tools that employ the shaped charge principle. The "Jet Tapper" is one such tool.

Show VA S2-1-56
T2-1-56

Discuss Slide:
This tool is used in the manufacture of steel. It is inserted into a chamber in the ladle, where it is detonated, puncturing the tap hole, thereby permitting the moulten steel to flow out.

Show VA S2-1-57
T2-1-57

Content:	**Notes:**
(6) This shaped charge jet effect can also be used in a linear configuration, such as a commercial forcible entry tool called the "Jet Axe" linear shaped charge.	Show VA S2-1-58 / T2-1-58 Discuss Slide: This device is used by fire fighters and police to cut through steel-fired doors, roofs, and light structural walls. Show VA S2-1-59 / T2-1-59
(7) Here are two types of shaped charge containers used by military EOD personnel in rendering safe military explosive ordnance.	Show VA S2-1-60 / T2-1-60 Note: Point out to the student how simple it is to manufacture the shaped charge. Use the Coca Cola bottle or beer can example.
2.5 EXPLOSIVE TRAINS	
(1) What is an explosive train?	
(a) An explosive train is a series of explosions specifically arranged to produce a desired outcome.	
(b) This visual aid will illustrate the explosive train, or processes, that must take place to initiate detonation or deflagration of explosives.	Show VA S2-1-61 / T2-1-61 Discuss the initiating of the impetus and the progression of the firing train to the detonation of the main charge of explosives.
1. We can relate the explosive train process to that of starting a fire.	
2. The same process must occur in the explosion of a bomb whether it contains TNT or black powder.	

Content: **Notes:**

(2) Explosive trains are classified as either a low or high explosive train depending upon the classification of the final explosive material in the train.

2.51
Low Explosive Train.

(1) A round of ammunition is a simple example of a two-step low explosive train. (percussion primer and propellant charge).

(2) When a low explosive propellant (smokeless and black powder) is used in a pipe bomb, a two-step explosive train is required (safety fuse and powder).

(3) The majority of low explosives require only a simple two-step train.

2.52
High Explosive Train.

(1) The nature of high explosive trains is affected by a wide range of sensitivity found within the category of high explosive compounds.

(2) Sensitivity refers to the amount of external force or effect needed to cause detonation.

Discuss:
Some explosives are so sensitive the brushing of a feather will cause it to detonate, while other explosives can be placed on an anvil and struck with a hammer and not detonate.

(3) The most sensitive explosives are called:

PRIMARY HIGH EXPLOSIVES

SECONDARY HIGH EXPLOSIVES

Content: **Notes:**

2.521
Primary High explosives- because of their sensitivity may be initiated by shock, friction, flame, or heat. They are used in the first step in high explosive trains as blasting caps and military fuse detonators. The primary high explosive compounds are:

(1) RDX

(2) Lead styphanate

(3) Lead azide

(4) Mercury fulminate

(5) Nitroglycerin

2.522
Secondary High Explosives

(1) Compared to the primary high explosives, are relatively insensitive to shock, friction, flame, or heat, and therefore less hazardous to handle and use. Consequently, primary explosives are used to detonate secondary explosives.

Discuss:
Secondary high explosives comprise the largest single class of explosives. Their detonation velocities range from 9,000 feet per second for some dynamites to 26,000 feet per second for military plastic explosives.

(2) Since there is a wide range of sensitivity found among the secondary high explosives, the more insensitive explosives cannot be detonated unless the primary high explosive wave is amplified. This amplification is accomplished through the use of a slightly more sensitive secondary high explosive, between the primary high explosive and the main explosive charge. This explosive is called a booster.

Content:	**Notes:**
2.53 Basic Three Step Explosive Train	Show VA S2-1-62 T2-1-62
(1) Here we can see the progression principle of the detonation from the primary high explosive to the booster and finally the main charge.	
(2) The normal explosive train is the two or three step train.	
(3) If we were to use a stick of dynamite and an electric blasting cap, we would have a two step explosive train.	Show VA S2-1-63 T2-1-63
(4) We could also use a nonelectric blasting cap and dynamite. However, we would have to employ a different firing train.	
	DEVELOP CLASS PARTICIPATION QUESTION: What type of firing train would we have if we use a stick of dynamite, a nonelectric blasting cap, and a piece of safety fuse filled with black powder? ANSWER: A three-step train
(5) A three-step train - the safety fuse would be ignited by a flame or other ignition device, the spurt of flame from the fuse would initiate the blasting cap, and the primary high explosive detonation would cause detonation of the dynamite.	"Show slide immediately after answer is given. Show VA S2-1-64 T2-1-64

Content: **Notes:**

(6) As previously mentioned, some secondary high explosives cannot be detonated by a primary high explosive, therefore, a booster charge is required. Such is the case in using ANFO, which is ammonium nitrate and fuel oil.

(a) ANFO is quite insensitive and a blasting cap alone will not cause it to detonate.

(b) Here a four-step explosive train is employed.

Show VA S2-1-65
T2-1-65

(c) If we were to employ an electric cap in place of the safety fuse and nonelectric cap, we would have how many steps in our explosive train?

DEVELOP DISCUSSION
We can easily see that we would have a four-step train.

2.6
SUMMARY

(1) Up to this point we have covered the basic essentials of the composition and behavior of explosives.

(2) We know that an explosive compound is a compound that is chemically unstable, that the oxidizers are chemically compounded into the combustible elements, and in explosive mixtures the oxidizers and combustibles are mechanically blended.

(3) The shock wave of a primary and/or booster explosive is required to detonate the main charge.

Content: **Notes:**

(4) The detonation process can be made to work depending on explosive configuration.

(5) The firing train is nothing more than a series of explosions arranged to achieve a desired end result.

(6) The processes used as we have discussed during this period are the same processes that must be employed for all bombs and destructive devices.

(7) If the firing train is broken or interrupted, detonation of the main charge will not occur.

2.7
VISUAL AIDS - Unit II - Explosives Detonation

The visual aids listed below are for Lesson 5145-2 - Explosive Detonation.

Slides		Transparencies
Unit II	Description	Kit #67
S2-1-50	Block of Explosive	T2-1-50
S2-1-51	Detonation Process	T2-1-51
S2-1-52	Detonation Wave - I	T2-1-52
S2-1-53	Detonation Wave - II	T2-1-53
S2-1-54	Shaped Charge Effect	T2-1-54
S2-1-55	Shaped Charge Jet	T2-1-55
S2-1-56	Jet Tapper - Commercial Shaped Charge	T2-1-56
S2-1-57	Use of Jet Tapper	T2-1-57
S2-1-58	Jet Axe Forcible Entry Tool - I	T2-1-58
S2-1-59	Jet Axe Forcible Entry Tool - II	T2-1-59
S2-1-60	Shaped Charge Containers	T2-1-60
S2-1-61	Firing Train	T2-1-61
S2-1-62	Basic Three Step Train	T2-1-62
S2-1-63	Two Step Train	T2-1-63
S2-1-64	Three Step Train	T2-1-64
S2-1-65	Four Step Train	T2-1-65

Lesson Plan 5145-3

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Demolition Materials & Accessories

Objectives:
1. Provide the student with the ability to identify and recognize military and commercial explosives.

2. Familiarize the student with the various blasting materials and equipment allied to the explosive and blasting field.

Assistants:
None

Total Time
2 hours

Space Required:
Classroom for 30 students.

Methods:
Lecture & conference.

Training Aids:
See Visual Aids Page 3-27. Screen, podium, blackboard, chalk, eraser, pointer.

Student Materials:
Notebook and pencil, and Student Handout 5145-3-1.

References: NBDC Publication 02 - Introduction to Explosives.
FM 5-25, Explosives and Demolitions

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

INSTRUCTOR NOTE:

During this hour we shall cover the most common military and commercial explosives likely to be encountered in bombing incidents. We shall also cover the accessory tools and materials that are used in explosive work and may be found at the scene of a bombing incident.

3.0
EXPLOSIVES

Explosives are categorized as:

(1) Low explosives

(2) Primary high explosives

Content: **Notes:**

(3) Secondary High explosives (boosters)

(4) Secondary high explosives

3.1 LOW EXPLOSIVES

3.11 Black Powder

(1) This explosive is probably one of the most dangerous explosives to handle; it is sensitive to:

(a) Friction

(b) Heat

(c) Impact

(d) Sparks (electrical and nonelectrical)

(2) The composition of black powder is:

75 percent potassium nitrate,
10 percent sulphur, and
15 percent charcoal

(a) There is a wide variation in the formula, and the color of black powder ranges from coal black to rusty brown.

(b) It can be in the form of a fine powder to granules as large as ½ inch in diameter.

(3) The burning speed of black powder is controlled by the size of granulation. Large grains burn more slowly than the fine powder.

Content: **Notes:**

(4) Black powder does not deteriorate with age, even if it has been submerged in water. Once it dries out it is just as effective and dangerous as it was the day of manufacture. That is why Civil War "souvenir" items are so dangerous.

(5) It is graded in grain size by the letter "F" appearing with the letter "g". The addition of each "F" indicates a finer grain.

WRITE ON BLACKBOARD

Fg, FFg, FFFg, etc.

(6) Though black powder has been replaced by dynamite, black powder is still used for special operations, improvised explosives, and is a favorite homemade explosive of the bomber.

(a) As a blasting charge, black powder has about half the strength of TNT.

(b) When black and smokeless powder are confined inside a pipe, and provided with a safety fuse, no blasting cap is needed to initiate the powder.

(c) The flame that spits out the end of the safety fuse is sufficient to cause an explosion of the bomb.

(d) Any sparks resulting from an attempt to dismantle a pipe bomb may cause it to explode.

3.12
Safety Fuse

(1) Is used for detonating explosives non-electrically. The purpose of the fuse is to transmit a flame at a continuous and uniform rate to a blasting cap.

Describe fuse

Show VA S2-1-100
T2-1-100

Content: **Notes:**

(2) Safety fuse comes in a variety of sizes and colors. It burns at two rates; the most common type is designed to burn at 40 seconds per foot, while the less common burns at 30 seconds per foot.

(3) Military time fuse burns at a rate of 30 to 45 seconds per foot.

(4) Fuse is used by bombers as a direct means to initiate a low explosive main charge.

(5) When employed in bombings a portion of the burnt fuse will usually survive the explosion and may be located near the point of detonation.

(6) Types of fuse:

(a) Commercial Safety Fuse - Numerous brands, various color-marked, outside wrapping materials. Comes in 50 foot rolls or coils. It is colored orange for general use, black for salt mines and white for coal mines.

(b) Military Safety Fuse - There are two types, one called safety fuse and the other called "M 700 time fuse." They are similar in construction and interchangeable.

(c) Improvised Safety Fuse - Made from common fireworks or by saturating cotton cord with certain liquid chemicals. Even rags wicks may be used, as in firebombs.

3.13
Smokeless Powder

(1) Is the world standard propelling powder for small arms, cannons, and in a slightly different form, rockets.

Content: **Notes:**

(2) Nitrocellulose is the base used in these powders.

(3) Various organic and inorganic substances are added to the base to provide special qualities such as "flashless," "smokeless," and "doublebase."

(4) Smokeless powders are produced by dissolving nitrocellulose in a mixture of ether and alcohol to form a mass called colloid. This colloid is squeezed into macaroni-shaped tubes that are cut in short lengths. The small cylindrical powder grains resulting from this process are generally used as rifle ammunition powder.

(5) Other forms of smokeless powders are:

(a) Wafers

(b) Flakes

(c) Balls

(6) Like black powder, smokeless powders vary in form and color.

(7) They are frequently used in the contruction of pipe bombs.

(8) Smokeless powders are as sensitive to friction as black powder and they should be handled with the same precautions as black powder.

3.2 PRIMARY HIGH EXPLOSIVES

3.21
Blasting Caps - They are used for initiating high explosives and contain small amounts of a sensitive high explosive.

Content: **Notes:**

(1) They must be protected from:

(a) Shock

(b) Extreme heat

(c) Impact

(d) Rough treatment

(2) There are two types of blasting caps:

(a) Nonelectric

(b) Electric

3.22
Nonelectric Blasting Caps

DISCUSS VISUAL AID

(1) Small copper or aluminum tube or shell, closed at one end.

Show VA S2-1-101
T2-1-101

(2) It is designed to detonate from the spit of flame provided by a safety fuse or other flame producer.

(3) In functioning, the flame ignites the ignition charge, which sets off the primary explosive, which, in turn, detonates the base charge.

(4) The most common commercial caps are numbers 6 and 8. The standard military issue is the U.S. Army Corps of Engineers Special Number 8 cap, designed to detonate the less sensitive military explosives.

(5) Nonelectric caps are packaged in a variety of containers, including metal cans, cardboard boxes and wooden boxes.

3.23
Electric Blasting Caps

Show VA S2-1-102
T2-1-102

Content: **Notes:**

(1) Constructed same as the nonelectric cap except a source of electricity is used to detonate the cap.

DISCUSS VISUAL AID

(2) The electrical element consists of two plastic insulated wires, a plug which holds the wires in place, and a small corrosion resistant bridge wire attached to the wires below the plug.

(3) Upon application of electric current, the bridge wire heats to incandescence and ignites the ignition mixture which sets off the primer charge and detonates the base charge.

(4) Electric blasting caps are normally packed 50 to a box and 500 to the case.

(5) Lead wires come in lengths of 4 to 300 feet of 22 gauge copper wires and lengths up to 24 feet of 20 gauge copper wire.

(6) Most commercial caps employ two different colors on their lead wires for identification and making connections.

(7) There are many types of electric caps and packaging.

Show VA S2-1-103
T2-1-103

(8) Various types of shunting devices are used to short-circuit the cap when not in use to guard against static electricity and prevent accidental firing.

DISCUSS VISUAL AID

3.24
Special Types Of Electric Blasting Caps

Show VA S2-1-104
T2-1-104

These delay caps are used in mining, geologist work and other tasks requiring a very short delay.

DISCUSS VISUAL AID

Content: **Notes:**

3.25
Detonating Cord

Show VA S2-1-105
T2-1-105

(1) Is similar in appearance to safety fuse. However, it contains a core of primary high explosive called PETN.

(2) This cord does not burn; it detonates at an approximate rate of 4 miles per second.

(3) The explosive cord is protected by a sheath of textiles or plastics and waterproofing materials.

(4) Various colorings and textile patterns are used to identify the different strengths and types of detonating cord.

Show VA S2-1-106
T2-1-106

(5) Detonating cord is frequently known by other names such as PRIMACORD, PRIMEX, DETACORD, and DETONATING FUSE.

(6) Detonating cord is used to detonate high explosive charges in the same manner as blasting caps.

(7) It may be tied around the explosive, threaded through it, or knotted inside the explosive, and it will cause them to detonate.

Show VA S2-1-107
T2-1-107

(8) Detonating cord is most commonly used when a simultaneous detonation of a number of explosive charges is required.

(9) Many explosive charges can be caused to detonate by using detonating cord and initiated with only one blasting cap.

3.26
Blasting Accessories

Content: **Notes:**

3.261
Safety Fuse Ignition

(1) There are several methods of igniting safety fuses. Some of the devices and techniques are:

(a) Friction type igniters

(b) Percussion type igniters

(c) Hot wire fuse lighters

(d) Flame type fuse lighters

(e) Improvised methods

(2) A safety match can ignite a safety blasting fuse.

Show VA S2-1-108
T2-1-108

(3) The flame type fuse lighters are devices that are crimped onto the end of the safety fuse and accept an ignitacord or other flame producing implement as a means of igniting the safety fuse.

DISCUSS VISUAL AID

DISCUSS

(a) Flame type w/ignitacord

Show VA S2-1-109
T2-1-109

(b) Flame type w/hot wire

(4) When conditions are such that these methods cannot be used, the electric squib, friction or percussion devices are used.

Show VA S2-1-110
T2-1-110

(a) Electric squib (Igniters)

Show VA S2-1-111
T2-1-111

1. Are commonly known as electric matches and are primarily used to initiate low explosives where a burning action is desired.

2. The electric squib resembles an electric blasting cap; however, the squib does not detonate, it only emits a spurt of flame through vent holes.

Content: **Notes:**

(b) Friction type fuse lighter

DISCUSS

1. The fuse is inserted into the end of this device. The handle when pulled will send a spurt of flame into the black powder core of the blasting fuse.

Show VA S2-1-112 T2-1-112

2. This lighter can be used only once.

(c) Percussion fuse lighters

Show VA S2-1-113 T2-1-113

1. The fuse is inserted into the open end of the igniter. When the release pin is removed and the pull ring activated, a firing pin strikes a primer, causing a spurt of flame to ignite the safety fuse.

2. The M2 fuse lighter can only be used once while the M60 can be recocked if it should fail to function the first time.

3.262
Blasting Machines

(1) These devices are sometimes referred to as "Hell boxes." The primary purpose of a blasting machine is to deliver a current directly to the cap bridge wire through an electrical circuit.

(2) There are various types and sizes of blasting machines that work by converting physical or mechanical actions into electrical energy, or by the use of generators, batteries or capacitors.

(3) Some of the types are:

(a) Ten cap blasting machine - it is a handheld, twist type, and will detonate 10 electric caps through 500 feet of #18 wire.

Show VA S2-1-114 T2-1-114

Content: **Notes:**

(b) The plunger type - illustrated is a 30, 50 or 100 cap machine which is generally used in quarry work or mining.

(c) The mini-blaster - is a battery operated machine slightly larger than a pack of cigarettes and weighs only 15 ounces. The electrical power source is two 22½-volt photoflash batteries and it will fire 20 electric blasting caps in series. It has an orange fiberglass case, is waterproof, and has a yellow ready-to-fire indicator light. It will fire over 10,000 individual shots without requiring a battery change and can be used in all types of explosive work.

Show VA S2-1-115 T2-1-115

(d) Models 7107-7 and 7107-4 - are small alternator machines and produce energy by squeezing the handle on the side of the machine.

Show VA S2-1-116 T2-1-116

1. M7107-7 - has a 120 volt output and can fire one blasting cap through 3,000 feet of #18, two conductor wires, or 10 blasting caps in series through 1,800 feet of wire.

2. M7107-4 - has a 300 volt output and can fire one blasting cap through 10,000 feet of #18, two conductor wires, or 50 blasting caps in series through 3,600 feet of wire.

3.263
Blasting Kits

(1) These kits are an assembly of demolition items, accessories and tools needed for various jobs, and are issued to military units.

DISCUSS ITEMS IN KIT

Content: **Notes:**

(a) The nonelectric kit - this kit is used for nonelectric firing of explosive charges. Show VA S2-1-117 T2-1-117

(b) The electric kit - is used for electric firing of explosive charges and can be used for non-electric as well. Show VA S2-1-118 T2-1-118

(2) The items in these kits can be purchased from most war surplus sales stores and property disposal sales at military installations.

(3) The bomber may leave any one of these items at an explosive scene.

3.3 SECONDARY HIGH EXPLOSIVES

(1) TNT Show VA S2-1-119 T2-1-119

(a) Is probably the most widely used military explosive in the world.

(b) Alone or in combination with other explosives, it is frequently used as a main charge in artillery projectiles, mortar rounds and aerial bombs.

(c) It is moderately insensitive and cannot be detonated by heat, shock, or friction, and is bullet impact safe.

(d) TNT will usually burn rather than detonate if consumed by fire.

(e) It is most often encountered in the form of ¼, ½ and 1 pound blocks. They are normally packed in 50 pound boxes for storage or transportation.

Content: **Notes:**

(f) TNT is light brown in color and will gradually turn dark brown after several days exposure to sunlight.

(g) Detonated TNT gives off a dirty grey smoke.

(2) Tetrytol

Show VA S2-1-120 T2-1-120

(a) It is used as an alternative to TNT by the military services.

(b) It is light tan to buff in color and detonates at about 24,000 feet per second.

(c) It comes in an M1 chain demolition package, with each block weighing about 2½ pounds and 8 blocks spaced eight inches apart on a 192-inch length of detonating cord.

(d) This chain can be used alone by each block or used in the haversack.

(e) The Tetrytol M2 block does not have a detonating cord through it; instead each block has a Tetryl booster pellet at each end. Each block weighs 2½ pounds and is wrapped in asphalt impregnated paper.

(f) When present stocks are depleted, no more tetrytol will be produced by the U.S. Military Services.

(3) Composition C-3

Show VA S2-1-121 T2-1-121

(a) This is a plastic explosive containing about 80% RDX and 20% explosive plasticizer.

(b) It is a yellow putty-like solid substance which has a distinct, heavy, sweet odor.

Content: **Notes:**

(c) In cold climates, it is brittle and difficult to shape.

(d) In hot climates, it is easy to mold, but it sticks to the hands.

(e) It will stain the hands yellow or light orange and it is hard to wash off.

(f) It is wrapped both in cardboard and clear plastic; the blocks weigh 2½ pounds.

(g) The M3 block is packed 8 blocks to the haversack and the M5 is packed 24 blocks to the wooden box.

(4) Composition C-4 & M112 — Show VA S2-1-122 T2-1-122

(a) It is an improved version of the C-3 explosive.

(b) It contains 90% RDX and has a greater shattering effect than the earlier C-3.

(c) C-4 is white to light tan in color, has no odor, and detonates at about 24,000 feet per second.

(d) The C-4, M5A1 demolition block is wrapped in clear plastic and has a threaded cap well at each end.

(e) The M112 is a smaller block with an adhesive backing.

(5) M118 - Sheet DETN — Show VA S2-1-123 T2-1-123

(a) This is an explosive that is also known as Flex-X by the military and Detasheet, commercially.

(b) It is a highly flexible demolition charge and comes in the form of sheets, with each sheet having a pressure sensitive adhesive backing.

Content: **Notes:**

(c) Commercially, sheet DETN is used for explosive forming, cutting, and metal hardening.

(d) The military sheet is olive green, but commercial sheets may range from pink to brownish red.

(6) M186 (Ribbon) Show VA S2-1-124 T2-1-124

(a) Is the same as M118, however, it is a narrow ribbon on a reel, and is used in perimeter defense tactics.

(7) Military dynamite Show VA S2-1-125 T2-1-125

(a) Military it is not a true dynamite in that is is 75% RDX, 15% TNT, 5% SAE motor oil, and 5% cornstarch.

(b) It is packaged in standard dynamite cartridges of colored wax paper and is marked either M1, M2 or M3 on the cartridge.

(c) It is less sensitive than commercial dynamites since it contains no nitroglycerin and is relatively insensitive to heat, shock, friction, or bullet impact. The qualities permit safer combat operations.

(d) When removed from its paper, it is yellow-white to tan and is a granular substance which crumbles easily and is slightly oily to the touch.

(e) It does not have a noticeable characteristic odor, nor does it cause the headaches typical of the true dynamites.

(f) It may be detonated by either an electric or nonelectric cap or detonating cord.

Content: **Notes:**

(8) Commercial dynamite

(a) Dynamites are the explosive most widely used for blasting operations throughout the world.

(b) In the past it has been relatively easy to obtain by theft or legal purchase and consequently is most frequently used by criminal bombers.

(c) They are generally used in earth moving operations, and they differ widely in their explosive content, strength, and sensitivity.

(d) Commercial dynamites are made of liquid nitroglycerin, oxidizers, and a binder material.

(e) The percentage strength of commercial STRAIGHT DYNAMITE is the gauge by which the strength of all other commercial dynamite variations are measured.

(f) This measurement is based upon the percentage of nitroglycerin by WEIGHT present in its formula as manufactured.

(g) The percentage value can be misleading, as a 60% dynamite is not 3 times more powerful than one marked 20%.

(h) Unless dynamite is packed loose in boxes or bags, for special applications, it is usually found in cartridge form in a variety of lengths and diameters.

(i) The most common sizes range from 1-1/8" to 1-1/2" in diameter and are about 8 inches long.

Show VA S2-1-126
T2-1-126

Content: **Notes:**

(j) The less common larger sizes may have diameters of 4 to 6 inches and be up to 38 inches in length.

(k) Because of the wide variety of formulas, ingredients and packaging, dynamite is not always easy to identify.

(l) The Department of Transportation regulations limit the largest size cartridge that may be shipped to 65 pounds in diameter and a maximum length of 36 inches.

(m) In addition to its illegal use in bombs, dynamite provides a source of nitroglycerin for use in safe and vault burglary.

(n) There are essentially only five basic types of dynamite in use today. They are:

Student Handout 5145-3-1 can be used as reference for the instructor and the student when discussing characteristics and use of dynamites.

1. Straight dynamite

   a. Rarely used in general blasting work because of its high sensitivity to shock and friction.

   b. Produces toxic fumes when detonated.

   c. Most hazardous to handle.

   d. Must be inverted periodically when in storage to prevent nitroglycerin from leaking out.

   e. Be extremely cautious when handling any of this dynamite when it appears to be in a deteriorated condition.

Content: **Notes:**

2. Ammonia dynamite

   a. Portions of the nitroglycerin content are replaced by ammonia nitrate.

   b. Has less shattering effect than straight dynamite and is therefore used in quarry operations, stump or boulder blasting.

   c. It is lower in cost and less sensitive to shock and friction than straight dynamite.

   d. It is the most widely used explosive in the dynamite family.

   e. When the wrapper is removed, ammonia dynamite will appear light tan to light brown in color and have a pulpy, granular, slightly moist, oily texture.

   f. It has the same odor as straight dynamite and may produce severe headaches after contact.

3. Gelatin dynamite

   a. Has a base of water resisant "gel."

   b. It is neither hydrosorbic nor is it desensitized by water.

   c. It is well suited for all types of wet blasting work.

   d. It is used extensively for blasting very hard, tough rock or ore.

   e. It is manufactured in percentage strengths from 20 to 90 percent.

Content: **Notes:**

4. Ammonia-gelatin dynamite.

   a. Retain most of the qualities of gelatin dynamite, but derive a portion of their strength from ammonia nitrate.

   b. Manufactured in 20 to 90 percent strengths.

5. Military dynamite - is the fifth, which we discussed.

(9) Permissibles or permitted explosives

(a) These are explosives that have been approved by the U.S. Bureau of Mines or the British Ministry of Fuel and Power for use in gas or dust-filled mines.

(b) When detonated, permissible explosives are especially designed to produce a flame of low volume, short duration, and low temperature to prevent the ignition of gas or dust within the confined space of a mine.

(c) They are similar in appearance and packaging to other dynamites.

(10) Ammonium Nitrate

(a) One of the least sensitive and readily available main charge high explosives.

(b) It ranges in color from white to buff-brown or grey.

(c) It is usually found in the form of small, compressed pellets called PRILLS.

(d) While it is used extensively as a blasting agent and by the military as a cratering charge, it is also used as an ingredient in some dynamites and is widely employed as a fertilizer.

Show VA S2-1-127
T2-1-127

Content: **Notes:**

(e) It requires a booster for detonation.

(f) It is very hydrosorbic and will lose its power and sensitivity in direct proportion to its moisture content.

(g) It is readily accessible to anyone, including bombers.

(h) It is easily sensitized with fuel oil and is generally referred to as ANFO (ammonium nitrate fuel oil).

(i) Ammonium nitrate should be handled with some degree of caution, because it is a strong oxidizing agent and has the ability to increase the combustibility of other flammable materials, if contact is made.

(j) Brass or bronze nonsparking tools should NOT be employed with ammonium nitrate because they react with the ammonium nitrate to form tetramino-nitrate, which is as sensitive an explosive as lead azide.

(11) Blasting Agents

(a) A blasting agent is an insensitive chemical composition or mixture, consisting largely of ammonium nitrate.

(b) Blasting agents will detonate when initiated by high explosive primers or boosters.

(c) One group of blasting agents is called nitro-carbo-nitrates or NCN, mainly ammonium nitrate and oil, with special additives to prevent hardening and reduce static electricity.

Content: **Notes:**

(d) Another group of blasting agents is made up of NCN with high explosive mixtures added, usually TNT.

(12) Free running explosives

(a) Consist of NCN, with or without the addition of high explosives.

(b) They are granula or small pellet form and can be poured around rigid explosive charges to fill all available space in a bore hole.

(c) Free running agents are packaged in 12-1/2, 50, 80, and 100-pound, multi-wall paper bags, asphalt laminated bags or polyethylene bags.

(13) Blasting slurries

(a) These consist of NCN, with or without the addition of TNT, in a gel-like consistency.

(b) Some of the slurries have powdered metals, such as aluminum, to increase their performance.

(c) Because of their consistency, they can be poured into regular or wet bore holes.

(d) They require a booster for detonation.

(e) They are packed in polyethylene bags 2 to 8 inches in diameter or may be delivered to the blasting site by special pump trucks.

3.4
SECONDARY HIGH EXPLOSIVE BOOSTERS

Show VA S2-1-128
T2-1-128

Content: **Notes:**

(1) These boosters provide the link between the primary high explosive (blasting cap) and the comparatively insensitive main charge. They are also called primer explosives or simply primers.

(2) The explosive packaged for boosters is relatively sensitive and must be carefully handled.

(3) Most boosters will detonate on sharp impact, such as that from a bullet.

(4) They are usually cylindrical in shape, and are in cardboard or plastic and are of various sizes.

(5) Boosters packaged in metal containers are usually employed in wet blasting operations.

(6) Common explosives used in boosters are:

(a) Pentolite - 50% PETN and 50% TNT. Varies in color from grey to yellow.

(b) RDX - Alone and mixed with other explosives. The TITAN BOOSTER is designed primarily for underwater work.

Show VA S2-1-129
T2-1-129

(c) PETN - Used in detonating cord. Most commonly used to boost ammonium nitrate and other cap insensitive explosives.

(d) TETRYL - Is the most common military booster. It is yellow in color, but may appear grey if graphite has been added.

3.5 TWO PART EXPLOSIVES

(1) Kinepak

Show VA S2-1-130
T2-1-130

Content: **Notes:**

(a) Kinepak is a two-part explosive which is inert until mixed.

(b) When mixed it can be detonated with a #6 blasting cap.

(c) Kinepak generates 50% more shock energy than 75% dynamite.

(d) It is 20 times less shock or impact sensitive than dynamite.

(e) Mixture of the two components takes about 10 seconds.

(f) Kinepak may be carried in a public safety vehicle without violating Department of Transportation regulations.

(2) Astrolite

(a) A two-part liquid explosive developed for commercial and military application.

(b) It comes in two plastic bottles. The smaller bottle contains a dry solid component and the larger bottle contains a liquid filled can in the bottom.

Show VA S2-1-131
T2-1-131

(c) The contents of the small can are poured into the larger bottle. The larger bottle is pressed down, puncturing the liquid filled can.

(d) By shaking the bottle, the two components are mixed and are ready for detonation with a standard blasting cap.

(e) Astrolite is clear in color and smells strongly of ammonia.

(f) Excessive inhalation of vapors or contact with the skin should be avoided.

Content: **Notes:**

(g) Astrolite reacts with tetryl and will cause it to detonate. It also reacts to brass, copper and most other metals, making aluminum caps necessary.

3.6 IMPROVISED EXPLOSIVES

(1) When manufactured explosives are not available, it is relatively easy to obtain all the ingredients necessary to improvise explosive materials.

(2) The listing of existing materials, ingredients, and simple chemical compounds which can be employed to construct homemade bombs is virtually unlimited.

(3) Most of the ingredients can be obtained at local hardware and drugstores, supermarkets, and other industrial facilities.

(4) Starch, flour, sugar or cellulose materials can be treated to become effective explosives.

(5) Powder from shotgun shells, small arms ammunition, match heads, firecracker powder and ammonium nitrate fertilizers can be accumulated in such volume as to create devastating main charges.

(6) To detonate or explode these improvised main charges, the most common means are:

(a) Blasting caps

(b) Percussion primers

(c) Flash bulbs

(7) The most widely improvised main charge explosives are black and smokeless powder.

Content: **Notes:**

(8) Other common inprovised explosives include:

(a) Match heads - used in pipe bombs, easy to ignite with a fuse.

(b) Smokeless powder - used in pipe bombs and other confinement materials.

(c) Potassium/Sodium chlorate - used in pipe bombs or as an incendiary device.

3.7 NITROGLYCERIN

(1) Not often employed as a main charge, it does present special public safety problems.

(2) It is the main component in dynamite and is found in lesser concentrations in a number of other explosives.

(3) Pure nitroglycerin is used by oil companies to fracture subterranean formations encountered in oil or gas well drilling, and may be used to "Snuff out" oil well fires.

(4) Criminals have used liquid nitroglycerin to blow open safes and vaults.

(5) It is an oily liquid which is not mixable with water and it is about 1.6 times heavier.

(6) It may be anything from clear and colorless to amber, and has been found looking almost milky.

(7) Brown fumes in a bottle of nitroglycerin are due to nitric acid, indicate decomposition, and are in an increasingly hazardous state.

Content: **Notes:**

(8) It is almost odorless, however, there may be an acrid odor due to the presence of acid, and it has a sweet taste.

(9) In a pure state it is very sensitive to:

(a) Heat

(b) Shock

(c) Friction

(10) When frozen, nitroglycerin is less sensitive; however, in a semi-frozen state it becomes extremely sensitive due to the internal crystal stress brought about by freezing or thawing.

(11) Sensitivity is increased by heat.

(12) Even under ideal conditions, nitroglycerin is extremely dangerous to handle and can explode from such causes as a slight jar, overheating or chemical reaction.

(13) In certain cases it has been known to detonate for no apparent reason at all.

(14) Unless the investigator is well qualified to handle and deal with nitroglycerin, he should call on a chemist or EOD personnel.

3.8
SUMMARY

(1) Cover all the salient points.

(2) Cover all those areas that may be in the form of a question in a quiz or examination.

Content: **Notes:**

3.9
VISUAL AIDS - Unit III - Demolition Materials & Accessories

The visual aids listed below are for use in lesson plan 5145-3.

Slides		Transparencies
Unit III	Description	Kit #68
S2-1-100	Safety fuse	T2-1-100
S2-1-101	Nonelectric blasting cap	T2-1-101
S2-1-102	Electric blasting cap	T2-1-102
S2-1-103	Types of electric caps	T2-1-103
S2-1-104	Delay caps	T2-1-104
S2-1-105	Detonating cord	T2-1-105
S2-1-106	Types of detonating cord	T2-1-106
S2-1-107	Application of detonating cord	T2-1-107
S2-1-108	Igniting safety fuse	T2-1-108
S2-1-109	Flame type fuse lighter w/ignitacord	T2-1-109
S2-1-110	Flame type fuse lighter w/hot wire	T2-1-110
S2-1-111	Electric squib	T2-1-111
S2-1-112	Friction type fuse lighter	T2-1-112
S2-1-113	Percussion fuse lighters	T2-1-113
S2-1-114	Blasting machines	T2-1-114
S2-1-115	Mini-blaster	T2-1-115
S2-1-116	Mini-blaster 7107-7 and 7107-4	T2-1-116
S2-1-117	Nonelectric blasting kit	T2-1-117
S2-1-118	Electric blasting kit	T2-1-118
S2-1-119	TNT	T2-1-119
S2-1-120	Tetrytol	T2-1-120
S2-1-121	C-3	T2-1-121
S2-1-122	C-4 & U112	T2-1-122
S2-1-123	M-118	T2-1-123
S2-1-124	M-186 - Ribbon	T2-1-124
S2-1-125	Military dynamite	T2-1-125
S2-1-126	Commercial dynamite	T2-1-126
S2-1-127	Ammonium nitrate charge	T2-1-127
S2-1-128	Commercial booster	T2-1-128
S2-1-129	Titan booster	T2-1-129
S2-1-130	Kinepack	T2-1-130
S2-1-131	Astrolite	T2-1-131

Lesson Plan 5145-4

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Firing Systems

Objectives:
1. To familiarize the student with the types of systems used for priming and firing explosives.

Assistants:
None

Total Time
Two hours

Space Required:
Classroom for 30 students.

Methods:
Lecture & conference.

Training Aids:
See Visual Aids Page 4-17. Screen, blackboard, podium, pointer, chalk, eraser.

Student Materials:
Notebook and pencil.

References:
FM 5-25, Explosives and demolitions.

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

INSTRUCTOR NOTE:

Inform students that the information presented is for official use only.

4.0
FIRING SYSTEMS

4.1
THE TWO TYPES OF SYSTEMS FOR FIRING EXPLOSIVES ARE:

(1) Non-electric

(2) Electric

4.11
Both have their individual priming methods and materials.

Content: **Notes:**

4.2
SYSTEM COMPONENTS AND ASSEMBLY PROCEDURES FOR DETONATION.

4.21
Non-electric system.

(1) An explosive charge prepared for detonation by a non-electric blasting cap is a non-electric system.

(2) The priming system consists of:

(a) Time fuse & ignition system

(b) Non-electric blasting cap

(3) The time fuse is cut with a tool called crimpers. — Explain Visual Aid; Show VA S2-1-200, T2-1-200

(a) Are constructed of a non-spark metal with the handles acting as a screw driver and a punch for making cap wells in explosives.

(b) The tool is also equipped with a fuse cutter for the right angle cutting of safety fuse. — Show VA S2-1-201, T2-1-201

(c) The upper jaws are for crimping the outer shell of the blasting cap onto the safety fuse. — Show VA S2-1-202, T2-1-202

(d) A method of crimping the cap onto safety fuse is shown here.

(4) The assembly of the non-electric system is as follows:

(a) Cut and discard the first 6 inch length from a roll of time fuse. This is done to insure that there is no chance of misfire from a damp powder train because of moisture absorption from the open air.

Content: **Notes:**

(b) Then cut a one foot length of time fuse for purposes of checking the burning rate of the fuse.

(c) Then cut the desired length of time fuse for the detonating charge. Make sure this length is long enough to permit the person detonating the charge to reach a safe distance by walking to a safe place before the explosion.

(d) Take a blasting cap and inspect the open end for debris. Do not blow into the cap or hit it with a hard object. Tap it gently, or bump the hand holding it with the other hand. Show VA S2-1-203 T2-1-203

(e) Hold the time fuse vertical and insert the square cut time fuse into the open end of the blasting cap till you meet resistance. Do not force the time fuse into the cap by twisting or any other method.

(f) After the blasting cap has been seated, grasp the time fuse between the thumb and third finger of the left hand and extend the forefinger over the end of the blasting cap to hold it firmly against the end of the time fuse.

(g) Set the crimpers on the thumb and third finger, and crimp the blasting cap at a point 1/8 to 1/4 of an inch from the open end. Make sure the cap is firmly held onto the safety fuse at all times. Point the cap away from the body during crimping procedure.

(h) Slide the time fuse through the priming adaptor, then pull the cap into the adaptor until it stops, and insert into the cap well of the explosive, and screw the adaptor into place. Show VA S2-1-204 T2-1-204

Show VA S2-1-205 T2-1-205

Content: **Notes:**

(i) If no priming adaptor is available, insert the capped time fuse into the cap well and tie it in place with a string or fasten it with tape or some other available material.

(j) The cap well for dynamite is prepared with the crimper punch. Show VA S2-1-206 T2-1-206

(k) End priming of dynamite is as shown here. Show VA S2-1-207 T2-1-207

(l) Side priming of dynamite is as shown here. Show VA S2-1-208 T2-1-208

(m) The friction, percussion, match or other ignition device or technique is fastened to the time fuse.

(5) The above technique constitutes the non-electric firing system. All explosives may be primed in the manner described.

(6) The handling of non-electric misfires.

(a) Occasionally, despite all painstaking efforts, a non-electric misfire will occur.

(b) Investigation and correction of the misfire should be undertaken by the instructor in charge of the range firing or in other situations, the man who placed the charge, or Explosive Ordnance Disposal.

(c) The procedures are as follows:

1. Delay the investigation of the misfire at least 30 minutes.

2. If the misfired charge is not tamped, lay a new primer at the side of the charge, without moving or disturbing it, and fire.

Content: **Notes:**

3. If the misfired charge has no more than a foot of tamping, attempt to explode it by detonating it by placing a new 2-pound primer placed on top.

4. If the misfire is located in a tamped bore hold, the tamping must be removed by means of wooden or non-metallic tools. Avoid accidentally digging into the charge. When the charge has been uncovered within 1 foot, insert and detonate a new 2-pound primer.

5. An alternate method is to drill a new hole within 1 foot of the old hole and to the same depth, place a 2-pound charge into the new hole and detonate the misfired charge. Extreme care must be used in this method.

4.22
Electric firing system

(1) An explosive charge prepared for detonation by an electric blasting cap is an electric system.

(2) The priming system consists of:

(a) Electric blasting cap.

(b) Firing wire and reel.

(c) Blasting machine.

(3) A testing device is required for the testing of the firing reel and blasting cap for continuity and shorts. It is called a galvanometer. Show VA S2-1-209 T2-1-209

(a) The most important characteristic of this device is the battery contained inside.

Content: **Notes:**

(b) It must be a silver chloride BA 254/4 type and of insufficient power to cause initiation of the blasting cap.

(4) The reel of wire should be of #18 gauge, double conductor and not more than 500 feet if the military blasting machines are to be used.

Show VA S2-1-210 T2-1-210

Show VA S2-1-211 T2-1-211

(5) The preparation of the explosive charge for detonation by electrical means is called priming.

(6) The galvanometer is used to check the electrical reel of wire, however, first the galvanometer must be checked for serviceability.

Show VA S2-1-212 T2-1-212

(a) This is done by placing a metal object across the terminals of the galvanometer.

(b) A deflection of the needle should register on the dial.

(c) If no deflection, you have a bad device.

(7) Testing the reel of wire for continuity.

Show VA S2-1-213 T2-1-213

(a) Twist the wires together at one end of the firing wire and place the other ends on the posts of the galvanometer.

(b) This should cause a wide deflection in the needle.

(c) No movement of the needle indicates a break in the wire.

(d) A slight movement, a point of high resistance.

(e) The wire can be tested on the reel, however, it should be tested again after unreeling.

Content: **Notes:**

(8) Testing the wire for shorts. Show VA S2-1-214 T2-1-214

(a) Separate the firing wire at both ends.

(b) Touch at one end of the reel to the posts on the galvanometer.

(c) The needle should not move.

(d) If it does, the firing wire has a short circuit.

(9) Testing the electric blasting cap. Show VA S2-1-215 T2-1-215

(a) Remove the short circuit shunt from the lead wires of the electric blasting cap.

(b) Touch one cap lead to one galvanometer post and the other cap lead to the other.

(c) If the needle deflects on the meter, the blasting cap is good.

(d) If not, the blasting cap is defective and should not be used.

SAFETY TIP

During the blasting cap test, always point the explosive end of the blasting cap away from the body.

(10) The common series circuit. Show VA S2-1-216 T2-1-216

(a) This is used for connecting two or more charges fired electrically by a blasting machine or other electric power source.

(b) A common series circuit is prepared by connecting one blasting cap lead wire from the first charge and so on until only two wires are free.

(c) Then connect the free ends of the cap lead wires to the end of the firing wire.

(11) The "Leapfrog" series circuit. Show VA S2-1-217 T2-1-217

(a) The "leapfrog" method of connecting caps in series is useful for firing ditching charges or any long line of charges.

Content: **Notes:**

(b) It consists of omitting alternate charges on the way and then connecting them to form a return path for the electric impulses to reach the other end of the firing wire.

(c) This technique brings both end wires out at the same end of the line of charges, and eliminates laying a long return lead from the far end of the line of charges back to the firing wires.

(12) Electric priming.

(a) After the cap has been tested, place the cap lead wires through the slot of the adaptor and pull the cap into place.

(b) Insert the cap into the explosives in the same manner as the non-electric method.

(c) If a priming adaptor is not available, insert the cap into the cap well, and tie the lead wires around the explosives by using two half hitches or a girth hitch.

(13) Wire connections.

(a) Bare the two cap leads and the firing wires at the ends and splice them together.

(b) Insulate with friction tape or cardboard.

(c) Check the two free wires of the firing reel with the galvanometer again.

(d) Fasten the two free wires to the posts on the blasting machine.

(14) The electric firing system. Show VA S2-1-218 T2-1-218

(a) This same system is used to electrically prime and detonate all explosives.

Content: **Notes:**

(b) The techniques of placing the cap into explosives are many.

(15) Electric priming of dynamite. Show VA S2-1-219 T2-1-219

(a) The punch or the crimpers are used to prepare the cap well.

(b) The cap is tested and inserted into the well.

(c) The lead wires are used to hold the cap in place.

(d) The lead wires are then connected to the firing reel, tested, blasting machine attached and fired.

(16) Prevention of electric misfires.

(a) In order to prevent misfires, make sure all blasting caps used are of the same manufacture.

(b) All splices are tightly made, and firing wire checked.

(c) Make sure all blasting caps are included in the firing circuit.

(d) All connections are properly made.

(e) Short circuits are avoided.

(f) Grounds are avoided.

(g) The number of caps in the circuit does not exceed the rated capacity of the power source.

(17) Cause of misfires.

(a) Inoperative or weak blasting machine or power source.

(b) Improperly operated blasting machine or power source.

Content: **Notes:**

(c) Defective and damaged connections causing either a short circuit, a break in the circuit, or high resistance with resulting low current.

(d) Faulty blasting cap.

(e) The use of more blasting caps than the power source rating permits.

(18) Handling of electric misfires.

(a) Because of the hazards of burning charges and delayed explosions, electric misfires must be handled with extreme caution.

(b) If an electric misfire occurs, immediately try 2 or 3 more times to fire, then remove the firing wire from the power source.

(c) If the electric misfire is below ground wait 30 minutes before investigating.

(d) Check the firing wire connections all the way down to the cap lead wires, correct any deficiencies, reconnect the power source and fire again.

(e) If the charge fails to fire, disconnect power source and wait 30 minutes before further investigation.

(f) Insure that all wires are shunted before below ground procedures are implemented. Follow same procedures used with non-electric misfire, and initiate detonation.

(g) If the electric misfire is above ground, it may be investigated immediately, checked and detonated with a new primed charge.

(19) Premature detonation by induced currents and lightning.

Content: **Notes:**

(a) Induced currents

1. These are currents induced by radio frequency (RF) current.

2. Minimum safe distance tables are available through the Institute of Makers of Explosives, New York, or the explosive dealer.

3. Mobile transmitters are prohibited within 150 feet of any electrical blasting caps or electric blasting system.

(b) Lightning

1. Lightning is a hazard to both electric and non-electric blasting charges.

2. A strike or a nearby miss is almost certain to initiate either type of circuit.

3. Lightning strikes at even remote locations, may cause extremely high local earth currents, and shock waves that may initiate electrical firing circuits.

4. All blasting activities should be suspended during electrical storms.

4.3
DETONATING CORD SYSTEM AND PRIMING

Show VA S2-1-220
T2-1-220

(1) Of all primers for explosive charges, detonating cord is probably the most versatile.

(2) It is especially applicable for underwater and underground blasting, as the blasting cap of the initiating system may remain above the water or ground.

Content: **Notes:**

(3) The detonating cord primer consists of:

(a) Detonating cord.

(b) Means of detonation.

1. Electric blasting cap and power source.

2. Non-electric blasting cap, time fuse and fuse ignition method.

(4) The detonating cord primers are usually tied around the block of explosive.

(a) Priming of dynamite — Show VA S2-1-221 T2-1-221

1. Dynamite is primed by lacing the detonating cord through it.

2. This is done by punching three or four equally spaced holes through the dynamite cartridge.

(b) Priming TNT — Show VA S2-1-222 T2-1-222

1. The detonating cord is wrapped at least five times around the block of explosives.

2. A clove hitch with two extra turns may be used.

(c) Priming plastic explosives.

1. The detonating cord is doubled at one end.

2. An overhand knot is then tied.

3. The plastic explosive is then moulded around the knot with at least 1" of explosive around the knot.

(5) Detonating cord assemblies and connections.

(a) Non-electric assembly.

Content: **Notes:**

1. Consists of a length of detonating cord (approximately 2 feet).

2. A non-electric blasting cap.

3. A length of time fuse and fuse lighter.

4. The blasting cap is crimped to the time fuse and then fastened to the detonating cord.

5. The fuse lighter is then fastened to the fuse.

(b) Electric assembly.

1. The electric detonating assembly is a length of detonating cord (approximately 2 feet) with an electric blasting cap attached.

(c) Detonating cord connections. Show VA S2-1-223 T2-1-223

1. A detonating cord clip or a square knot pulled tight is used to splice the ends of the detonating cord.

2. At least a 6-9 inch length should be left free at both sides of the knot.

3. When fabric is used to cover the detonating cord, the fabric must not be removed.

4. The knot should not be placed in water or in the ground unless the charge is to be fired immediately.

(d) Branch line connections.

1. A branch line is fastened to a main line by means of a clip or girth hitch with one extra turn. Show VA S2-1-224 T2-1-224

Content: **Notes:**

2. The angle formed by the branch line and the cap end of the main line should not be less than 90° from the direction from which the blast is coming.

3. At a smaller angle the branch line may be blown off the main line without being detonated.

4. At least 6 inches of the running end of the branch line is left free beyond the tie.

(e) Ring Main — Show VA S2-1-225 / T2-1-225

1. A ring main is made by bringing the main line back in the form of a loop and attaching it to itself with a girth hitch and one extra turn.

2. Branch lines coming from a ring main should be at a 90° angle.

3. Kinks in lines should be avoided and curves and angles should be gentle.

4. Any number of branch lines may be connected to the main line.

5. Avoid crossing lines as they will cut each other off.

(f) Detonating cord misfires.

1. Failure of non-electric blasting cap.

   a. If a non-electric blasting cap initiator attached to detonating cord fails to function, delay the investigation for 30 minutes.

   b. Then cut the detonating cord between the main line and the blasting cap and the charge, and fasten a new blasting cap.

Content: **Notes:**

2. Failure of Electric blasting cap.

   a. If an exposed electric blasting cap fastened to detonating cord fails to fire, disconnect the blasting machine immediately and investigate.

   b. Test the blasting circuit for any breaks or shorts.

   c. If necessary, replace the original blasting cap.

3. Failure of detonating cord.

   a. If detonating cord fails to function at the explosion of an exposed electric or non-electric cap, investigate immediately.

   b. Attach a new blasting cap to the detonating cord, taking care to fasten it properly.

4. Failure of Branch Line.

   If the detonating cord main line detonates but a branch line fails, fasten cap to the branch line and fire it separately.

5. Failure of charge to explode.

   a. If the detonating cord leading to the charge detonates but the charge fails to explode, when above ground, delay investigation until it is certain that the charge is not burning.

   b. When charge is below ground, wait 30 minutes.

   c. If the charge is scattered by the detonation of the original detonating cord, reassemble as much of the original

Content: **Notes:**

charge as possible, place a new charge, if necessary, and re-prime.

d. Make every attempt to recover all explosives scattered by a misfire, particularly in a training exercise.

4.4
DUAL FIRING SYSTEMS

(1) The use of a dual firing system greatly increases the probability of successful firing.

(2) The dual firing system may consist of:

(a) Two non-electric systems.

(b) Two electric systems.

(c) A combination of the electric and non-electric. Show VA S2-1-226 T2-1-226

1. Each charge has a non-electric and electric primer.

2. Both systems are entirely independent of each other.

3. The non-electric system should be fired first.

4.5
SUMMARY

4.51
Review the two types of firing systems.

(1) Non-electric.

(2) Electric.

4.52
Review those areas that may be in the form of questions in a quiz or examination.

A practical exercise for range firing may be developed from this lesson plan, however, range procedures have been omitted from this lesson plan.

Content: **Notes:**

4.6
VISUAL AIDS - Unit IV - Firing Systems

The visual aids listed below are for use in Lesson Plan 5145-4.

Slides		Transparencies
Unit IV	Description	Kit #69
S2-1-200	Crimpers	T2-1-200
S2-1-201	Cutting safety fuse	T2-1-201
S2-1-202	Crimping blasting cap	T2-1-202
S2-1-203	Method of crimping cap	T2-1-203
S2-1-204	Priming adaptor	T2-1-204
S2-1-205	Priming adaptor in TNT	T2-1-205
S2-1-206	Preparing dynamite w/crimpers	T2-1-206
S2-1-207	End priming dynamite	T2-1-207
S2-1-208	Side priming dynamite	T2-1-208
S2-1-209	Galvanometer	T2-1-209
S2-1-210	Reel of wire	T2-1-210
S2-1-211	Blasting machines	T2-1-211
S2-1-212	Testing galvanometer	T2-1-212
S2-1-213	Testing reel of wire for continuity	T2-1-213
S2-1-214	Testing reel of wire for shorts	T2-1-214
S2-1-215	Testing blasting cap	T2-1-215
S2-1-216	Common series circuit	T2-1-216
S2-1-217	"Leapfrog" circuit	T2-1-217
S2-1-218	Electric firing system	T2-1-218
S2-1-219	Electric priming of dynamite	T2-1-219
S2-1-220	Detonating cord system	T2-1-220
S2-1-221	Detcord primed dynamite	T2-1-221
S2-1-222	Detcord primed TNT	T2-1-222
S2-1-223	Square Knot	T2-1-223
S2-1-224	Girth hitch	T2-1-224
S2-1-225	Det cord firing system	T2-1-225
S2-1-226	Combination electric and non-electric firing system	T2-1-226

Lesson Plan 5145-5

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Firing Devices

Objectives:
1. To familiarize the student with the various types of firing devices and detonators.

2. To familiarize the student with firing systems and techniques used in bombs and destructive devices.

Assistants:
None

Total Time
One Hour

Space Required:
Classroom for thirty students.

Methods:
Lecture, conference and demonstration.

Training Aids:

See Visual Aids Page 5-9. Screen, blackboard, podium, pointer, chalk, eraser.

Student Materials:
Notebook and pencil.
Student Handout 5145-5-1

References:
FM 5-25 - Explosive and Denotation
FM 5-31 - Installation of Boobytraps
Military Firing Devices

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

INSTRUCTOR NOTE: Brief students on lesson material.

The material contained in this lesson is FOR OFFICIAL USE ONLY and should only be disseminated to law enforcement personnel attending a recognized course of instruction. This information should not be discussed in public areas. Notes on the functioning of firing devices should not be left in an unguarded or unlocked condition where they might fall into the wrong hands.

5.1
FIRING DEVICES

5.11
What Is a Firing Device?

(1) A firing device is a mechanism designed to initiate a train or detonation in

Question
Present question to class and solicit discussion.

Content: **Notes:**

bombs, boobytraps, mines, demolition charges and other destructive devices.

(2) Employment of fiendish mechanisms is not new. Since early recorded history man has devised cunning traps to foil his enemy. Today we are still at it, however, the state of the art has advanced to an effectiveness where bombs can now be made that cannot be disarmed. The systems and mechanisms of the devices encountered today are not stereotypes and the procedures for their employment and use in bombs is limited only by the imagination of the bomber.

5.12
The Components of a Bomb Are:

(1) An ignition system.

(2) Explosive or incendiary material.

(3) Container (not always required).

(4) Basically a bomb consists of a firing device, a detonator and a main charge. The firing device may be attached directly to the detonator or connected to it by detonating cord, time fuse, or electric wires depending on the type of device.

5.13
Firing - the firing techniques employed as a means of initiating for a bomb are varied and many. Let us become bomb manufacturers for a moment and try to think of techniques that we can use to initiate a detonation. Some of the techniques are as follows:

Develop class participation and solicit firing techniques from the students and put on blackboard.

(1) Mechanical — Chemical

Electrical — Audio

Friction — Gravitational

Seismic — Expansion

Thermal (Heat) — Contraction

Content: **Notes:**

Barometric

(2) The initiating action is usually by personnel disturbing an apparently harmless object which acts upon the firing device which, in turn, sets off the detonator. The detonator detonates the main charge.

(3) Other iniating actions can be caused by the techniques discussed as shown on the blackboard.

5.2
FIRING DEVICES
Let us now look at some of the firing devices and their operational characteristics.

5.21
Pull Type, M1

Show VA S2-1-250
T2-1-250

(1) This non-electric mechanism is designed primarily for use with a trip-wire.

(2) It is a pull operated percussion type.

(3) The mechanism is designed to operate where a person or vehicle moves a trip-wire pulling release pin.

(4) The device must be firmly anchored in place.

(5) Safety pins in the head and body of the device prevent premature firing.

(6) A blasting cap can be crimped onto the end of the base coupling percussion cap. The percussion cap can be used on a pipe bomb filled with black powder. A blasting cap is not needed.

At this time, demonstrate the functioning of the pull type, M1 firing device. Make sure the plastic covering over the base coupling is removed and do not aim the device at personnel. This gives you an idea of the function of this device.

(7) A pull of 3-5 pounds applied through a distance of about 1/32 of an inch will cause the device to fire.

5.22
Pull-Release Type, M3

Content: **Notes:**

(1) This device is primarily designed for use with a trip wire. However, it has an advantage over the M1, in that this device has both pull and tension release firing action.

Show VA S2-1-251
T2-1-251

(2) Safety pins are provided to prevent premature firing.

(3) An anchor lug, cast integral with the firing device body, may be used to secure the device in place.

(4) It has a winch with a ratchet mechanism used to tighten the trip wire and apply tension to the device.

(5) Any movement of the trip wire, either in or out, will fire the device.

(6) A pull of six to ten pounds on the trip wire will cause the pull operation to function and fire the device.

(7) A release of tension, such as detaching or cutting of the trip wire will cause the device to fire.

5.23
Pressure Type, M1A1

Show VA S2-1-252
T2-1-252

(1) This device is primarily designed to function when pressure, such as results when it is stepped on by a person, is applied to the cap.

(2) A solid foundation is required to hold firing device in a fixed position.

(3) The striker assembly consists of a spring striker which is held back by the button at the top; when pressure is applied to the bottom, the striker is released firing the device.

(4) The button has a threaded hole in it to accommodate a three-pronged pressure head or an extension rod that may be adjusted to raise or lower the point of contact to a pressure object.

Content: **Notes:**

(5) A safety clip and safety pin are provided to prevent premature firing.

(6) The trip wire anchor must be firm enough to withstand a pull of at least twenty pounds.

5.24
Pressure-Release Type, M5

Show VA S2-1-253
T2-1-253

(1) This device is primarily designed to function when a load resting on the hinged plate is removed.

(2) A load of at least five pounds resting on the release plate is required to restrain this device.

(3) A positive safety hole (interceptor hole) is located on the side of the box. This hole is used during the arming process to prevent accidental firing of the device.

Show VA S2-1-254
T2-1-254

(4) A blasting cap may be crimped onto the standard base coupling.

And discuss function of cutaway

5.25
Concussion Detonator, M1

Show VA S2-1-255
T2-1-255

(1) This device is a mechanical firing device which is actuated by the percussion wave of a nearby blast.

(2) It will fire several charges simultaneously without connecting them with wire or detonating cord.

(3) A single charge fired in any way in water or air will detonate all charges primed with concussion detonators within range of the main charge or each other.

(4) This operating range is based on the amount of explosive in each charge.

(5) This detonator will function by hydrostatic pressure at a depth of twenty-five feet.

Content: **Notes:**

(6) The salt delay tablet is a safety mechanism and when it is dissolved by water or moisture the device becomes armed. A safety pin is used to prevent premature firing.

5.3
DELAY DETONATORS AND OTHER FIRING DEVICES

(1) Standard delay detonators are devices for detonating explosive charges after a definite period of delay.

(2) The initiating mechanism, delay system, and detonator are all integral parts of a unit.

(3) Time delay varies with temperature changes and accurate timing is not possible.

(4) Changes may vary from minus one to plus four seconds from established standards.

5.31
M1 Firing Device

Show VA S2-1-257
T2-1-257

(1) This is a percussion type, chemically operated firing device, used in detonating a bomb or boobytrap.

(2) This device cannot be test fired.

(3) Firing device consists of a body divided into two compartments.

(a) Lower compartment contains a spring loaded striker held by a wire that passes to the upper compartment.

(b) In the upper compartment there is a glass vial of acid attached to the wire.

(4) Lower compartment is made of brass and upper compartment of copper.

(5) To fire the detonator the upper compartment is squeezed, crushing the glass vial of acid.

Content: **Notes:**

(6) The acid will react on the wire, eventually causing it to break, releasing the spring loaded firing pin.

(7) Each identification strip indicates a specific time delay. The color code is enclosed in the detonator packaging.

(8) An inspection hole is used to insert a nail or similar item to act as a safety and prevent premature firing.

5.32
Fifteen Second Delay Detonator (MIA2)

Show VA S2-1-258
T2-1-258

(1) This percussion detonator may be used with any boobytrap or bomb having a threaded cap well, whenever a delay of approximately fifteen seconds is desired.

(2) It consists of:

(a) a pull-type fuse lighter

(b) a fifteen second length of fuse

(c) a blasting cap.

(3) It is water resistant and may be fired under water.

(4) Used in a bomb or boobytrap it can be activated by a pull on the pull ring.

(5) The charge must be secured in place if a trip wire is used as the means of initiation.

(6) A cotter pin safety is used to prevent premature firing.

(7) Round pull ring signifies it is a fifteen second detonator.

5.33
Fifteen Second Friction Delay Detonator (MIAI)

Show VA S2-1-25
T2-1-25

Content: **Notes:**

This detonator performs the same function as the MIA2 except that it is a friction type device.

5.34
Eight Second Percussion Delay Detonator

Show VA S2-1-260
T2-1-260

(1) This delay functions the same as the fifteen second delay detonators.

(2) The T-handle on this detonator indicates that it is an eight-second device.

5.35
Eight-Second Friction Delay Detonator

Show VA S2-1-261
T2-1-261

This detonator is the same as the other delays except that it is a friction type device.

This has been a short introduction into the field of firing devices and techniques. The items we have just seen are hardware devices used by the Armed Forces of the United States. They have been distributed all over the world and similar devices are used by all armies of foreign nations.

5.4
SUMMARY

STUDENT HANDOUT 5145-5-1. This handout shows some of the common materials used as explosives or incendiary bomb ingredients.

The area of improvisation has not been covered during this period. The construction of an improvised firing device is restricted only by the ingenious imagination of the inventor. Earlier we covered the various systems that can be employed as triggering mechanisms for firing devices. We covered some of the firing devices and their characteristics. The next period we shall take a look at various types of fuze actions and how they can be employed in bombs, explosives and other destructive devices.

Content: **Notes:**

5.5
TIE-IN

(1) The next one to four hour period of instruction can be a showing of various slides or training bombs and explaining their construction and functioning, or,

(2) A two to three hour period of instruction can be developed by covering the Material Bomb Data Slides - Fuzes and fuze components.

Part I - Delay Fuzes - 80 slides

Part II - Acting Fuzes - 75 slides.

(3) The NBDC presentation lesson 5145-6, Bombs and Destructive Devices is sensitive and is for official law enforcement instruction only.

5.6
VISUAL AIDS - Unit V - Firing Systems

The visual aids listed below are for use in lesson 5145-5, Firing Devices.

Slides		Transparencies
Unit V	Description	Kit #70
S2-1-250	MI - Pull Device	T2-1-250
S2-1-251	M3 - Pull-Release Device	T2-1-251
S2-1-252	MIAI - Pressure Device	T2-1-252
S2-1-253	M5 - Pressure Release Device	T2-1-253
S2-1-254	M5 - Cutaway	T2-1-254
S2-1-255	Concussion Device	T2-1-255
S2-1-256	Concussion Device Cutaway	T2-1-256
S2-1-257	MI - Delay Detonator	T2-1-257
S2-1-258	15 Second Delay Percussion Detonator	T2-1-258
S2-1-259	15 Second Delay Friction Detonator	T2-1-259
S2-1-260	8 MAI Second Delay Percussion Detonator	T2-1-260
S2-1-261	8 M Second Friction Detonator	T2-1-261

Lesson Plan 5145-7

Course:
Modular Explosives Training Course for Law Enforcement Officers.

Lesson:
The Bomb Incident

Objectives:

1. Familiarize the student with the development of the bomb incident and the six critical decision points.

2. Familiarize the student with policy development related to the bomb incident.

3. Familiarize the student with the skill and functional assignments required to cope with the bomb incident.

Assistants:
None

Total Time
1 Hour

Space Required:
Classroom for 30 students

Methods:
Lecture and conference

Training Aids:
See Visual Aids Page 7-16 & 17.
Screen, blackboard, podium, pointer, chalk, eraser.

Student Materials:
Notebook and pencil
Student Handout 5145-7-1 and 2.

References:
NBDC Publication 02-
Development of Bomb Incident Policy and Procedure

NOTE:
THE MATERIAL CONTAINED IN THIS LESSON PLAN IS FOR OFFICIAL LAW ENFORCEMENT USE ONLY.

Content: **Notes:**

7.0
THE BOMB INCIDENT

7.1
POLICY AND PROCEDURE CONSIDERATIONS.

(1) Like all major public safety responsibilities, the bomb incident can be effectively handled only through prior planning and policy formulation.

(2) All agencies, regardless of size or location, should anticipate bomb and bomb threat incidents.

(3) Procedures that will most effectively respond to the incident, utilizing available personnel and material resources, must be developed.

Content: **Notes:**

(4) A single concept of operations applicable to all public safety agencies would not be practical.

(5) There are certain basic considerations that apply to all bomb incident planning. They are: Good for class discussion.

(a) What is the basic objective of public safety response to a bomb incident?

(b) What public safety agency will respond?

(c) Will the public safety agency respond to all bombing threats?

(d) How will the decisions be made at the scene?

(e) What reporting procedures should be established?

(f) What are the skill requirements of the public safety personnel?

7.2 BOMB THREATS AND BOMBINGS

Bomb threats and bombings are on the increase in the United States. Whether this trend will continue, peak or decline, is a matter of speculation. In any event, bombing is clearly perceived as a serious social problem by large segments of the public and law enforcement community. The need for official response is relatively independent of any anticipated course of events.

7.3 THE BOMBER

(1) Information media today make possible the construction of sophisticated explosive devices that are extremely difficult to disarm.

Content: **Notes:**

(2) The new wave of bomb and bomb threat activity is widely diversified geographically, significant in volume, and eminently credible.

(3) Earlier bomb epidemics were generally regional problems or confined to the very large urban centers where police technical and investigative expertise was available or could be rapidly mobilized. Such is not the case today.

(4) Excluding conjecture and reactionary rhetoric, there is very little National data available regarding the motives of the present day bombers. A current Treasury Department study concluded that only about one-third of all recent bombing incidents could be attributed to any specific cause or group. The breakdown for this one-third was:

(a) Campus disorder and student unrest	56%
(b) Black extremists	19%
(c) White extremists	14%
(d) Activities in and of criminal pursuits	8%
(e) Labor disputes	2%
(f) Religious difficulties	1%

Develop on blackboard and open class discussion.

(5) Efforts are currently underway to provide a more detailed analysis of the motives and affiliations of bombers.

(6) In the meantime, it is reasonable to assume that there are at least three characteristics of bombing that would appeal to those radical, fringe groups now at odds with the established social order in the United States. These characteristics are:

Content: **Notes:**

(a) Psychology — Write on blackboard.

(b) Technology

(c) Security

7.31
Psychology - It is still possible to identify several aspects of bombing as a form of violence that is potentially attractive to the radical mind.

(1) Bombing is historically linked to anarchy, nihilism, and classical revolution.

(2) Bombing is essentially a symbol of extreme frustration, and the individual who feels powerless in society can retaliate by exerting ultimate power--the power of life and death.

(3) Bombing can provide a satisfying feeling of conspiracy, danger, action, drama, and group excitement, all short of the final act of violence.

(4) When the device ignites or detonates in the target area, the participants need not be present. The bomber can dissociate himself psychologically from any resulting death or injury.

7.32
Technology

(1) Contrary to popular opinion, neither commercial explosives nor blasting caps are necessary for the construction of effective bombs.

(2) Underground literature and some legitimate publications provide information on

Content: **Notes:**

bomb construction and source of materials.

(3) Instructions and techniques for ordering and procuring a lethal supply of chemicals from several sources to avoid arousing suspicion are available.

(4) Any student taking serious high school or college chemistry has the capability to manufacture a bomb.

7.33
Security -

(1) Successful bombing destroys the kind of physical evidence that frequently leads to conviction in many crimes of violence.

(2) Fingerprints, characteristic markings on bullets, bloodstains, and even tool marks offer no threat to the careful bomber.

(3) Even eyewitnesses, the major source of incriminating evidence in crimes against the person, are frequently not available in bombing cases.

(4) In summary, then, bombing offers a psychologically rewarding, simple and relatively safe instrument of depersonalized violence, with great potential for terror and publicity.

(5) If the present trend data are correct, the bomb is likely, in the near future, to become a far more common tool of extortion, criminal diversion, and homicide.

7.4
MOTIVATION OF BOMBERS.

7.41
By basic motive groups

Show VA S2-1-500
T2-1-500

Content: **Notes:**

(1) Experimentation

(a) Excitement

(b) Curiosity

(c) Construction

(d) Noise

(e) Peer group prestige

(2) Vandalism — Show VA S2-1-501 T2-1-500

(a) Extension of experimentation and curiosity.

(b) Destruction for sake of destruction.

(3) Ideological Action

(a) Racial

(b) Political

(c) Religion

(d) Anti-something (Protest)

(e) Symbolic (Aircraft hijacking)

(4) Emotional release — Show VA S2-1-502 T2-1-500

(a) Frustration

(b) Hate/Love

(c) Jealousy

(d) Revenge

(5) Profit

(a) Extortion

(b) Enforcement

(c) Fraud (Insurance loss)

Content: **Notes:**

(d) Criminal diversion

(e) Concealment of other crime

(f) Burglary

7.42
Bombing motive overlap

Show VA S2-1-503
T2-1-501

(1) We can see that the bombing motives cannot always be considered as singular motives.

(2) One or a combination of bombing motives must be recognized.

(3) A breakdown of 976 bombings was surveyed for bomber motivation. The statistics fell in the following categories:

Develop on blackboard and discuss.

MOTIVE	NO. BOMBINGS	PERCENT
Ideological	532	34.51%
Vandalism	205	21.00%
Emotional	154	17.78%
Profit	74	7.58%
Experimental	11	1.13%

7.5
BOMBER SKILL LEVEL

We can class the bomber into three skill levels. This will provide us with a means of categorizing these individuals, and assist in the possible identification of type individual responsible for a bomb incident. The bomber skill levels are:

Write on blackboard.

(1) Amateur

(2) Sub-professional

(3) Professional

7.51
Let us look at the skill levels:

Show VA S2-1-504
T2-1-502
and discuss

(1) Amateur-

Temporary preoccupation or interest

Content: **Notes:**

(2) Sub-professional -

-A means to more rewarding ends

-A tool to be used as long as it is useful

-A secondary vocation

(3) Professional - Show VA S2-1-505 T2-1-502

-A career

-A sustained interest over a long period

-An agent

7.6
LET US NOW CONSIDER THE SKILL LEVEL CAPABILITIES.

(1) Amateur Show VA S2-1-506 T2-1-503

(a) Targets of opportunity

(b) Low level planning

(c) Ineffective placement

(d) Underkill generally

(e) Attacks only easy targets

(2) Sub-professional Show VA S2-1-507 T2-1-503

(a) Normal reconnaissance

(b) Fair to good planning

(c) Good placement

(d) May underkill or overkill

(e) Attacks easy or lightly protected targets.

(3) Professional Show VA S2-1-508 T2-1-503

(a) Excellent multiple reconnaissance

Content: **Notes:**

(b) Timetable actions

(c) Placement is precise

(d) Tailored bomb--no overskill--right on target--usually no warning.

(e) Attacks any target with time and study.

7.7
CASE STUDIES

In capsulating the bomber motivation and skill level, this next visual aid will show us the most common motivation, type of training, bomb material employed and pattern that is identified with each skill level.

7.71
Bomber Skill Level Case Studies — Show VA S2-1-509 T2-1-504

(1) The following three case studies have been put together from actual cases and represent a type of action in each of the three bomber skill levels we have just discussed. Again they are the:

(a) Amateur

(b) Sub-professional

(c) Professional

(2) Let us consider the action taken at the amateur skill level.

7.72
Case Study #1 Amateur-Ideological Action — Show VA S2-1-510 T2-1-505

-Males and females (loose group)

-Have read underground manual and decide to build bomb

-Obtain black powder or other components

Content:	**Notes:**
-Build bomb--others watching and helping	
-Talk about possible targets with other groups	
-Decide on target--symbolic building (Bank of America)	Show VA S2-1-511 T2-1-505
-General decision on where to place	
-General decision on when to deliver (night)	
-Selection of delivery group (3-5 persons)	
-Drive or walk by target	
-Discuss if they should give warning	
-Deliver bomb	Show VA S2-1-512 T2-1-505
-Explosion breaks glass door	
-Fire and police respond	
-Peer groups knowledge (that group did bombing because of talk)	
-Group decides bombing was a success	
-Group decides to build four more bombs.	
7:73 Case Study #2--Sub-professional	Show VA S2-1-513 T2-1-506
-Male and female (cell structure)	
-Some military training--underground manuals	
-Some outside training	
-Select target--low level recon--easily or lightly protected target (police station)	
-Obtain explosive through theft (dynamite, blasting caps)	Show VA S2-1-514 T2-1-506

Content:	**Notes:**
-Build bomb--package it (retain extra explosives)	
-Plan bomb attack--conduct recon--select placement --plan delivery route--select placement time. (against alley wall, just before night shift change)	
-Decide to give two minute warning to TV station and identify bombing with group	Show VA S2-1-515 T2-1-506
-Deliver bomb (1-2 persons)	
-Explosion destroys corner of building and injures two officers	
-Group disappears undercover	Show VA S2-1-516 T2-1-506
-For next few days each member makes bomb threat	
-After time lapse--group selects another target.	
7.74 Case Study #3--Professional	
-Male (Female in other countries)	Show VA S2-1-517 T2-1-507
-Extensive training	
-Thinks professional all the time	
-Works alone if possible--with others only in secondary support	
-Agent of foreign power (cover) on loan--contract man	
-Receives contract on orders (prominent) political figure	Show VA S2-1-518 T2-1-507
-Tentative acceptance--conditional on target evaluation	
-Conducts background and close-in evaluation of target protection	
-Access target pattern of vulnerability (points)	Show VA S2-1-519 T2-1-507

Content: **Notes:**

of target

-Establishes target kill timetable

* Establishes target lock if necessary

-Recons and selects point of placement

-Establishes delivery route

-Establishes placement point

-Establishes departure route and alternates diversion, cover, etc.) Show VA S2-1-520 T2-1-507

-Calculates amount of explosives, type and size of bomb required

-Constructs required bomb

-Dry runs through entire attack and escape

-Conducts attack and target kill as per timetable

-Shifts location and assumes cover.

7.8
PROTECTIVE SKILL REQUIREMENTS Show VA S2-1-521 T2-1-508

(1) Only about a dozen of the largest municipal, county and State public safety agencies have created units with the equipment and technical personnel necessary to handle bomb disposal assignments.

(2) Outside of larger metropolitan areas, the only qualified disposal technicians are available at the Military Explosive Ordnance Disposal units. These units are located throughout the United States, but due to other commitments, they are not always able to provide response to bomb incidents.

Content: **Notes:**

(a) The EOD units will not provide response service for the bomb search.

(b) They will, if available, respond only after the bomb has been located.

(3) It can safely be stated that virtually every public safety agency is in the Nation in in need of some degree of assistance to reach a desirable degree of skill level proficiency.

(4) An analysis of the typical bomb incident running the full course from warning through investigation suggests that three basic skill constellations are involved in an effective response pattern. These skills are:

(a) Protective

(b) Technical

(c) Investigative

Show VA S2-1-522
T2-1-508

7.81
These Skill Constellations Are:

(1) Public Safety Officer

(2) Bomb Scene Officer

(3) Bomb Disposal Technician

(4) Investigator

Show VA S2-1-523
T2-1-509

Discuss the next four visual aids by giving a short resume of each of the skills related to the skill level title as depicted on the visual aid.

7.82
Skill Responsibilities

The responsibilities of each of these skills must be stated and defined in such a manner as to leave no doubt as to the limitations of their skills and the hazards of exceeding these limits.

Show VA S2-1-524
T2-1-510

Show VA S2-1-525
T2-1-511

Show VA S2-1-526
T2-1-512

Show VA S2-1-527
T2-1-513

Content: **Notes:**

(1) As an example, the public safety officer should in no way attempt to disarm a bomb unless he is fully qualified.

(2) The bomb scene officer may be expected to do more than open windows. He may be required to operate a portable X-ray unit or use a stethoscope.

7.83
Training

(1) The Military Armed Services, Department of Defense, National Bomb Data Center, and programs funded through the Law Enforcement Assistance Administration (LEAA) do and have conducted several training courses that address the various disciplines of the bomb incident.

(2) Your nearest LEAA office should be able to provide the necessary information concerning this training. Additionally self-generated training programs have been successful with requests to guest speakers from the technical fields to provide the instruction or expertise dictated by the course.

7.9
BOMB INCIDENT FLOW CHART

Pass out student handout 5145-7-1 (Bomb Incident Flow Chart).

7.91
Line A of the Bomb Incident Flow Chart illustrates a simplified bomb incident flow chart and points out six critical decision points.

(1) Will evacuation be ordered?

(2) Will the search be overt or covert?

(3) Will damage control measures be employed?

CONTINUED

1 OF 3

Content: **Notes:**

(4) Will the device be removed to a safe area or disarmed in place?

(5) Will final disposal be by detonation/ ignition or disarming?

(6) Will evidence support the arrest of suspects?

(a) Each of these decisions is operational in nature and can be made only by personnel familiar with the facts of each individual case.

(b) An established policy, therefore, is essential to the safety of officers and other members of the community.

7.92
Line B indicates the required Public Safety Skill Constellations.

7.93
Line C indicates the personnel assignments and responsibilities.

7.94
Line D indicates the estimated risk to public safety personnel.

7.95
Line E reflects the supporting NBDC Procedural Manuals.

7.96
By selecting anyone of the decision points in line A, by following down the chart, you can get an overall picture of the skills involved and the risk condition, as well as the appropriate training text required to provide the response procedures.

Content: **Notes:**

7.(10)
SUMMARY

(1) During this period I have presented an overview of the policy, procedure and skill requirements necessary to properly address the Bomb Incident.

(2) The bomber actions and various modi operandi have been discussed and the psychology, technology and security aspects were presented.

(3) To further understand the detailed response requirements to the bomb incident additional training in the respective skills is required.

(4) Be sure to cover all of those areas that may be in the form of questions on the quiz or examination.

STUDENT HANDOUT 5145-7-2 may be issued at this time. This handout gives an example bomb incident plan for a school facility. It should be discussed in detail, time permitting.

7.(11)
VISUAL AIDS - Unit VII - The Bomb Incident

Slides		Transparencies
Unit VII	Description	Kit #73
S2-1-500	Motivation of Bombers - Part I	T2-1-500
S2-1-501	Motivation of Bombers - Part II	T2-1-500
S2-1-502	Motivation of Bombers - Part III	T2-1-500
S2-1-503	Bombing motive overlap	T2-1-501
S2-1-504	Bomber Skill Level - Part I	T2-1-502
S2-1-505	Bomber Skill Level - Part II	T2-1-502
S2-1-506	Bomber Skill Level Action - Part I	T2-1-503
S2-1-507	Bomber Skill Level Action - Part II	T2-1-503
S2-1-508	Bomber Skill Level Action - Part III	T2-1-503
S2-1-509	Bomber Skill Characteristics	T2-1-504
S2-1-510	Case Study #1 - Amateur - Part I	T2-1-505
S2-1-511	Case Study #2 - Amateur - Part II	T2-1-505
S2-1-512	Case Study #1 - Amateur - Part III	T2-1-505
S2-1-513	Case Study #2 - Sub-Professional- Part I	T2-1-506
S2-1-514	Case Study #2 - Sub-Professional- Part II	T2-1-506
S2-1-515	Case Study #2 - Sub-Professional- Part III	T2-1-506
S2-1-516	Case Study #2 - Sub-Professional- Part IV	T2-1-506
S2-1-517	Case Study #3 - Professional- Part I	T2-1-507

Content: **Notes:**

Slides		Transparencies
Unit VII	Description	Kit #71
S2-1-518	Case Study #3 - Professional - Part II	T2-1-507
S2-1-519	Case Study #3 - Professional - Part III	T2-1-507
S2-1-520	Case Study #3 - Professional - Part IV	T2-1-507
S2-1-521	Protective Skill Requirements	T2-1-508
S2-1-522	Protective Functional Assignments	T2-1-509
S2-1-523	Protective Safety Officer	T2-1-510
S2-1-524	Bomb Scene Officer	T2-1-511
S2-1-525	Bomb Technician	T2-1-512
S2-1-526	Investigator	T2-1-513
S2-1-527	Bomb Incident Flow Chart	T2-1-514

Lesson Plan 5145-8

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:

Bomb Threats

Objectives:

1. Familiarize the student with the bomb threat and types of incidents.

2. Familiarize the student with the preparation management and execution of a bomb incident plan.

Assistants:

None

Total Time

1 Hour

Space Required:

Classroom for 30 students.

Methods:

Lecture, slides and/or transparencies, and classroom discussion with students.

Training Aids:

See Visual Aids Page 8-12. Pointer, podium, slides and/or transparencies kit #72.

Student Materials:

Notebook and pencil.
Student Handout 5145-8-1.

References:

U.S. Treasury and National Bomb Data Center Material

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

INTRODUCTION:

This session of your training will be devoted to the necessary planning which is required prior to receipt of a bomb threat, immediate response actions that are required, and those decisions that should be made prior to the emergency. The handling of an actual device or actions required at the scene of an actual detonation will be covered in later sessions.

8.1
BOMB INCIDENTS

8.11
There are three types of bomb incidents:

(1) Receipt of the threat — Show VA S2-1-550 T2-1-550

Content: **Notes:**

(2) The locating of an actual device

(3) An actual detonation

8.2
TYPES OF THREATS:

Show VA S2-1-551
T2-1-551

(1) Telephone

Show VA S2-1-552
T2-1-552

(2) Written

8.3
REASON FOR THE BOMB THREAT CALL

(1) Caller knows that an explosive or incendiary device has been placed or

NOTE:
Caller may be the man who placed the device!

(2) That a device will be placed and wants to minimize personal injury or property damage.

(3) These are the only two logical explanations for notification that a device is purportedly in a particular facility.

Show VA S2-1-553
T2-1-553

8.4
HIDING PLACES:

Electric switches and parcels, gas and fuel tanks, indoor trash receptacles, record storage areas, mail rooms, ceiling lights with easily removable panels, and firehouse racks. While this list is not complete, it can give you an idea where a time-delayed explosive or an incendiary device may be concealed.

8.5
SECURITY AND SAFETY PRECAUTIONS:

(1) All security and maintenance personnel should be alert to suspicious looking people, and to foreign and suspicious objects or parcels.

Content: **Notes:**

(2) You should instruct security and maintenance personnel to make periodic checks of the building to assure that unauthorized personnel are not hiding or reconnoitering the area.

(3) You should assure adequate protection for classified documents, proprietary information and other records essential to the operation of your business. A well-planned, properly charged device could , upon detonation, destroy those records needed in day-to-day operations. Computers have also been singled out as targets by bombers.

(4) Instruct all personnel, especially those at the telephone switchboard, of what to do if a bomb threat call is received.

(5) Panic must be avoided. Show VA S2-1-554 T2-1-554

(a) State of Panic: Personal injuries and property damages are increased. Emergency facilities are shut down or abandoned. Unattended facilities can lead to their destruction. (Power plants and unattended boilers).

(b) Most contagious of all human emotions. In case of bomb threat, may be the ultimate achievement of caller.

8.6
BOMB THREAT PLAN PREAPARATION

(1) Plan in advance establish clear-cut levels of authority - and lines of organization. Written plans.

(2) Designate a control center or command post. Must have decision authority! Show VA S2-1-555 T2-1-555

(3) Local liaison: Police Dept., Fire Dept., other Governmental agencies. Show VA S2-1-556 T2-1-556

Content: **Notes:**

(4) Establish strict procedures for control and inspection of packages and material entering critical areas. Show VA S2-1-557 T2-1-557

(5) Develop a positive means of identifying and controlling personnel who are authorized access to critical areas.

(6) Arrange, if possible, to have police and/or fire representatives, with members of your staff, inspect the building for areas where explosives are likely to be concealed. This may be accomplished by reviewing the floor plan of the building.

(7) During the inspection of the building, you should give particular attention to elevator shafts, all ceiling areas, rest rooms, access doors, and crawl space in restrooms and areas used as access to plumbing fixtures, electrical fixtures, utility and other closet areas, space under stairwells, boiler (furnace) rooms, and flammable storage areas.

8.7 BOMB THREAT EVALUATION

8.71 Receipt of Threat

(1) Once the bomb threat has been received, threat must be analyzed and appropriate action taken. To avoid dangerous delay and indecision, pre-incident questions that must be asked and planned for are:

(a) Who will evaluate the threat? Show VA S2-1-558 T2-1-558

(b) How will the threat be evaluated?

Content: **Notes:**

(2) Every facility which considers itself a potential bomb threat target must establish a bomb threat decision authority. Generally, this authority is vested in management. For each individual with primary decision authority, there should be at least one alternate to provide twenty-four hour coverage every day of the week. They should be completely familiar with the scope of authority and responsibility of the assignment.

(3) While owners, managers, or administrators may wish to avoid making difficult decisions regarding bomb threats, in most areas of the country, police and fire personnel are reluctant to accept the responsibility. Most public safety agencies will gladly assist in pointing out various courses of action, but the final decision must be made by the individual responsible for the target facility.

8.72
Hoax or Real Threat?

(1) In the past, the vast majority of bomb threats turned out to be hoaxes. However, today more of the threats materialize.

(2) It is practically impossible to determine immediately whether a bomb threat is real.

(3) Of course the first consideration in assessing the credibility of the bomb threat must be for the safety of the people.

8.8
HANDLING THE THREAT

Distribute Student Handouts 5145-8-1

Content: **Notes:**

8.81
Bomb Threat Check List

(1) A check list that will serve as a guide for the person receiving the bomb threat call over the telephone.

(2) It will serve as a record of the call for the investigator.

(3) Facilities that anticipate or receive a high volume of calls may arrange training of their receptionist (s) by the telephone company. Special electronic equipment can be employed for call tracing.

8.82
Telephone Response Techniques

(1) Keep the caller on the line as long as possible. Ask him to repeat the message. Record every word spoken by the person.

Show VA S2-1-562
T2-1-562

(2) If the caller does not indicate the location of the bomb or the time of possible detonation, ask him for this information.

(3) Inform the caller that the building is occupied and the detonation of a bomb could result in death or serious injury to many innocent people.

(4) Pay particular attention to peculiar background noises such as motors running, background music, and any other noise which may give a clue as to where the call is being made.

(5) Listen closely to the voice (male, female), voice quality (calm, excited), accents and speech impediments. Immediately after caller hangs up, report to the person designated by management to receive such information. Since the law enforcement personnel will want to talk firsthand with the person who received the call, he should remain available.

Content: **Notes:**

(6) Report immediately to the police department, fire department, BATF, FBI, and other appropriate agencies. The sequence of notification should be established during planning phase.

8.83
Bomb Threat Response

(1) After the assessment of the bomb threat has been made one of three alternative actions must be made.

Show VA S2-1-559
T2-1-559

(a) Take no action.

(b) Search without evacuation.

(c) Evacuate and search.

(2) Except for those facilities unable to evacuate because of their size or the critical nature of their activities, the decision making authority must simply weigh the cost of productivity loss against the risk of injury or death to personnel. When faced with this equation, most decision makers choose positive action and the protection of human life.

8.84
Evacuation:

Show VA S2-1-560
T2-1-560

The most serious of all decisions to be made by management in the event of a bomb threat is evacuation or non-evacuation of the building. The decision to evacuate or not to evacuate may be made during the planning phase. Management may pronounce a carte blanche policy that in the event of a bomb threat, evacuation will be effective immediately. This decision circumvents the calculated risk and gives prime consideration to the safety of personnel in the building. This can result in production down-time, and can be costly, if the threat is a hoax. The alternative is for management to make the decision on the spot at the time of the threat. There is no magic formula which can produce the proper decision.

Content: **Notes:**

8.85
Total Evacuation:

(1) At first glance, immediate and total evacuation would seem to be the most appropriate response to any bomb threat. However, there are significant economic and safety factors that may weigh against the evacuation response. Even where evacuation is possible and desirable, the process itself may not be as simple as it might appear.

(2) Limitations on Total Evacuation

(a) Risk of Injury - As a general rule, the easiest area in which to plant a bomb is often in the shrubbery surrounding a building or in a car in a parking lot. If personnel are evacuated out of a building, they may be increasing rather than decreasing their risk of injury. Easily accessible areas of the buildings are also prime targets for the bomber. Therefore, any evacuation that requires personnel to move through public areas such as halls near restrooms, waiting rooms, or lobbies, might increase the risk of injury during any detonation.

(b) In the case of highrise office or apartment buildings, the process of evacuation may require that all occupants pass the point of possible detonation. Personnel evacuated from a building in a congested downtown area could be forced to wait on streets or sidewalks where they are vulnerable to any falling glass or other debris resulting from an explosion. In either case the risk of injury may be increased by evacuation.

Content: **Notes:**

8.86
Response Impairment:

(1) Total and prompt evacuation will remove workers and supervisors who might be required to make a comprehensive search or take damage control measures.

(2) Panic - For facilities without bomb incident plans and properly trained personnel, a sudden bomb threat may cause panic and unpredictable behavior leading to unnecessary risk of injury.

(3) Essential Services - Some evacuations may be precluded by the essential nature of the operations conducted by a facility. Hospitals, utilities, telephone exchanges, and police stations may fall into this category if they are providing critical public safety services that would be disrupted by evacuation.

(4) Loss of Production - Almost all bomb threats are directed at facilities engaged in some form of production. Whether in a manufacturing plant or a high school, total evacuation will result in loss of productivity. While the protection of life usually outweighs any economic loss, repeated threats may pyramid costs to an unacceptable level.

(5) Some conditions make total evacuation an undesirable response. In such cases a partial evacuation may be more appropriate.

8.87
Partial Evacuation:

Show VA S2-1-561
T2-1-561

(1) One alternative to total evacuation is partial evacuation. This response is particularly effective in those instances where the threat includes the specific or general location of the bomb

Content: **Notes:**

or in those cases where a suspicious device has been located without prior warning.

(2) Partial or selective evacuation can reduce risk of injury by removing personnel who can safely be moved out of the facility. Personnel essential to search or damage control can remain, critical services can be continued, and production losses minimized. On the other hand, partial evacuation requires a far higher degree of planning, training, supervision and coordination than does a total evacuation response.

8.88
Control:

(1) Evacuation is often pictured as merely moving the occupants out of a facility as in a fire drill. Evacuation in response to a bomb threat, however, may be considerably more complicated. For example, in instances where the location of the bomb is known or suspected, it may be necessary to alter established routes in favor of an exit pattern that will provide the greatest protection in the event the device detonates during the evacuation. Obviously, greater supervision and control will be required for a bomb evacuation, especially if a decision has been made not to announce the purpose of the evacuation.

(2) The personnel reaction to a bomb threat, as compared to a fire alarm, must also be considered. To the layman, the danger of an unexploded bomb is generally an unknown and highly exaggerated entity. Without proper preparation and supervision, panic can develop during a bomb evacuation, increasing the risk of secondary injury and delaying the clearing of the area. Properly trained evacuation teams, composed of supervisory or security personnel who are thoroughly

Content: **Notes:**

familiar with the selected routes and possible hazards, can help to deter irrational behavior. These teams must be well trained and, for larger facilities, equipped with communication devices that will facilitate timely changes in evacuation routes or procedures.

(3) At a prearranged signal, evacuation team personnel will conduct a rapid patrol of their assigned areas to see that the partial or total evacuation is complete, and then report to positions outside the facility to insure that occupants remain at proper distances, usually at least 300 feet, from the building until the re-entry order is received.

(4) An important point frequently overlooked in planning evacuations is the need to select an area or areas where those being evacuated may safely and, if possible, comfortably wait until the search for the bomb has been conducted. The occupant who has to stand two hours in the wind and rain will be far less cooperative when asked to evacuate a second time. The well-developed evacuation plan will not only insure safety but will consider the comfort and morale of those being evacuated.

8.9
Handling the Threat:

Emphasize how to handle bomb threat.

(1) Facilities with a high volume of bomb threats may arrange with telephone company for incoming call circuits to be locked open for tracing.

8.(10)
SUMMARIZE:

(1) Recap the salient teaching points.

Content: **Notes:**

(2) Lead into the next block of instruction--
the Bomb Search and Equipment.

8.(11)
VISUAL AIDS - Unit VIII - Bomb Threats

The visual aids listed below are for use in lesson plan 5145-8.

Slides		Transparencies
Unit No. VIII	Description	Kit No. 72
S2-1-550	Initiation	T2-1-550
S2-1-551	There's A Bomb In The Building	T2-1-551
S2-1-552	A Bomb In The Building	T2-1-552
S2-1-553	Why The Threat	T2-1-553
S2-1-554	Panic	T2-1-554
S2-1-555	Command Center Control	T2-1-555
S2-1-556	Liaison	T2-1-556
S2-1-557	Building Security	T2-1-557
S2-1-558	Threat Evaluation	T2-1-558
S2-1-559	Points to Consider	T2-1-559
S2-1-560	Evacuation	T2-1-560
S2-1-561	Partial Evacuation	T2-1-561
S2-1-562	Warning Message	T2-1-562

Lesson Plan 5145-9

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Bomb Scene Search and Equipment

Objectives:
1. To outline the basic factors involved in planning, organizing and executing a bomb search operation.

2. To familiarize the student with equipment and tools used during a bomb search.

Assistants:
None

Total Time
Two Hours

Space Required:
Classroom for 30 students

Methods:
Lecture & conference

Training Aids:
See Visual Aids Page 9-13. Pointer, podium, slides and/or transparencies kit #73.

Student Materials:
Notebook and pencil. Student Handouts 5145-9-1 thru 9

References:
Bomb Scene Procedures-04, The Protective Response, National Bomb Data Center publication.

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

9.0
INTRODUCTION

This section of your training will be devoted to giving you various guidelines in the use of personnel, searching techniques, equipment and tools that will assist you in conducting a bomb scene search.

(1) Bomb Threats and bombings are on the increase in the United States. Whether this trend will continue, or peak and decline, is a matter for speculation. In any event, bombing is clearly perceived as a serious social problem by large segments of the public and the law enforcement community and, in this context, the need for official response is relatively independent of any anticipated course of events.

Content: **Notes:**

(2) The bomb, regarded by many as the ultimate weapon of terrorism, has been employed sporadically in the United States over the past hundred or so years by groups and individuals in violent conflict with each other and with society at large. The mentally ill, cranks, racists, political exiles, anarchists, right and left wing militants, labor organizers, and syndicated criminals have all employed the bomb with varying degrees of success in support of their particular causes.

9.01
Historical Review

(1) Let me go back in history for a moment:

- In 1886, an anarchist's bomb killed seven policemen in Haymarket Square, Chicago.

- Ten people were killed when a fragmentation bomb was thrown at a San Francisco parade.

- A suspicious package was brought into the Central Police Station in Milwaukee for examination in November of 1971. It exploded, killing eleven persons, including nine policemen.

- Two years later a total of thirty-six bombs were sent through the mail to prominent industrialists.

- The famous "Wall Street Bomb" of 1930 resulted in the death of thirty-three persons and injured an additional two hundred bystanders.

- Between 1941 and 1957 New York's "mad bomber" demonstrated the ease with which simple bombs could be employed to terrorize a modern city.
and etc., etc., etc., etc.,

Content: **Notes:**

(2) While there has been no comprehensive historical record developed to reflect either the quantity or the quality of criminal bombing activity in the United States, it is clear that the current rash of "new left" and "right wing" bombings represent not a new and alien tactic, but simply the contemporary revival of a traditional form of violence.

9.02
Public Safety Capability

(1) Only about a dozen of the largest municipal, county, and state public safety agencies have created special units with the equipment and technical personnel necessary to handle bomb incident assignments. Outside of larger metropolitan areas, it can safely be stated that virtually every public safety agency in the nation is in need of some degree of training to reach a desirable level of proficiency in dealing with incidents involving explosive or incendiary bombs, not to mention the increased number of personnel that would be required.

Show VA S2-1-600
T2-1-600

(2) Based on this, the burden of dealing with bomb incidents falls directly upon the shoulders of the Plant manager, the school superintendent, the office supervisor, or, namely, the man in charge.

9.1
DECISIONS PRIOR TO SEARCH

(1) A bomb incident, after receipt of the threat, has four critical decisions that must be made by a responsible person.

- Will evacuation be ordered?

Show VA S2-1-601
T2-1-601

- Will the search be overt or covert?
- Will damage control measures be employed?
- Will the device be removed to a safe area or disarmed in place?

Content: **Notes:**

(2) Each of these decisions is operational in nature and can only be made by personnel familiar with the facts of each individual situation. More basic, however, are certain policy decisions that must be reached and disseminated before the threat is received. These policy decisions are usually found in a plan, if one exists.

9.11
Absence of Guidelines

(1) It has often been noted that, in the absence of guidelines from any other source, the responsible individual on the scene will of necessity develop his own policy.

(2) In the case of bombing incidents or any incident involving explosives or incendiaries, an erroneous decision by an inadequately prepared individual could have unfortunate consequences. An established policy, therefore, is essential to the safety of personnel and other members of the community.

9.12
Policy Formulation

(1) Policy development is decision making. It involves the selection of the best possible course of action to suit the situation at hand. Because bombing incidents often involve many variables which cannot be controlled, responsive policy must be broad enough to allow flexibiltiy and yet restrictive enough to prevent over-reaction. NO PLAN - Result - evacuation-close down - haphazard search or wait out threat period.

(2) With those guidelines established let us move into the organization of search units and necessary equipment.

Content: **Notes:**

9.2
SEARCH

Show VA S2-1-602
T2-1-602

Some individual or group attempts to locate explosive devices that may or may not have been placed in the facility.

(1) Bombs may not look like bombs.

(2) May or may not be concealed.

9.21
Individual Bomber Motivation Consideration

(1) Psychotic

(2) Amateur

(3) Disgruntled Employee

(4) Professional

9.22
Time Factor Considerations:

(1) Search of a Medium Building - 12-24 hours.

(2) Search of a vehicle -2-5 hours.

(3) Time remaining on a delay device.

9.23
Disorder and Confusion Created During Search

(1) Furniture disassembly

(2) Search of files

(3) Disruption of assembly lines and storage areas

(4) Invasion of privacy

9.24
Adequate Plans

(1) They provide an alternative to the manager.

Content: **Notes:**

(2) Lacking a plan only alternatives are to evacuate, close down and perform haphazard search or wait out the threat for 24-48 hours.

Delay devices have been found that cover 217 days! and delays up to 365 days are possible.

9.3
SEARCH RESPONSIBILITY

9.31
Jurisdiction Workload

(1) It should not be assumed that the local police or fire agencies will conduct bomb searches.

(2) In many instances the jurisdiction, workload or policy may preclude their participation in bomb searches.

9.32
Type of Search — Show VA S2-1-603 / T2-1-603

(1) Overt - complete evacuation — Show VA S2-1-604 / T2-1-604

(2) Covert - partial or no evacuation — Show VA S2-1-605 / T2-1-605

9.33
Search Systems

(1) Supervisory — Show VA S2-1-606 / T2-1-606

(2) Occupants — Show VA S2-1-607 / T2-1-607

(3) Trained Team — Show VA S2-1-608 / T2-1-608

9.34
The Composite Search Team — Discuss visual aid

(1) This team would be composed of supervision, occupants, and search team personnel, each given specific search responsibilities. — Show VA S2-1-609 / T2-1-609

(2) The training of these personnel in systematic search procedures is essential.

Content: **Notes:**

(3) Search personnel must be made aware of the great risks involved in touching or moving any suspected explosive device.

(4) Safety cannot be overemphasized.

9.4
ORGANIZATION

Show VA S2-1-610
T2-1-610

(1) Assuming that a comprehensive team search will be conducted by trained personnel the followig division of labor has been found effective:

(a) Exterior search - 25% of available personnel

(b) Public Search - 25% of available personnel

(c) Detailed Room Search - 50% of available personnel

(2) Smallest team - 2 men - better psychologically and physically.

(3) Exterior teams complete work and join room search teams.

(4) Public area search teams start at ground floor and work up through the building.

(5) Detailed room search teams - start in basement and work up.

9.41
Access Problems:

(1) The most frequent and frustrating problems encountered in the search process are access limitations:

(a) Utility panels and storage areas locked.

(b) Key control; implement key control system; a key available for each area.

(c) Access officers - with keys.

Content: **Notes:**

(d) Stand-by Personnel - await search teams and open facilities for inspection.

(e) Unlock/Evacuate -- Everybody unlocks containers or desks, removes personal property - briefcases, packages, lunch containers, etc.

(f) No matter what plan is used - a certain number of doors or containers will be locked.

(2) Decision: Will searchers use force to gain access during the search?

9.5
SEARCH EQUIPMENT

While there is almost no limit to the number of tools or other pieces of equipment that might at one time or another come in handy in the search of a building, experienced searchers have found that almost all searching assignments can be executed with a small number of tools and instruments that can be carried on the person inconspicuously. These items, which are briefly described below, should be considered minimum equipment for each person involved in detailed searching operations.

9.51
Flashlight and Light Bending Adapter - a two-cell pencil flashlight will provide sufficient illumination and fits into the shirt or jacket pocket. The usefulness of the pencil flashlight can be increased considerably by the attachment of a light bending adapter for directing light into small openings or around corners. The adapter consists of a rubber distributor cap wire projector and a clear plastic or glass stirring rod. The rod is $\frac{1}{4}$ or 5/16-inch in diameter, four inches long, and bent about 15° at the first inch. This entire unit can be fabricated from materials available in a locality.

Show VA S2-1-611
T2-1-611

Content: **Notes:**

9.52
Multipurpose Pocket Knife - A variety of operations can be performed with an inexpensive pocket knife with a number of blades and tool ends. These knives are sometimes referred to as "Boy Scout" or "Swiss Army" knives.

9.53
Medical or Electronic Stethoscope - Although medical stethoscopes can be employed for bomb searching, they are not designed to detect sound transmitted through air or nonfluid solids and are not very efficient for general listening. Electronic stethoscopes are more efficient and excellent units can be purchased for hundreds of dollars or built locally for twelve to fifteen dollars. Regardless of how it is acquired, the electronic stethoscope is an invaluable searching instrument.

DISTRIBUTE AND DISCUSS STUDENT HANDOUT 5145-9-1

9.54
Screwdrivers - Both standard and Phillips screwdrivers in various sizes are useful for removing heating and cooling duct grillworks and other types of fixtures and plates that might conceal explosive devices. A screwdriver kit containing a single handle and a variety of changeable blades is ideal because it is both lightweight and compact.

9.55
Crescent Wrench - A 4 or 6-inch crescent wrench is required for removal of those grillworks and plates which are held in place by bolts or nuts.

9.56
Probes - Two types of probes are required for searching. One probe, measuring 1/16-inch in diameter by 12-inches in length, is used for checking overstuffed furniture, automobile seats, and cushions as illustrated in figure 9 The second probe, measuring 1/8-inch in diameter by 12 inches in length, is used to probe earth, flowerpots, and lawn areas. Ideally, these probes should be electronically nonconductive, spark-proof and nonmagnetic. Because of their small diameter, nylon, aluminum, or phenolic plastic knitting needles make excellent furniture probes. Brass, bronze, or

Content: **Notes:**

stainless steel rods may be used as earth probes. A convenient arrangement is to adapt the probe to the handle contained in the screwdriver kit.

9.57
Plastic Strip - A 2-inch by 6-inch strip of stiff plastic about 1/32-inch thick is useful for checking doors, windows, drawers, and desks for concealed wires and attachments. The strip can also be used to unlock some simple door, desk, and file cabinet locks.

9.58
Roll of Crepe Paper - Crepe paper in 2-inch wide rolls is useful in marking rooms or areas which have been searched by tying a strip of the paper to the doorknob or across doorway. Should suspected bomb be found, a strip of crepe paper may be placed from the room doorway leading directly to the object. By marking the suspected bomb in this manner, the bomb technician can immediately locate the item without having to be directed by a searcher.

9.59
Hand Mirror - A small mirror approximately 2 by 3 inches is useful for aiding the searcher in looking behind and under furniture items. A strip of tape with a loop or tab placed on the back of the mirror will enable the searcher to hold the mirror more conveniently. The mirror may be attached to the probe for insertion into small openings.

9.6
TEAM EQUIPMENT - In addition to the items of personal equipment described earlier, each of the searching teams will require certain other items of equipment in order to function efficiently within the searching system.

9.61
Communications Equipment - Portable radio transceivers for contact with the command center and battery powered bull horns for use when radios cannot be used or when it is necessary to address widely spread search teams, buildings occupants, or spectators.

Show VA S2-1-612
T2-1-612

Content: **Notes:**

9.62
Battery Powered Auxiliary Illumination- Lightweight, wide area, fluorescent lights, such as the Burgess "Safari Lite", are required to provide adequate searching light for night operations outside and for inside searching of low illumination areas such as utility and storage areas, and elevator shafts.

9.63
Folding Lighweight Ladders - Lightweight aluminum ladders will be required by the exterior search teams so that window lengths, trees, sewers, and similar areas may be searched. Inside search teams will use them in the utilities areas, elevators, air shafts, storage rooms, and to inspect false or suspected ceilings.

9.64
Forcible Entry Tool Set - This tool set should contain prybars, hacksaws, and heavy duty bolt cutters. The bomber may have replaced an existing lock with one of his own, locking the bomb in a room or control panel.

9.65
Common Hand Tool Set - Hammer, saw, pliers, socket wrench set, assorted wrenches, and similar hand tools, as well as quantities of rope and line. Without this tool set valuable time will be lost in any search operation.

9.66
Three Inch Diameter Extension Mirrors
This item is very useful in all phases of searching by eliminating a great deal of bending and stooping.

9.7
EQUIPMENT STORAGE

All personnel and team search equipment should be stored where it will be rapidly available when required. By utilizing vehicle storage, the necessary equipment may be quickly transported to the area to be searched and located in an area which is readily accessible to all

Content: **Notes:**

search teams and also to the command center in the event that requests for special equipment are received during the search.

9.8
CHECK LISTS AND WRITTEN REPORTS

Distribute and discuss the following student handouts.

(1) Area Sketch - Acme Tool and Die Company — SH5145-9-2

(2) Supervisor Search Check List - Outside Search Team — SH5145-9-3

(3) Outside Search Area - East — SH5145-9-4

(4) Outside Search Team - East — SH5145-9-5

(5) Public Area Sketch — SH5145-9-6

(6) Public Area Search Plan Supervisor — SH5145-9-7

(7) Room 105 — SH5145-9-8

(8) Occupants of Room 105 — SH5145-9-9

9.9
SUMMARY

The handouts listed above can be used as a classroom practice exercise for lesson 5145-10, Bomb Search Techniques.

(1) Review the salient teaching points and be sure to cover any points that will be presented as questions in quiz or an examnation.

(2) For the next block of instruction we shall cover the techniques and use of equipment during a bomb search.

Reports and check lists are turned in to the Command Center as the plan dictates.

9.10
VISUAL AIDS - Unit IX - Bomb Scene Search and Equipment

The visual aids listed below are for use in lesson 5145-9.

Content: **Notes:**

Slides		Transparencies
Unit IX	Description	Kit #73
S2-1-600	Public Safety Capability	T2-1-600
S2-1-601	Critical Decision	T2-1-601
S2-1-602	Search Variables	T2-1-602
S2-1-603	The Evacuation Process	T2-1-603
S2-1-604	Overt	T2-1-604
S2-1-605	Covert	T2-1-605
S2-1-606	Supervisors	T2-1-606
S2-1-607	Occupants	T2-1-607
S2-1-608	Trained Team	T2-1-608
S2-1-609	Composite Search Operation	T2-1-609
S2-1-610	Search Organization	T2-1-610
S2-1-611	Light Bending Adapter	T2-1-611
S2-1-612	Communication	T2-1-612

Lesson Plan 5145-10

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Bomb Search & Techniques

Objectives:
1. To familiarize the student with the use of search equipment.

2. To familiarize the student with the techniques employed in conducting a bomb search operation.

Assistants:
None

Total Time
2 hours

Space Required:
Classroom for 30 students

Methods:
Lecture, Conference, and Practical Exercise.

Training Aids:
See Visual Aids Page 10-16 & 17. Pointer, podium, slides and/or transparencies kit #74.

Student Materials:
Notebook and pencil, Student Handout 5145-10-1

References:
Bomb Scene Procedures, 04, "The Protective Response." National Bomb Data Center Publication.

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content:

10.0
INTRODUCTION

(1) While the peculiar characteristics of buildings and situations make it impossible to develop standarized search doctrine applicable to all incidents, it is still possible to formulate general guidelines that will apply in a vast majority of the bomb search cases encountered. The guidelines that follow are intended as procedures to serve as a basis for planning and bomb searching to meet local conditions.

(2) As a general rule, building and vehicle searches follow two basic maxims.

Notes:

STUDENT HANDOUT
5145-9-1
can be incorporated into this lesson plan, as a classroom practical excersise.

Content: **Notes:**

(a) Searching operations start on the outside and work toward the inside.

(b) Once on the inside, searching starts from the lowest level and works up. Both principles have evolved from years of experience and the application of common sense. Properly applied, they reduce the risk of injury to both searchers and occupants.

10.1 ORGANIZATION

10.11 Division of Labor

- 25, 25, and 50% division of labor for the total search team force has been found effective.

Show VA S2-1-700 T2-1-700

10.12 Smallest Search Team

Show VA S2-1-701 T2-1-701

(1) A minimum of two persons is required.

(2) Psychological and physical advantages are:

(a) They are not alone, they have each other, and both share the same danger.

(b) Someone to talk to, keep each other going.

(c) A system of checks and balances is established (ask each other questions).

Show VA S2-1-702 T2-1-702

(d) Reckless chances are not taken.

(e) Pilferage temptation is reduced.

(f) Aid in moving heavy objects.

(g) Increases security (in case bomber is a member of search team).

(h) Two different points of view.

Content: **Notes:**

10.13
Review of Search Rules.

Show VA S2-1-703
T2-1-702

(1) Start on outside and work inward

(2) When inside, start at bottom and work up.

(3) Teams always work toward each other.

(4) Search is not halted when bomb is found (clear immediate area and continue search; more than one bomb may be placed).

10.14
Divide the Area.

Show VA S2-1-704
T2-1-703

(1) Exterior

(2) Public access area

(3) Detailed room starting in basement

10.15
Three Divisions of Labor - Work is immediately performed in the three areas where a bomb is most likely to be placed:

(1) Outside the building

(2) Public access area

(3) Utilities/basement area

10.2
SEARCH PATTERNS - EXTERIOR

(1) Residence

Show VA S2-1-705
T2-1-704

(2) Small business

Show VA S2-1-706
T2-1-705

(3) Office building

Show VA S2-1-707
T2-1-706

Content: **Notes:**

10.21
Exterior Search

(1) Search of exterior areas is extremely important because they are the most accessible areas to the bomber, especially at night when the building is closed.

(2) Searching should begin at ground level, with close attention to piles of leaves or refuse, shrubbery, entrances, manholes, trash cans, and parked vehicles.

(3) The area should extend outward from the building to a distance of 25 to 50 feet or to some natural division line such as a curbing or wall.

(4) Areas of recently disturbed loose dirt should be probed to a depth of approximately 12 inches and all window wells and crawl spaces checked.

(5) Once the ground level search is completed, a search should be conducted to the exterior height which could be reached by a bomber. Particular attention should be given to window ledges, air-conditioning units, signs, building ornaments, and fire escapes. If accessible by a fire escape or other external means, the exterior search unit will include roof areas in its search pattern.

10.22
Public Area

(1) Reception room and lobbies. - Show VA S2-1-708 T2-1-707

(2) Public rest rooms - ladies room in detail - most common target - use purses for concealment.

Content: **Notes:**

(3) Elevators, stairs and hallways.

(4) Cleaning equipment areas, janitor closets.

10.23
Public Area Search Team

(1) Public area Search Team personnel make an immediate check of those interior areas most likely to attract the bomber. This includes areas open to the public as they are frequent bomb targets and must be closely screened.

(a) Reception rooms

(b) Lobbies

(c) Elevator cabs

(d) Stairs

(e) Rest Rooms

(f) Cleaning equipment rooms

(2) The team should move systematically from floor to floor up through the building. Areas searched by this team will be marked to eliminate duplication or omission or search by other teams.

10.3
INTERIOR ROOMS

10.31
Search Pattern - start basement, work up.

Show VA S2-1-709
T2-1-708

10.32
Interior Search Team

(1) This interior search team will enter the building along with the public area search team but will proceed directly to the basement or sub-basement areas of the structure.

Content: **Notes:**

(2) They will systematically search each room or area of the building not searched by the public area search teams, starting with the utilities areas.

(3) Their search team will be augmented by members of the janitorial or maintenance force who will be familiar with their initial areas of search.

(4) When all the areas on the one level have been searched, the detailed room search teams will move up to the next level and conduct a search of that area. This system of search will continue until the entire structure has been searched.

(5) Utility and service areas are generally located in the basement or sub-basement and may be prime target areas for the bomber.

(6) Destroying a building's utilities area puts the building out of operation with a small risk of killing or injuring the occupants.

(a) Whenever possible search of utilities area should be at least guided by maintenance personnel familiar with the facility.

(b) Furnace rooms, electrical control centers, telephone switching rooms, auxiliary power plants, central air-conditioning units and elevator shafts and wells are all searched as well as any storage or maintenance areas.

(7) Elevator wells and equipment are especially difficult and unpleasant to search, yet these areas are frequently accessible to the public and must be included in any detailed building search.

Content: **Notes:**

(a) To begin this portion of the search operation, keys should be obtained and the elevator functioned remotely through at least one complete cycle in the event that an explosive device is set to be activated by the action of the elevator.

(b) Next, the roof of the elevator car or cars should then be searched carefully.

(c) Then the wall or pit at the base of each elevator shaft should be probed. This may require the use of a stick or rod, as grease, trash and dirt may have accumulated to the depth of 2 or 3 feet in some older installations.

(d) Once elevator cars and wells have been searched, the shaft should be checked by riding on top of the car while it is moved upward a few feet at a time. It is not unusual to find that elevator shafts contain nooks, ledges, storage rooms, false panels, walk ways, and even empty bottles. As the elevator goes up, the counterweights are coming down and they must also be checked. The elevator machinery, normally found at the top of the shaft, should not be overlooked.

10.33
Audio Check

Show VA S2-1-711
T2-1-710

(1) Upon entering the room to be searched, personnel first move to various parts of the room and listen to establish the background noise level of the room. By remaining immobile and closing the eyes, it is remarkable how often faint sounds can be detected, even clockwork devices may be detected in some cases.

Content: **Notes:**

(2) If an electrical stethoscope is used for a general sweep, it should be remembered that ticking sounds can be made by plumbing, air-conditioners, business machines, etc. Electric machines should be shut off or disconnected.

Show VA S2-1-712 / T2-1-711

10.34
Division of Single Room Search Area.

(1) Divide room on basis of number of items it contains.

(2) Divide room into the various search levels.

Show VA S2-1-713 / T2-1-712

(3) First-sweep. The first sweep of the room will normally cover all objects resting on the floor or built into the walls up to a selected height, usually about the waist height of an average man. This height will cover everything from the floor to desk tabletop level, including chair backs. The search begins from one end of the dividing line designated as the starting point. Searchers move in both directons from the starting point, working along the walls until they meet and then into the center of the room. The first sweep is usually the most time and effort consuming and should include checking under rugs or carpets. Rugs should be folded back, not rolled. This lessens the danger of activating electrical or mechanical pressure switches. The electronic stethoscope should be used frequently on walls, furniture and floors during the first and subsequent sweeps. The furniture probe, flashlight and mirror will greatly assist in the first sweep.

Show VA S2-1-714 / T2-1-713

Show VA S2-1-715 / T2-1-714

Show VA S2-1-716 / T2-1-715

Show VA S2-1-717 / T2-1-716

Show VA S2-1-718 / T2-1-717

(4) Second sweep. The height of the second sweep will be determined by the individual in charge of the room search, and will depend on the nature of the room. If the second sweep can be extended from waist

Show VA S2-1-719 / T2-1-718

Show VA S2-1-720 / T2-1-719

Content: **Notes:**

height to the ceiling, only two search sweep heights are usually sufficient because of the small number of furniture items encountered above waist height. In certain types of heavily furnished rooms three or four search sweep heights may be required to effectively complete the search. Once the height has been decided the searchers return to the starting point and work outward along the walls in both directions.

(5) Third Sweep. When required, the third sweep will usually cover the area between the top of a standing person's head to the ceiling including air ducts, window tops and hanging light fixtures.

(6) Fourth Sweep. When required, the fourth sweep includes an investigation of false or suspended ceilings, indirect lighting fixtures, electrical wiring and ceiling ducts.

(7) Conclusion. The room search will be terminated only when the individual in charge of the search is satisfied that an adequate search has been made. If the building being searched has a large number of rooms, each room may be marked when the search is completed by placing a piece of crepe paper on the door handle or across the doorway. As an alternative, a small piece of tape can be placed at the lower corner of the door frame on the side opposite the door handle. These markers will prevent duplication of search effort or accidental omission of a room from the search operation.

Show VA S2-1-721
T2-1-720

10.4
SEARCH SUMMARY

(1) The search can be categorized into the following steps:

(a) Audio check

Content: **Notes:**

(b) Room division

(c) Establish search height

(d) Start search

(2) However, if the search is not going to be thorough, it is a waste of time and effort.

10.5
VEHICLE SEARCHING

(1) Like buildings, vehicles are searched by starting on the outside and working into the interior with the interior search starting on the floor and working up to the roof or top of the vehicle. Since bombs placed in vehicles are always directed at individuals rather than just property destruction, vehicle searchers must be especially alert for concealed triggering devices.

(2) Bombs placed in automobiles are generally wired into the ignition system to detonate when the car is started or are attached in such a manner that heat generated in normal operation will ignite a simple pyrotechnic fuze. These devices can usually be found in a superficial search of the engine compartment, exhaust system and the area under the dashboard. Unfortunately, the potential for sophisticated anti-disturbance fuzing in automobile bombs is great, and it is dangerous to assume that any search is routine or can be completed by untrained personnel. Without an unusually high level of skill, the average car can be rigged to detonate a bomb or incendiary device in response to any number of normal actions from opening a door to turning on the headlights or simply tilting the vehicle when weight is applied to one side during entry.

(3) Experience has shown that a detailed automobile search conducted by two men will take from 2½ to 4½ hours, depending upon the size, make and accessories of the car.

Content: **Notes:**

Whether the time and expense of a detailed search can be justified will depend upon the nature of the threat and how it is evaluated. Faster or quick searches can be accomplished, but not without omitting or skipping over certain areas of the vehicle that could conceivably contain a bomb or incendiary device. The following procedure steps for the detailed search of a four door sedan can easily be modified or amplified to cover other kinds of motor vehicles.

DISTRIBUTE STUDENT HANDOUT 5145-10-1

10.51
Check List For Automobile Search.

(1) What circumstances led to need for search?

(2) Who is suspected victim - he may determine bomb location and type.

(3) Look for marks on ground.

(4) Check for forced entry.

(5) Check under vehicle - DO NOT JACK IT UP.

(6) Remove hub caps - (Remotely). Show VA S2-1-722 T2-1-721

(7) Raise hood - (Remotely). Show VA S2-1-723 T2-1-722

(8) Remove battery leads - (Remotely). Show VA S2-1-724 T2-1-723

Show VA S2-1-725 T2-1-724

Show VA S2-1-726 T2-1-725

Show VA S2-1-727 T2-1-726

Content: **Notes:**

(9) Gain access to vehicle by (Remotely) opening doors — Show VA S2-1-728 T2-1-727

(10) Detailed search of all areas.

(a) Check the clutch, brake, accelerator, and steering linkage for actuating devices. Check the air cleaner, the access panels, and equipment mounted on the fire wall for signs of tampering. Also check all power operated equipment such as brakes, steering, air-conditioning, windshield wipers and similar devices for evidence of electrically initiated bombs.

(b) Interior

- Start at the floor and work up.
- Check floor mats and rear surface areas.
- Open the other rear door remotely.
- Remove the rear seat remotely by passing a line through the car and under the front edge of the seat. Since most car seats are removed with pushing and lifting motion pulling on both ends of the remote line from the rear of the vehicle should release the seat.
- Check arm rests, ash trays, rear seat back, rear deck, rear deck speakers, headliner, and dome lights. Dome light switches should be removed from the door frames and the interior examined.
- Check the front seat areas that can be seen from the back seat. Look under the front seat, checking the back and bottom of the seat. Check and remove the ash tray and inspect the inside of the front seat back. Probe the seat and seat back if necessary.

Content: **Notes:**

- Visually check the front doors from the inside.

(c) Trunk

(1) Open remotely

(2) Check all items - especially electrical wiring.

(d) Gas tank - external visual inspection and if deemed necessary remove tank from vehicle.

(11) Operate vehicle - drive at least a mile - let run for 15 minutes - operate all controls and cycle transmission through all gears.

10.52
Use of Checklist

(1) The use of a checklist will help avoid omissions in the complex vehicle search process and will also serve as a record of the search operation. If the vehicle search fails to locate a bomb, this fact should be reported to the individual in charge of the operation.

(2) As with building searchers, it should be reported that no bombs were found, NOT that the vehicle is cleared or safe.

10.6
GAS TANKS BOMBS AND EXPLOSIVE DISPERSION

(1) Comment on Gas tank Mogent Bombs

Show VA S2-1-729
T2-1-728

(2) Proper dispersion of found explosives.

10.7
AIRCRAFT SEARCHING.

(1) Have all personnel property and baggage removed.

(2) Start outside - work toward the interior in the same manner as a vehicle.

Content: **Notes:**

(3) Have baggage claimed and opened for inspection - allows you to focus on unclaimed baggage.

10.8
WATER CRAFT

(1) The detailed search of a water craft can only be accomplished by personnel thoroughly familiar with the craft.

(2) In addition, the search of a ship or will require the aid of experienced divers for inspection of the hull, propellers and steering gear. To ignore the underwater portion of the search is extremely risky as the exterior below the water line is the most vulnerable area to bomb attack during period when the craft is not underway.

(3) Internally, the search would begin with a sweep of the public areas, and then continue with a systematic compartment-by-compartment search starting in the engine room and moving from lower to upper levels in the usual search pattern.

10.9
SEARCHING OPEN AREAS.

(1) Occasionally it becomes necessary to search large open areas, such as a route for the movement of dignataries.

(2) When conducting outside area searches, particular attention should be given to:

(a) Drainage systems.

(b) Manholes in streets and sidewalks.

(c) Trash receptacles.

(d) Garbage cans.

(e) Dumpsters.

Content: **Notes:**

(f) Incinerators.

(g) Mailboxes should be opened and examined where they are accessible to the bomber.

(3) Parked cars and trucks should be searched in the presence of their owners or operators whenever possible.

(4) Streets which an official party will pass down should be thoroughly checked at each intersection, as well as along the route of travel.

(5) Bridges should receive special attention.

(6) Once route security searches have been completed, the areas cleared must remain under the observation of public safety personnel to prevent the placement of devices subsequent to the search.

(7) Key underground drainage systems may have to be searched and physically secured. Electrical power transformers mounted on poles along the route of travel should be inspected by a power company representative.

10.91
Outdoor Stadiums

(1) Outdoor stadiums should be searched and secured under guard at least twelve hours before any contest, meeting or performance that could become the target of a bomb attack.

(2) Prior to the admission of the public the entire seating areas should be swept by large numbers of public safety or security personnel moving down each row of seats. However, no amount of prior searching will be effective if the public is allowed to import all varities of packages and containers when the facility is opened.

10.(10)
LOGIC IN SEARCHING

Content: **Notes:**

(1) The use of common sense or logic in searching has both advantages and limitations. For example, if a guest speaker at a convention was threatened, common sense would indicate the speaker's platform and microphones first. However, the search should always return to the basic pattern. Searchers should never rely exclusively on random or spot checking of only logical bomb locations as the bomber may not behave in a logical manner.

(2) Comment on Search Problem — Show VA S2-1-731 / T2-1-730

10.(11)
SUMMARY

(1) Cover all salient teaching points.

(2) Review those areas that may be asked as question on a quiz or examination.

10.12
VISUAL AIDS - Unit X - Bomb Search Techniques

The visual aids listed below are for use in lesson plan 5145-11.

Slides		Transparencies
Unit X	Description	Kit #74
S2-1-700	Team Organization	T2-1-700
S2-1-701	Bomb Searching	
S2-1-702	Bomb Searching	T2-1-701
S2-1-703	Search Rules	T2-1-702
S2-1-704	Bomb Searching	T2-1-703
S2-1-705	Exterior Search Residence	T2-1-704
S2-1-706	Exterior Search Small Business	T2-1-705
S2-1-707	Exterior Search Office Building	T2-1-706
S2-1-708	Public Area Search	T2-1-707
S2-1-709	Interior Search Pattern	T2-1-708
S2-1-710	Detailed Room Search	T2-1-709
S2-1-711	Audio Check	T2-1-710
S2-1-712	Division of Room	T2-1-711

Content: **Notes:**

Slides		Transparencies
Unit X	Description	Kit#74
S2-1-713	Division of Room by Height	T2-1-712
S2-1-714	First Sweep	T2-1-713
S2-1-715	First Sweep Pattern	T2-1-714
S2-1-716	Rug Fold Back	T2-1-715
S2-1-717	Use of Stethoscope	T2-1-716
S2-1-718	Use of Probe	T2-1-717
S2-1-719	Use of Light and Mirror	T2-1-718
S2-1-720	Division of Room by Height	T2-1-719
S2-1-721	Summary of Steps for Room Search	T2-1-720
S2-1-722	Removal of Hubcaps	T2-1-721
S2-1-723	Hood Opening	T2-1-722
S2-1-724	Battery Cable Removal	T2-1-723
S2-1-725	Battery Cable Removal	T2-1-724
S2-1-726	Battery Cable Removal	T2-1-725
S2-1-727	Battery Cable Removal	T2-1-726
S2-1-728	Remote Door Opening's	T2-1-727
S2-1-729	Magnetic Gas Tank Bombs	T2-1-728
S2-1-730	Dispersion of High Explosives	Not Used
S2-1-731	Problem Areas in Searching	T2-1-730

Lesson Plan 5145-11

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Damage Control

Objectives:
Familiarize students with purpose of damage control and methods that can be employed to protect life, property and critical or sensitive areas.

Assistants:
None

Total Time
1 hour

Space Required:
Classroom for 30 students.

Methods:
Lecture and conference.

Training Aids:
See Visual Aids Page 11-11. Pointer, podium, slides and/or transparencies.

Student Materials:
Notebook and pencil.

References:
"Bomb Scene Procedures, The Protective Response" National Bomb Data Center publication.

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

11.1
DAMAGE CONTROL

11.11
What are Damage Control Measures?

Show VA S2-1-800
T2-1-800

(1) Damage control measures are those steps to minimize the damage resulting from the detonation or ignition of a bomb. While it is often difficult to precisely estimate the destructive potential of a bomb, there are available a limited number of procedures that may limit damage to buildings and equipment.

(2) Responsibility for damage control can be assigned to search teams, bomb scene officers, or specially trained damage

Content: **Notes:**

control teams. When sufficient personnel are available, damage control teams are desirable so that search teams will be free to continue their operations.

11.2
DAMAGE CONTROL TEAMS

(1) Leader must have decision authority. Shutting off utilities and/or closing certain access ways may have an effect on other operations.

(2) Personnel selected for assignment to damage control teams should be familiar with the physical layout of the facility and the location of utility control centers.

(3) Damage control decisions regarding the full or partial shutdown of utilities in a large industrial or business complex can only be made by personnel with a specific knowledge of the mechanics and implications of such actions.

(4) In addition, team members should be trained in the terminal effects of explosives and the protective measures which can be taken to limit these effects.

11.3
EXPLOSIVE EFFECTS

Show VA S2-1-801
T2-1-801

(1) In considering any type of damage control, the nature of an explosive detonation must be kept in mind. For example, consider the detonation of a pipe bomb filled with high explosive. When the explosive detonates, the pipe bomb containing the explosive is stretched until it tears and breaks violently into fragments. The higher the rate of velocity of the detonation, the more numerous and smaller are these fragments. The fragments move outward in all directions from the point of detonation and precede

Show VA S2-1-802
T2-1-802

Show VA S2-1-803
T2-1-803

Content: **Notes:**

the blast pressure wave created by the force of the explosion. This blast pressure wave consists of rapidly expanding gases which reach maximum pressure in a fraction of a second and then rush away from the point of detonation at about 7,000 miles per hour. Expansion of these gases reaches from 10,000 to 15,000 times the original volume of the explosive.

(2) The detonation of explosives is also accompanied by extremely high temperatures, of 3,000° to 4,000° Centigrade. Because of these temperatures, almost all explosives have an incendiary effect on combustible materials at or near the point of detonation. Thus, when an explosion of a bomb occurs, three separate types of problems must be dealt with:

11.31
Fragmentation

(1) A stick of dynamite not encased but detonated in the open would not, in itself, produce fragmentation. However, stones, sticks and other debris picked up by the blast would be hurled through the air.

(2) Fragmentation may be handled in two ways:

(a) Constructing an armored shield allowing the fragments to strike the shield and bounce off.

(b) Constructing a shield of absorbent material and allowing fragments to lose velocity as they penetrate the material and are eventually captured (e.g., sand bags).

11.32
Blast

(1) In dealing with the blast pressure wave, there are two possible courses of action. The blast pressure may be totally confined or it may be directionally vented.

Content: **Notes:**

Because total confinement would require an extremely large volume container, the common damage control barricades or devices use the directional venting system in one form or another.

(2) The blast pressure expelled may be:

(a) Shielded

(b) Focused

(c) Reflected

11.33
Heat - The problem of heat generated by the detonation is of concern mainly as a possible cause of secondary fires. Protection consists primarily of removing flammable materials from the immediate area of the suspected bomb.

11.4
DAMAGE CONTROL TECHNIQUES

Show VA S2-1-804
T2-1-804

11.41
Fire and Medical Service Standby - Fire and medical teams should be moved into position to provide rapid assistance in the event of detonation.

11.42
Disconnection of Utilities - Utility services such as gas and fuel oil which may contribute to the damage of an explosion should be cut off in the bomb area if not already discontinued throughout the facility.

11.43
Evacuation - Depending upon the size and nature of the bomb, only the floors above and below the bomb location may have to be evacuated. When any question exists, evacuation should be ordered for a minimum distance of 300 feet from the bomb or suspicious device.

Content: **Notes:**

11.44
Venting - Windows and doors should be opened in order to vent the blast if detonation should take place.

11.45
Removal of Flammables - Any materials which might ignite and contribute to fire damage during detonation should be removed.

11.46
Barriers - Protective structures in the form of blast and fragmentation barriers can be erected to minimize damage when the necessary materials are available. A double row of sandbags, mattresses or even overturned desks can be placed between the suspected bomb and any equipment or walls considered vulnerable. The barrier should not touch the bomb. The function of the barrier is to focus, shield or reflect much of the blast away from the vulnerable areas. The bomb should not be covered with any heavy barrier material.

11.5
DAMAGE CONTROL DEVICES

Show VA S2-1-805
T2-1-805

11.51
Bomb Blanket - An effective blast, fragmentation and fire barrier against certain types of bombs. Industry uses blankets in their day-to-day work. For example, the Davis blanket (4 x 4 feet square, weighing 25 pounds) will reduce the blast effect and contain the fragmentation of a 1-1/2 by 8-inch pipe bomb or dynamite bombs consisting of two or three sticks of explosive. Even where the containment is incomplete, the fragmentation is reduced. For maximum effect, bomb blankets should not be placed in contact with the bomb, but should be tented over the device with a standoff of about 12 to 18 inches.

11.52
Bomb Basket.

(1) For example, the Colt-Tabor bomb basket is manufactured in two versions, one

Content: **Notes:**

with an open bottom. These bomb baskets are constructed of laminated, ballistic fiberglass and later versions incorporate ceramic armor linings. Both versions of the bomb basket are approximately 24 inches in height and 26 inches in diameter. The cylindrical basket is fitted with moulded in plastic rope handles for ease of handling. The open bottom version of the Colt-Tabor bomb basket can be employed as a damage control device under certain conditions. If a suspicious device is located in a clear area, the open bottom basket can be carefully lowered over the device without disturbing it and, should the device detonate, serve to directionally vent the blast and fragmentation upwards while reducing the horizontal fragmentation effect.

(2) Mattresses, wooden tables, etc., reduce fragmentation.

11.53
Sandbag Devices

Show VA S2-1-806
T2-1-806

(1) If a bomb is located in an exterior area, similar protective measures can be taken to reduce the risk of damage or injury. When the bomb is located on the surface, a sandbag barricade can be erected surrounding the device. If sufficient material is available, the sandbag barrier should be at least two stacks thick and high enough to contain any fragments that might cause injury or damage. A barricade of approximately 6 feet in diameter should afford protection from most common improvised explosive devices since the accepted rule of thumb calls for barricading a few feet outside the expected diameter of the crater.

(2) When a bomb is located too close to an external wall to allow for erection of a sandbag barricade between the bomb and the wall, it is sometimes possible to

Show VA S2-1-807
T2-1-807

Content: **Notes:**

buttress the structure from the inside. In this method the sandbags are stacked inside the building against the wall facing the bomb. The bags should be interlocked. This technique would be employed only in those cases where the bomb would appear likely to be of a size sufficient to damage the wall of the structure upon detonation.

(3) When probing locates a suspected buried bomb, no effort should be made to dig up the device until bomb technicians arrive. In the interim barricading may be used with surface bombs as long as care is used to avoid sandbagging over the bomb. The bomb blanket can be used to cover the suspected area.

11.6
REMOVAL OF BOMB OR DEVICE

Show VA S2-1-808
T2-1-808

(1) The examination, disarming, transportation and destruction of a bomb is a highly technical and hazardous operation. Removal, disposal or examination of known or suspected devices is, therefore, normally regarded as a technical rather than a protective function.

SUSPECTED BOMBS SHOULD BE HANDLED ONLY BY TRAINED BOMB DISPOSAL TECHNICIANS.

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(2) While it might appear that some bombs are simple in design and can easily be rendered safe by anyone, it is also true that even the simplest bomb can be rigged to detonate if disturbed in any way.

(3) Under certain conditions, where evacuation is impossible and trained bomb disposal personnel are not available, it may be necessary for a bomb scene officer to take a series of high-risk

Content: **Notes:**

steps to remove the device to an exterior holding area. In such cases the following procedure may be followed with the realization that detonation and injury may well result:

(a) Evacuate the immediate area as far away as conditions permit.

(b) Take damage control measures as discussed.

(c) Remotely jar the suspected bomb.

(d) Evacuate the exit route.

(e) Transport the device to an outside holding area and await the bomb disposal technician.

11.61
Remote Jarring.

Show VA S2-1-809
T2-1-809

(1) Remote jarring techniques are employed to determine if a bomb is equipped with vibration, mercury, or other switches which will cause it to detonate if moved. Vigorous remote jarring may also disconnect battery connections, disrupt electrical circuits, stop clocks, or jam firing mechanisms. It may also detonate the device.

(2) To be fully effective, the jarring action must tumble and roll the bomb. A sharp, violent pull on a long line, or one stretched around several corners, will probably result in no more than a gentle nudge at the bomb end of the line. Since violent jarring is the objective, the line should be reeled in taut before jarring. It may also be necessary to run a few yards with the line. Again, when jarring a suspected bomb remotely, expect a detonation and take the proper precautions.

Content: **Notes:**

(3) Filament tape can be effectively used to attach the remote jarring line to suspected bomb. Several turns of 1/2-inch or 1-inch filament tape are placed around the object and pressed securely on three sides, leaving a loop on the fourth side for the attachment of the remote line. Filament is also very useful when attempting to secure a line to an odd shaped or round object such as a pipe bomb.

11.62
Removal

Show VA S2-1-810
T2-1-810

(1) After the bomb has been vigorously jarred without detonation, it may be picked up and carried from the building. However,

(2) The bomb may detonate during this process either because of the expiration of a timing device or by accidental completion of an electrical circuit. Attempting to drag the bomb from the building at the end of the remote line will increase the likelihood of detonation but will reduce somewhat the risk of injury to the individual removing the device.

(3) Added protection may be gained by transporting the bomb out of the building in a special bomb basket or container. The fiberglass Colt-Tabor bomb basket system and the woven steel cable carrier both offer some protection to personnel transporting small explosive devices.

(4) Prior to any attempt to remove a bomb from a building, arrangements should be made for a secured holding area. Parks, athletic fields, parking lots, and similar open areas should be used. If a specially constructed bomb trailer is available, the device can be placed directly into the vehicle container. Normally, the bomb trailer or truck will not arrive before the bomb technician. Therefore, a holding area is required.

Content: **Notes:**

(5) Where the risk of bombing attack is high, a portable bomb holding container can be improvised from sand filled aircraft tires. Such a device can be fabricated from local materials, and when built to specifications, will contain or divert blast and fragmentation from pipe bombs containing up to two sticks of 60% dynamite or 2 pounds of black powder. Package bombs containing four sticks of 40% or three sticks of 60% dynamite were also contained in operational tests of the improvised bomb holder.

11.63
Detonation.

(1) If a bomb explodes, the major problems produced are the treatment of casualties and control of any resulting fires. Normal fire and first aid procedures should be followed. In cases where a bomb search is in progress, fire and medical personnel and equipment should be on a standby basis outside of the 300-foot evacuation radius.

(2) Where large explosions take place, it may be necessary to organize light rescue, heavy rescue, litter, first aid, and communication teams in accordance with standard disaster planning and response doctrine.

(3) The possibility of successive detonations should not be overlooked and the remaining areas of any building or facility should be searched even though one explosion has occurred.

11.7
SUMMARY

(1) Cover salient teaching points.

(2) Review those areas that may be in the form of questions on a quiz or examination.

Content: **Notes:**

11.8
VISUAL AIDS - Unit 11 - Damage Control

The visual aids listed below are for use in lesson plan 5145-11.

Slides		Transparencies
Unit XI	Description	Kit #75
S2-1-800	Man carrying a bomb	T2-1-800
S2-1-801	Explosive Effects	T2-1-801
S2-1-802	Pipe Bomb	T2-1-802
S2-1-803	Fragmentation	T2-1-803
S2-1-804	Damage Control Policy	T2-1-804
S2-1-805	Bomb Blanket and Colt Tabor Basket	T2-1-805
S2-1-806	Sandbag Barrier	T2-1-806
S2-1-807	Sandbagging	T2-1-807
S2-1-808	High Risk Actions	T2-1-808
S2-1-809	Remote Jarring	T2-1-809
S2-1-810	Man carrying a bomb	T2-1-810

Lesson Plan 5145-12

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Security Planning (Section 1)

Objectives:
1. To familiarize the student with the planning of security measures and procedures for the prevention of bombing attacks.

2. To provide the student with the ability to develop and execute bomb incident plan.

Assistants:
None

Total Time
2 hours

Space Required:
Classroom for 30 students.

Methods:
Lecture & conference.

Training Aids:
See Visual Aids Page 12-15. Screen, pointer, podium.

Student Materials:
Notebook and pencil.
Student Handout 5145-12-1 thru 4.

References:
"Bomb Security Guidelines, The Preventive Response," National Bomb Data Center.

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

12.1
INTRODUCTION

(1) The material contained in this lesson plan is suitable for presentation to federal, state, county and city fire, police and law enforcement officers; and safety, security and management personnel of business firms, industrial complexes, hospitals, etc.

(2) Mention that this course will consist of two sections: (1) Security Planning, and (2) Security Methods and Procedures. Handout material is available to the students. It may or may not be used during the presentation of this instruction, depending upon the target audience and time.

Content: **Notes:**

12.11
Preventive Response Planning

Show VA S2-1-850
T2-1-850

(1) The need for pre-planning in the area of "Preventive Response" to meet the ever-increasing bomb threat and bomb incident is urgent in view of the types of people and organizations who are responsible for criminal bombings and sabotage.

(2) The rest of society must implement the necessary preventive measures to properly combat these criminal actions.

12.12
Today's Threat

(1) Although there is no security formula which can render every target immune from attack, a good security plan, properly executed, will reduce the threat of a successful bomb attack.

(2) The development of a security and implementation plan for the prevention of bomb attacks is a challenging task. Physical security deals with prevention and is designed to protect against not only bombing incidents but also a full range of possible attacks.

(3) Let us examine the time bomb threat and the capability of timing devices.

12.13
Timing Devices

(1) During July 1971 nine unusual prototype bombs were planted in different banks across the country. These bombs were placed in safety deposit boxes in the vaults of the banks, in New York City, Chicago and San Francisco.

(2) What made these time bombs unusual was the use of long range timers. Normally the ordinary clock or wristwatch has a cycle of 12 hours which can be employed for bomb timing purposes.

Content: **Notes:**

(3) The timers used in this case had a bombing cycle of 7 months or 217 days. This permits a well advanced time frame till detonation.

(4) A 7-month time bomb, or even multiples of this device, could be imbedded in the structure of a new building, bridge or other structure.

Show VA S2-1-851
T2-1-851

(5) The device could actually become part of the building. This planting of the bomb could become a ransom tool in the hands of the criminal, for detonation 217 days and one minute later.

Show VA S2-1-852
T2-1-852

Show VA S2-1-853
T2-1-853

12.2
SECURITY PLANNING PRINCIPLES

Planning of security measures for the prevention of bombing attacks should be based upon five basic concepts or principles:

Show VA S2-1-854
T2-1-854

(1) Accurate assessment of vulnerability and the risk of the attack must be made.

(a) Vulnerability must be determined by security survey.

(b) Risk is estimated on basis of current intelligence.

(2) Security must be based on relative rather than absolute protection.

Show VA S2-1-855

(a) Absolute protection against bombings is virtually unachievable.

(b) Security costs rise in proportion to protection provided.

(3) Responsibility for development and implementation of security measures rests with management.

Content: **Notes:**

(4) Existing operating structure, supervisory and technical skills, and materials and equipment on hand should be used. This: Show VA S2-1-856

(a) Reduces security costs.

(b) Emphasizes that effective security must involve all endangered personnel.

(5) Operational readiness is essential to security. Constant reviewing, testing and revising of security plans is necessary.

12.3
THE SECURITY PLANNING CYCLE

(1) Security planning is a continuous process. It should be regarded as a cyclical procedure.

(2) There are six sequential steps or phases which must be repeated periodically, if not continuously, to insure an effective security preparedness.

12.31
Six Steps in Security Show VA S2-1-857 T2-1-855

(1) Assessment of the situation - Assess the risk of attack through an intelligence study and determine vulnerability through a security survey.

(2) Security Policy - Since total security is impossible and because of costs involved, management officials must determine the levels of security to be established.

(3) The Security Plan - A plan for achieving the security goals must be developed.

(4) Implementation - Security plan must be implemented, necessary training given, and required systems and devices installed.

Content: **Notes:**

(5) Testing and Inspection - Tests of plan must be conducted on a continuing basis.

(6) Evaluation - Continuous evaluation must be made by management, security and operations, based on routine operations, scheduled tests and actual bomb incident experience.

12.4
THE SECURITY OFFICER

Show VA S2-1-858
T2-1-856

(1) A designated security officer is necessary to implement security planning.

(a) He must be carefully chosen, based on background, experience and interest.

(b) In large or decentralized facilities additional security officers are required.

1. Number of officers must be adequate.

2. Each must be assigned specific duties and areas of responsibility.

(2) The security officer should:

Show VA S2-1-859

(a) Be charged with the responsibility of developing a security plan, subject to supervision by management.

(b) Be responsible for response actions if plan fails.

12.5
SITUATION ASSESSMENT

Issue Student Handout 5145-12-1

Show VA S2-1-860
T2-1-857

Content: **Notes:**

12.51
Risk - Intelligence Collection & Estimate

The continuous collections and evaluation of information about recent bombing incidents in the United States will provide three (3) essential functions:

(1) Insure practicality of security plans for area to be protected.

(2) Serve as a basis to select the security level necessary for the existing or potential threat.

(3) Provide for updating and revising security plans to include counter-measures against new techniques employed in actual bombing activities.

The first and most important step in security planning is, "An Accurate assessment of facility vulnerability and risk." This must be a continuous, systematic and effective program. Without this, security costs will pyramid or protection will diminish.

12.512
Type of Information

The type of information collected should answer as many of the following questions as possible:

Show VA S2-1-861
T2-1-858

(1) Has the facility been the target of a bombing or bomb threat?

(2) Have similar facilities been the target of a bombing or bomb threat?

(3) In recent bombings, attempted bombings or threats:

Show VA S2-1-862

(a) What was the target?

(b) Where was the device placed?

(c) How was the device delivered?

(d) How did bomber gain access to the target?

(e) What incendiary or explosive device was used?

Content: **Notes:**

(f) Did it include a timing mechanism or other delay fuse?

(g) If a warning message or telephone call was received: Show VA S2-1-863 T2-1-859

1. Did it specify location of bomb and/or when it would detonate?

2. To whom was the message addressed and how was it addressed?

3. Who or what office received the threatening call?

(h) What was the day and time of incident? Is there a pattern?

(i) What security measures were compromised, neutralized or circumvented? How was this accomplished? Show VA S2-1-864 T2-1-860

(j) What security measures might have prevented the attack? Show VA S2-1-865

(k) Are terrorists or suspected terrorists present or en route to the community?

(l) Have any thefts of explosive materials or materials which can be used to manufacture explosives occurred in the area?

12.52
Liaison

Security officers should maintain liaison with local public safety officials for statistical information such as: Show VA S2-1-866 T2-1-861

(1) Incidents by population group.

(2) Incidents by region of the country.

(3) Motive or intent of bombers.

(4) Targets.

(5) Type of bomb or incendiary device.

Special statistical analysis will be prepared by the National Bomb Data Center in response to specific requests from public safety officials.

Content: **Notes:**

12.53
Vulnerability - The Security Survey

Show VA S2-1-867
T2-1-862

12.531
Identification of Hazards and Deficiencies

Show VA S2-1-868

Comprehensive, written security surveys should be conducted to:

Show VA S2-1-869
T2-1-863

(1) Identify security hazards and deficiencies.

(2) Develop recommendations to minimize or eliminate opportunities for an attack.

12.532
Reports

Written reports are necessary to:

(1) Enable officials to determine the scope and adequacy of survey.

(2) Substantiate need for additional studies of certain areas.

(3) Provide basis for decision making regarding adequacy of existing or proposed security systems.

12.533
Control of Surveys and Reports

Survey and reports must be handled and stored in a manner which will protect them from unauthorized persons.

Show VA S2-1-870
T2-1-864

(1) Reports would identify to unauthorized persons:

(a) Critical areas.

(b) Security hazards.

(c) Existing security precautions.

Content: **Notes:**

(d) Recommendations for additional security measures.

(2) Disclosure of this information could result in successful bombing or destruction of the facility.

12.534
Report Format

Report should contain following information: Show VA S2-1-871 T2-1-865

(1) Identification of building, area or structure.

(2) Date of survey.

(3) Name of survey official.

(4) Pertinent history - brief statement of operations, number of personnel, and record of previous bombing incidents, if any.

(5) Structure - include physical characteristics and a general description of the building or structure, setting and surrounding area. Show VA S2-1-872

(6) Identification and location of critical areas.

(7) Identify critical functional elements, where destruction or damage would totally halt productivity.

(8) Security measures not in effect. Show VA S2-1-873

(9) Defective or unused security devices.

(10) Security weaknesses.

(11) Recommendations.

12.535
Conduct of Security Survey

Security survey should be conducted by experienced and competent personnel. Show VA S2-1-875 T2-1-867

Content: **Notes:**

(1) By fulltime security officer, if one is employed.

(2) If no fulltime officer, survey by professional security consultant under a company official.

(3) Security officer or outside consultant should follow these six recommended steps:

(a) Meet with management officials to arrange for assistance and coordination during survey.

(b) Obtain working knowledge of the "round the clock" operation of the facility.

(c) Obtain floor and site plans of area.

(d) Obtain and review details of previous bombing incidents or threats to the facility.

(e) Obtain and review details of bombing incidents and threats at similar facilities throughout the nation.

(f) Obtain and review details of bombing incidents and threats in the surrounding community.

12.54
Survey Parameters - The following six questions should be considered throughout the survey:

Show VA S2-1-876
T2-1-868

Student Handout 5145-12-2 can serve as an outline or check list in conduct of the security survey.

(1) What is the area to be protected?

(2) Where could a bomb be concealed at or near the target?

(3) How could an incendiary or explosive device be employed against the target?

(4) How can an attack on the target be prevented?

Content: **Notes:**

(5) What can be done to minimize damage if a device detonates or ignites in the target area?

(6) What are the costs of the necessary security measures?

12.55
Target Analysis

(1) Be aware of all operational aspects of the facility. Show VA S2-1-877 T2-1-869

(2) Determine key functional elements of overall operation of facility.

(3) Do not overlook, misidentify or oversimplify critical factors because they appear to be commonplace. EXAMPLE: Factory produces parts used in guidance systems in aircraft. Machinery is computer operated. Damage or destruction to each computer will effectively stop operation of 10 machines. However, the destruction of a certain water pump, necessary in the operation of the machinery, would make the entire plant inoperable for several weeks, pending removal and replacement of the pump.

(4) Increased costs for "total facility" security may prove to be prohibitive. Show VA S2-1-878 T2-1-870

(a) May require decreasing total security to acceptable cost level and increasing security protection in key and critical areas.

(b) Survey must be conducted during peak activity hours in daylight and darkness, as well as during times when facility is not operating, to identify those areas which are vulnerable to penetration and attack.

Content: **Notes:**

12.6
SECURITY POLICY

Show VA S2-1-879
T2-1-871

(1) Security measures should be no more extensive than warranted after careful consideration of surveys.

(2) The following factors should be considered in determining the level of security for the facility:

(a) Effect of security measures on morale.

(b) Impact of security measures on productivity.

(c) Availability of funds.

(d) Potential damage or loss from bombing.

(e) Existing resources available for security programs.

(f) Legal obligations.

(g) Measures necessary for protection and safety of employees.

12.7
THE SECURITY PLAN

Show VA S2-1-880
T2-1-872

(1) After analysis of the surveys, management must implement a detailed security plan.

(a) Should be a plan to achieve a relatively permanent state rather than plan to be implemented in response to some specific incident.

(b) Should prescribe continuing distribution of human and fiscal resources to accomplish predetermined level of physical security.

(2) Scope and format of security plan.

Issue Student Handout 5145-12-

Refer students to handout material entitled, "Industrial

Content: **Notes:**

Defense Plan Against Civil Distrubances - Sabotage" - this suggested format may be added to or deleted from, depending on the facility involved - the principles involved are essentially the same. (Conduct whatever discussion deemed necessary with students concerning format and content of security plan.)

12.8
SECURITY PLAN IMPLEMENTATION

Student Handout 5145-12-4. This Bomb security plan for a county government building is an actual plan and can serve as a model in plan preparation- Good for class discussion.

(1) Should be implemented only after management, security and planning personnel are satisfied with adequacy of plan to achieve desired level of security.

(2) Implementation entails training and/or education of all personnel involved and installation of required systems and devices.

(a) Training should acquaint all personnel with nature and purpose of security plan.

(b) Must obtain complete understanding and cooperation of employees.

Show VA S2-1-881
T2-1-873

(c) Plan must be supported by top management personnel.

1. Any indication of indifference by supervisory officials is recognized by employees and gives them an indication that the plan is unimportant.

12.9
TESTING AND INSPECTION

Show VA S2-1-882
T2-1-873

Content: **Notes:**

(1) Once plan is implemented, provisions must be made to insure current and continuing effectiveness.

(2) Security inspections should be incorporated into existing supervisory inspections. Show VA S2-1-883 T2-1-875

(3) Emphasis during routine inspections should be placed on identifying and correcting security weaknesses and determining the extent of personnel compliance.

(4) Consider use of practical exercise to test security effectiveness. Individual will attempt to gain access thru controlled areas rather than denial areas and attempt to place a device inside the facility. Show VA S2-1-884 T2-1-876

(5) Continuous evaluation of security plan is necessary to achieve its goals. Show VA S2-1-885

12.(10)
SUMMARY

(1) Cover salient points of instruction.

(2) Review those areas of instruction which may be in the form of questions in a quiz or examination.

12.(11)
VISUAL AIDS - Unit 12 - Security Planning

The visual aids listed below are for use in lesson plan 5145-12.

Slides		Transparencies
Unit XII	Description	Kit #75
S2-1-850	The Preventive Response	T2-1-850
S2-1-851	TODAY	T2-1-851
S2-1-852	217 Days Later	T2-1-852
S2-1-853	One Minute Later	T2-1-853
S2-1-854	Security Planning - I	T2-1-854

Content: **Notes:**

Slides		Transparencies
Unit XII	Description	Kit #75
S2-1-855	Security Planning - II	do
S2-1-856	Security Planning - III	do
S2-1-857	The Security Planning Cycle	T2-1-855
S2-1-858	The Security Officer - I	T2-1-856
S2-1-859	The Security Officer - II	do
S2-1-860	Situation Assessment	T2-1-857
S2-1-861	Information Collected - I	T2-1-858
S2-1-862	Information Collected - II	do
S2-1-863	Warning Message	T2-1-859
S2-1-864	Date and Time of Incident - I	T2-1-860
S2-1-865	Date and Time of Incident - II	do
S2-1-866	Security Officer Liaison	T2-1-861
S2-1-867	Security Survey - I	T2-1-862
S2-1-868	Security Survey - II	do
S2-1-869	Comprehensive Surveys	T2-1-863
S2-1-870	Protect Surveys	T2-1-864
S2-1-871	Detailed Data	T2-1-865
S2-1-872	Description of Structure - II	do
S2-1-873	Security Devices - III	do
S2-1-874	Security Survey	T2-1-866
S2-1-875	Six Steps	T2-1-867
S2-1-876	Survey Parameters	T2-1-868
S2-1-877	Target Analysis	T2-1-869
S2-1-878	Total Costs	T2-1-870
S2-1-879	Security Policy	T2-1-871
S2-1-880	The Security Plan - I	T2-1-872
S2-1-881	The Security Plan - II	T2-1-873
S2-1-882	The Security Plan - III Simple	T2-1-874
S2-1-883	The Security Plan - IV Complex	T2-1-875
S2-1-884	The Security Plan - V Complex	T2-1-876
S2-1-885	The Security Plan - VI Complex	do

Lesson Plan 5145-13

Course:
Modular Explosive Training Program for Law Enforcement Officers

Lesson: The Preventive Response - Section Two - Security Methods and Procedures

Objectives:

Familiarize student with various methods and procedures to reduce the risk of bombing attacks and sabotage.

Assistants:

None

Total Time

2 hours

Space Required:

Classroom for 30 students.

Methods:

Lecture & conference.

Training Aids:

See Visual Aids Page 13-20 & 21. Scree pointer, podium, 35mm slides and/or transparencies, blackboard, chalk, eraser.

Student Materials:

Notebook and pencil.

References: "Bomb Security Guidelines The Preventive Response" - 08, National Bomb Data Center publication.

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

13.0
INTRODUCTION TO SECURITY METHODS AND PROCEDURES — Show VA S2-1-900 T2-1-900

Certain security measures can be taken to reduce the risk of bombing attacks. These will be identified and discussed during this course.

13.1
SECURITY OBJECTIVES — Show VA S2-1-901 T2-1-901

(1) Four (4) common security objectives can minimize vulnerability and maximize protection.

(a) Denial of access to potential bombers.

(b) Proper use of existing and/or additional security measures to protect critical and vulnerable areas.

Content: **Notes:**

(c) Identify and eliminate, if possible, areas where devices can be concealed.

(d) Develop a detection capability.

(2) Greatest need of bomber is method of delivering the bomb.

(a) We will be concerned here with developing methods of denying unauthorized access and controlling authorized access.

Show VA S2-1-902
T2-1-902

(b) These will be referred to as:

1. Denial procedures

2. Control procedures

13.2
PRIME TARGET AREAS

Show VA S2-1-903
T2-1-903

(1) There are two (2) areas most likely to be selected by the bomber for placement of a bomb.

(a) Public Areas

(b) Utility or essential areas

13.21
Public Areas:

Show VA S2-1-904
T2-1-904

(1) Entrances

Show VA S2-1-905

(2) Corridors

(3) Lobbies

(4) Stairwells

(5) Elevators

(6) Rest rooms

(7) Retail stores

Content: **Notes:**

(8) Cafeterias

(9) Snack bars

(10) Newsstands

(11) Observation decks

(12) Bars

(13) Garages

13.22
Hiding Areas

Show VA S2-1-906
T2-1-905

Within these general areas, a number of specific places where devices may be placed are:

(1) Fire extinguisher cabinets

(2) Water coolers

(3) Radiators

(4) Air conditioners

(5) Behind vending machines

(6) Behind, below or inside furniture

(7) Public lockers (Relocate or provide security)

13.23
Public Access

Show VA S2-1-907
T2-1-906

(1) Although not public areas, public often has access to:

(a) Janitor closets

(b) Telephone equipment rooms

(c) Heating, cooling and power supply areas

(d) Trash storage and removal areas

Content: **Notes:**

(2) Employees often leave these areas unlocked or tape the latches open to negate the need of locating the key when they need access to the area.

13.24
Rest Rooms (PUBLIC)

Show VA S2-1-908
T2-1-907

(1) Have proven to be a popular location for placement of bombs.

(2) Areas to check are:

(a) Stalls, wastepaper and towel receptacles must be considered for security. Security officers should have keys to these areas and receptacles.

(c) Plumbing access crawl space. Secure or seal these.

13.25
Furniture

Show VA S2-1-909
T2-1-908

(1) Waiting rooms

(2) Lobbies

(3) Cafeterias

(4) Bars

Consider rearranging or replacing furniture to eliminate concealment possibilities.

Show VA S2-1-910
T2-1-909

13.26
Public Area Surveillance.

Show VA S2-1-911
T2-1-910

(1) Uniformed guards

Show VA S2-1-912
T2-1-911

(2) Plainclothes guard

(3) Mirrors

(4) Two-way mirrors

Content: **Notes:**

(5) Closed circuit television cameras (concealed or open)

(6) Installation of dummy mirrors and/or TV cameras

(7) Posted signs disclosing to public the use of TV cameras, mirrors, guards, etc. This will act as a psychological deterrent.

13.27
Janitorial Force.

Show VA S2-1-913
T2-1-912

(1) Must be utilized in security plan.

(2) Often aware of what "should or should not" be there, areas which "have or have not" been tampered with.

13.28
Motor Vehicles and Parking Areas.

Show VA S2-1-914
T2-1-913

(1) Motor vehicles are often parked in areas accessible to the public.

(2) Installation of a bomb prepared elsewhere can be attached to a vehicle in seconds.

(3) Access to interior of vehicle or engine compartment is not necessary. (Magnet on gas tank)

(4) Many devices are available to bomb unattended vehicle.

(a) Timing device. (detonation at specified time)

(b) Explosion as result of specific action:

1. Opening door

2. Starting vehicle

Content: **Notes:**

3. Stopping vehicle

4. Starting car in motion.

(c) Devices intended to kill or injure are usually placed under the hood and connected to ignition.

(d) Devices intended for property destruction are usually placed under the vehicle.

13.3
SECURITY

Show VA S2-1-915
T2-1-914

(1) Adequate security of vehicles is difficult to achieve.

(2) Suggested steps to afford some degree of security on vehicles:

(a) Anti-theft door knobs

(b) Replace door lock knobs with straight knobs.

(c) Gas cap locks and clockspring type anti-syphon device in fuel filler pipe.

(d) Hood locks

(3) Vehicles which are considered prime targets for bombers should not be left in unattended areas.

Show VA S2-1-916
T2-1-915

(a) Use protected lots or garages when possible.

1. These can be controlled access areas.

2. These areas can be protected by fencing, adequate lighting, low-light television with moving image sensor, electronic intrusion detection devices and use of

Content: **Notes:**

security patrols or guard dogs.

(b) Vehicle storage areas should be far enough away from building or critical areas to avoid damage from fire or explosion in vehicle. Show VA S2-1-917 T2-1-916

(c) Park vehicles in some manner so as to afford easy egress from the area.

(4) Utility areas include:

(a) Transformer vaults.

(b) Mechanical space (boilers and air conditioning).

(c) Machine or fan rooms (distribution system for air).

(d) Electric Power (access points). Show VA S2-1-918 T2-1-917

13.4
ACCESS DENIAL

(1) Generally speaking, the bomber needs a method of hand-carrying the device into the facility and to the point he has selected for placement. Some methods of "access denial" are depicted on the visual aids. Show VA S2-1-919 T2-1-918

13.41
Perimeter Barriers

(1) A boundary must be set around the area to be protected.

(a) Fences

(b) Lighting

(c) Instusion detection devices

(d) Dogs

Content: **Notes:**

(e) Guards

(2) These will serve four security purposes:

(a) Definition or identification of security area

(b) Denial or delay of unauthorized access

(c) Control of authorized access

(d) Psychological deterrence

(3) In buildings or areas that are open to the public at least part of the day, perimeter barriers may have to change during "open" and "closed" periods.

13.42
Fencing

Show VA S2-1-920
T2-1-919

(1) Will not guarantee complete denial of access, but will normally delay access and serve as psychological deterrent to bomber.

(2) Will channel flow of traffic and personnel through controlled access points.

(3) Recommended types of installation.

Show VA S2-1-921
T2-1-920

(a) Chain link, minimum height - four feet.

(b) Mesh openings not larger than two inches.

(c) Number 11 gauge or heavier wire.

(d) Twisted barbed-wire selvage-top and bottom.

Content: **Notes:**

(e) Extended to at least 2" of firm ground or below the surface if soil is sandy and easily windblown or shifted.

(f) Fence should be drawn taut and securely fastened to metal posts, corner posts and gate openings, set in concrete.

(g) Topped with a 45 degree outward and upward extending arm bearing three strands of barbed wire stretched taut and spaced to increase the vertical height of the fence by approximately one foot.

(h) Provide culverts or other openings to prevent washouts. If such openings are larger than 96 square inches in area, they should also be protected.

(i) Periodic inspection for damage, deterioration or attempted access.

13.43
Masonry Walls:

(1) Minimum height of 7 feet topped by a barbed-wire guard as described for chain link fence.

(2) Minimum height of 8 feet topped by a layer of broken glass set on edge and cemented to the surface.

13.44
Anti-Penetration Techniques

(1) Change or rotate locks frequently.

(2) Construct perimeter road inside and parallel to the fence to facilitate use of vehicular patrol if fence surrounds a large area.

Content: **Notes:**

(3) Guarding the fence.

(4) Installation of intrusion detection devices in conjunction with fence or parallel to it.

(5) Installation of parallel fencing.

(6) Use of sentry dogs between parallel fencing.

(7) Installation of adequate lighting.

(8) Establishing "clear zones" surfaced with a light colored material, such as white sand, for better visibility.

13.45
Clear Zones

Show VA S2-1-922
T2-1-921

When possible, "clear zones," free of structures, vegetation or other objects should be established on each side of security fence.

(1) Clear zone should extend twenty feet outside the fence and fifty feet inside fence.

(2) Grass in clear zone should be kept cut short enough to assure that it will not conceal a person in a prone position.

(3) No temporary storage or parking in clear zones.

13.46
Underground Access

Necessary steps must be taken to insure security of any underground channels or tunnels normally there for utility lines and conduits.

Content: **Notes:**

13.47
Doors and Windows

Show VA T2-1-922

(1) Locks

(a) Use of "dead bolt" type locks is recommended. Has a longer "throw" and blunt or flat end cannot normally be manipulated by metal or plastic strip.

(b) Gaps in doors, between door and frame should be eliminated by use of metal angle-iron on frame to prohibit the use of a tool on the bolt.

(c) Dead bolt locks require a key to lock and unlock door.

(d) Doors to critical areas (boiler rooms, machine rooms, electrical rooms, etc.) may be equipped with spring loaded hinge. This will keep door standing open about three inches if door is not locked and will enable security personnel to quickly identify doors not secured.

(e) Exposed hinges on doors should have a non-removable hinge-pin feature. Existing hinge-pins can be spotwelded and provide the same feature.

(2) Keys

Show VA S2-1-924
T2-1-923

(a) Some accounting system for keys must be established.

(b) Distribution of keys to critical areas should be to authorized personnel only and must be accountable.

(c) Code numbers should be removed from keys.

(d) Removal of keys to certain critical areas should be prohibited. (Should not be removed from building or area.)

One method would be to place key or keys on heavy ring about 12 inches in diameter. This would assist in the prevention of removal or loss of keys. If access denial features are successful, then some consideration must be given to the possibility of bombs being thrown through or placed on windows.

Content:	**Notes:**
(3) Windows	Show VA S2-1-925 / T2-1-924
(a) Install heavy grills.	
(b) Remove or bevel window and building ledges or install angled metal siding to prevent bomb placement.	
(c) Installation of some material such as "Lexan", a transparent synthetic resin developed by General Electric which resists shattering and fragment penetration.	Show VA S2-1-926 / T2-1-925
(d) Seal existing window openings.	Show VA S2-1-927 / T2-1-926
13.48 Illumination	If costs in this area are prohibitive, consider possibility of one of the above four steps on the first, second and third floor windows since the possibility of a bomb being thrown through a fourth or fifth (or higher) story window is remote.
(1) Continuous lighting. (Continuous operation)	
(2) Command lighting. (Turned on manually or automatically if suspicious activity is detected).	
(3) Movable lighting. (Portable)	
(4) Emergency lighting.	Show VA S2-1-928 / T2-1-927
This may be a duplicate of any or all of the above types, which has an independent emergency power source.	Show VA S2-1 929 / T2-1-928
(a) Lighting should be inspected regularly.	
(b) Lamps should be replaced when they have been in use approximately 80 percent of their rated life.	
13.49 Alarms	Show VA S2-1-930 / T2-1-929
(1) Alarm systems are designed to detect...	

Content: **Notes:**

not prevent intrusion. Alarm systems must be supported by personnel who can respond to the alarm in sufficient time and strength to prevent delivery of bomb or implement emergency procedures if bomb is found.

(2) Four basic types of alarm systems in use: Show VA S2-1-931 T2-1-930

(a) Local alarm systems

Alarm device is usually a bell or other audible alarm that is located near the protected area.

It is simply designed and easily defeated. Local alarm intended to frighten intruder and alert neighbors or passersby to call police.

(b) Central Station Alarm Systems

The alarm device is relayed to a central station. This is a commercial operation which would notify police to send unit, or some employ their own patrol units which would be deployed to the area. Will generally afford better protection than local alarm.

(c) Proprietary Alarm Systems

Alarm device is relayed to a central location which is owned, manned and operated by the protected organization. Alarm could then be relayed to police or fire stations. Organization must maintain its own adequate response force.

(d) Direct Connect Alarm Systems

Alarm device is relayed only to an alarm annunciator in a police or fire station.

Content:	**Notes:**
(3) To maintain effectiveness and reliability, each system should:	Show VA S2-1-932 T2-1-931
(a) Be capable of operation from emergency power supply.	
(b) Be tested at least daily.	
(c) Be serviced regularly by competent personnel.	
(d) Be protected by keeping plans, wiring diagrams, etc., secured from unauthorized personnel.	
(4) Several factors to consider in selecting alarm system.	Shov VA S2-1-933 T2-1-932
(a) Application (interior and exterior).	
(b) Weather conditions.	
(c) Sound level required.	
(d) Building construction.	
(e) Sources of vibration (subways, aircraft).	
(f) Sources of movement within unoccupied room (forced air).	Show VA S2-1-934 T2-1-933
(g) Radio and electrical interference.	
(h) Cost (installation, maintenance, purchase vs. lease).	
(i) Warranty and availability of service.	
(j) Number of nuisance or false alarms.	Show VA S2-1-935
(5) Nuisance Alarms.	
(a) Frequent nuisance or "false" alarms may lead to an eventual "casual" response by security personnel.	

Content: **Notes:**

(b) Intruders may activate numerous alarms to determine response time and methods of security personnel and to condition responding personnel into thinking that it is another false alarm.

(c) Each response must be prompt, prepared for an emergency.

13.5
SECURITY GUARDS.

Show VA S2-1-936
T2-1-934

13.51
Requirements

(1) Physically fit.

(2) Properly trained.

(3) Properly equipped.

(4) Properly supervised.

(a) Orders in concise, simple language.

Show VA S2-1-937
T2-1-935

(b) Should define limits of posts, specific duties, outline authority.

(c) Should report regularly to guard control center.

(d) Should conduct varied patrols, both route and time of patrol.

(5) Failure of guard to report as required should be investigated.

13.52
Sentry Dogs.

Show VA S2-1-938
T2-1-936

(1) Can serve to deter, detect, attack or detain suspicious persons.

(2) Advantageous during hours of darkness and inclement weather.

Show VA S2-1-939
T2-1-937

Content: **Notes:**

(3) Sentry dog can be used with dog handler.

(4) Can be placed in building after working hours and removed in the morning.

(5) Can be used in space between parallel fencing.

(6) Can be leashed to a cable running between two points.

(7) Can be chained to a specific location.

(8) Can be placed in a vehicle.

13.6
IDENTIFICATION AND MOVEMENT CONTROL

Show VA S2-1-940
T2-1-938

13.61
Personnel Control.

Show VA S2-1-941

(1) Personal Recognition.

(a) Guards recognize all employees. Not feasible when employing large work force.

(b) Guards must be notified of new employees and employees who have been terminated or resigned and are no longer allowed access to area.

(2) Passes or Badges.

(a) Can incorporate such features as photographs, expiration dates, serial numbers, coding systems, authenticating signatures and deterrents to alteration.

(b) Are subject to loss and theft.

(c) If lost or stolen, entire system is compromised and may require issuing or replacing all badges and passes.

(d) All components of badges and

Content: **Notes:**

passes must be safeguarded, beginning with the manufacture.

(e) There are many variations of Pass/Badge systems depending on degree of security sought.

(3) Guard stations should have adequate room, personnel and lighting.

(4) Key access areas.

(a) Access to these areas usually limited to certain employees.

(b) Access controlled by use of key or combination locks, either manual or electronic.

(5) Visitors.

Depending on degree of security desired and nature of facility, one or more of the following steps may be taken to control visitors.

(a) Casual Screening.

(b) Verification.

(c) Verification and Escort.

(d) Sign-in and Sign-out.

(e) Badges or passes.

13.62
Vehicle Control

Show VA S2-1-942
T2-1-939

(1) Consideration should be given to parking, standing or loading zones which may be adjacent to critical areas or targets.

(2) If vehicle access is controlled at a gate, the risk of unauthorized intruders may be reduced by:

(a) Security personnel becoming familiar

Content: **Notes:**

with the usual pattern of activity or vehicles.

(e) Provide escort for each vehicle.

13.63
Material Control

Show VA S2-1-943
T2-1-940

(1) Packages, parcels, briefcases, other containers.

(a) Manual inspection.

(b) Radiographic inspection.

(c) Package diversion or holding.

13.7
SECURITY DESIGN CHARACTERISTICS

Show VA S2-1-944
T2-1-941

13.71
Security Design Planning

The best time to plan security design features is when new building is in the planning stages. Next best time would be when remodeling is planned. Design considerations are:

Show VA S2-1-945

13.71
Site Location

13.72
Landscaping

Should not interfere with visual observation by security force.

13.73
Building Openings

(1) Principal entrances and exits should be at or above street or ground level to reduce areas to be observed by guard force.

(2) Stairwells should be open if possible.

(3) Elimination or reduction of windows and other openings on first and second floors should be considered.

Content: **Notes:**

13.74
Elevators — Show VA S2-1-946

(1) Programmed elevator movements. (All elevators must stop on first floor, etc.)

(2) Eliminate places where bomb could be concealed inside elevators.

(3) Equip escape or service panels in elevators with alarm devices.

(4) Elevator machinery must be protected.

13.75
Guard Stations — Show VA S2-1-947 T2-1-942

(1) Proper placement depending on type of security required.

(2) Guards can control elevator operations.

13.76
Public Restrooms

(1) These are popular areas for bomb concealment.

(2) Reduce concealment areas. (Towel holders, waste receptacles)

13.77
Rooftops — Show VA S2-1-948 T2-1-943

(1) Security level may depend on type of equipment stored on roof.

(2) Access to roof areas must be secured properly.

(3) If guards are utilized on rooftops, consider anti-silhouette devices for their protection. — Show VA S2-1-949 T2-1-944

13.78
Security Of Design Details — Show VA S2-1-950 T2-1-945

Disclosure of security features and/or drawings must be limited to authorized personnel.

Content: **Notes:**

13.8
SUMMARY

(1) Recap the salient teaching points.

(2) Lead into the next block of instruction (if applicable).

Slides		Transparencies
Unit XIII	Description	Kit #77
S2-1-900	The Protective Response	T2-1-900
S2-1-901	Four Security Objectives	T2-1-901
S2-1-902	Security Objectives-Delivery	T2-1-902
S2-1-903	Prime Target Areas	T2-1-903
S2-1-904	Public Areas	T2-1-904
S2-1-905	Public Areas Continued	
S2-1-906	Hiding Places in these Areas	T2-1-905
S2-1-907	Not Public/Accessable to Public	T2-1-906
S2-1-908	Rest Rooms	T2-1-907
S2-1-909	Furniture	T2-1-908
S2-1-910	Bomb Concealment	T2-1-909
S2-1-911	Rearrange	T2-1-910
S2-1-912	Public Area Surveillance	T2-1-911
S2-1-913	Janitorial Force	T2-1-912
S2-1-914	Motor Vehicles	T2-1-913
S2-1-915	Suggested Vehicle Storage	T2-1-914
S2-1-916	Prime Target Vehicles	T2-1-915
S2-1-917	Vehicle Storage Areas	T2-1-916
S2-1-918	Utility Areas	T2-1-917
S2-1-919	Access Denial	T2-1-918
S2-1-920	Fencing	T2-1-919
S2-1-921	Features Added to Fencing	T2-1-920
S2-1-922	Clear Zones	T2-1-921
S2-1-923	Doors & Windows	T2-1-922
S2-1-924	Keys	T2-1-923
S2-1-925	Windows	T2-1-924
S2-1-926	Decorative/Protective Window Grills	T2-1-925
S2-1-927	Ledges	T2-1-926
S2-1-928	Illumination	T2-1-927
S2-1-929	Ground Level Area Lightning	T2-1-928
S2-1-930	Alarms	T2-1-929
S2-1-931	Four Basis Alarm Systems	T2-1-930
S2-1-932	For Effectiveness and Reliability	T2-1-931
S2-1-933	Selected Alarm Systems	T2-1-932
S2-1-934	Selected Alarm Systems (Continued)	T2-1-933
S2-1-935	Selected Alarm Systems (Continued)	
S2-1-936	Security Guards	-1-934

CONTINUED

2 OF 3

Lesson Plan

Content: **Notes:**

Slides		Transparencies
Unit XIII	Description	Kit #77
S2-1-937	Proper Supervision	T2-1-935
S2-1-938	Sentry Dogs	T2-1-936
S2-1-939	Sentry Dogs - Advantages	T2-1-937
S2-1-940	Identification and Movement Control	T2-1-938
S2-1-941	Personnel Control	
S2-1-942	Vehicle Control	T2-1-939
S2-1-943	Material Control	T2-1-940
S2-1-944	Security Design Characteristics	T2-1-941
S2-1-945	Consider for Security	
S2-1-946	Elevators	
S2-1-947	Guard Stations	T2-1-942
S2-1-948	Roof Tops	T2-1-943
S2-1-949	Anti Silhouette Device	T2-1-944
S2-1-950	Don't Divulge	T2-1-945

LESSON MODULE 5145-14

IS UNDER REVISION

Lesson Plan 5145-15

Course:
Modular Explosives Training Program for Law Enforcement Officers

Lesson:
Bomb Safety Equipment

Objectives:
Familiarize the student with safety equipment used by various bomb disposal and bomb squads in the United States.

Assistants:
None

Total Time
1 hour

Space Required:
Classroom for 30 students.

Methods:
Lecture & conference.

Training Aids:
See Visual Aids Page 15-26. Screen, blackboard, podium, pointer, chalk, eraser.

Student Materials:
Notebook and pencil.
Student Handout 5145-15-1

References:
IACP - Police Weapon Center
Report Series No. 4-70 and No. 6-70

NOTE:
THE INFORMATION CONTAINED IN THIS LESSON PLAN IS FOR DISSEMINATION TO OFFICIAL LAW ENFORCEMENT OFFICERS ONLY.

Content: **Notes:**

INSTRUCTOR NOTE:

The purpose of this presentation is to inform you of some of the various types of safety equipment being used around the country by bomb disposal personnel.

15.0
PROBLEM AREAS

Show VA S2-1-1100
T2-1-1100

15.1
TRANSPORTING A BOMB - One of the problems confronting public safety agencies in dealing with increased bombing activity throughout the nation is that of transporting a bomb or suspected bomb from the location where it is found to an area

Content: **Notes:**

where it can be destroyed or dismantled. Transportation of the bomb to a disposal area generally means that it must be moved by surface vehicle through public areas to reach its destination.

(1) Hazards - In many cases this involves the transportation of potentially dangerous devices along streets in crowded urban centers where detonation would predictably result in the injury or death of innocent persons.

(2) Standardization of Equipment - In times past, when bombing was a rare phenomenon confined to several of our larger cities, there was little widespread public safety interest in the problems posed by bomb transporting. In the absence of standardized doctrine, bomb transport vehicles were designed independently by those public safety agencies that experienced a sufficiently high level of bomb activity to justify the construction of a special purpose vehicle.

(3) Individual Protection - The second problem confronting public safety agencies is protection of the individuals who must handle or physically move the suspected device. Some body armor has been produced, but to be perfectly frank about it, very, very little testing has been accomplished to determine the value to the wearer if a detonation occurs while the bomb disposal squad is in the very near vicinity.

15.2
EFFECTS OF AN EXPLOSION

Show VA S2-1-1101
T2-1-1101

First, we shall review the effects of an explosion and see what we must protect against.

(1) Fragmentation

(a) When detonation takes place, if the explosives are confined, the outer container is literally stretched and

Content: **Notes:**

expanded to about one and one-half times its original diameter before it tears and breaks into fragments. About half the total energy of the explosive is expended in this rupturing process and in propelling the fragments outward.

(b) The size of the fragments produced depends both on the nature of the explosive and the type of container involved. The use of a high explosive in a pipe bomb results in thinner and smaller fragments, while fragments from a pipe bomb containing a low explosive are usually larger, with occasional intact chunks of pipe being found.

(c) Some pipe bomb fragments may attain a velocity of 2,700 feet per second, comparable to that of a military rifle bullet, while others travel much slower, depending upon the amount and type of explosive. Regardless of size and speed, fragments travel in a straight line of flight until they lose their velocity and fall to earth, or strike some object and either ricochet or become embedded in the material they strike.

Show VA S2-1-1102 / T2-1-1102

(d) Obviously, fragments in flight represent a hazard to both personnel and property.

(2) Blast Pressure

(a) One of the effects created by the blast pressure from the detonation of a bomb, confined or unconfined, is the shock front, which is a thin layer of compressed air on the leading edge of the positive pressure wave.

Show VA S2-1-1103 / T2-1-1103

Content: **Notes:**

(b) The shock front imparts a sudden, hammering blow to objects in its outward path.

(c) The blast pressure wave may travel at a speed of up to 7,000 miles per hour as the gases generated by the detonation expand from 10,000 to 15,000 times the original volume of the explosive. The outward movement of the positive pressure wave, with its accompanying shock front, creates a partial vacuum near the point of detonation.

(d) As a result, when the positive pressure wave is reduced in strength and finally loses its power, a reverse movement of air inward, towards the point of detonation, occurs. This creates the negative or suction phase, which although not as powerful as the positive phase, lasts about three times as long. Thus, blast pressure actually delivers a "one-two" punch to objects in its path.

(e) Another characteristic of blast pressure waves is that, like sound or light waves, they may be reflected from surfaces. When the blast pressure wave is reflected or bounced off an intervening surface, the wave may either be weakened by scattering or diffusion or intensified by a focusing action. If detonation occurs inside a building or container, the pressure wave is usually intensified at certain points as a result of reflection from confining surfaces.

Content: **Notes:**

(3) Thermal Effects

(a) The incendiary or thermal effects produced by a detonation vary for different explosives. The effect is seen as a bright flash and is measured in fractions of a second. In general, high explosives produce greater heat for a shorter period of time and low explosives generate lower but longer lasting heat.

(b) Unless highly combustible materials are involved, the thermal effect is not a significant hazard in connection with detonations.

(c) While the debris resulting from a detonation may provide an additional source of combustible material, the risk of fire in most bombing incidents is not as great as commonly believed. In terms of containment and transport, the thermal effect of explosive devices is of concern only in those instances where fiberglass baskets or containers are employed.

15.3 ARMOR PROTECTION

(1) Military Armor

(a) For over 3,000 years, military forces used armor as a protection against missiles and hand-held weapons, but with the advent of the longbow and the introduction of gun powder, armor was no longer effective and ceased to be used, except for ceremonial purposes.

(b) Not until World War I was there a rebirth of interest in personal armor to defend the individual against shell fragments and projectiles.

Content: **Notes:**

(c) During World War II, body armor was further developed to protect personnel, especially air crews, against bomb and shell fragments. However, none of the types of military armor developed offered any substantial protection.

(2) Police Armor

(a) Until recently police forces have had only a sporadic need for body armor, usually in connection with attempts to dislodge barricaded criminals. The recent increase in violent civil disorders and assaults on police officers has generated a new interest in protective armor, including a critical review of the characteristics of on-hand armor as well as the merits of newer units being vigorously marketed to the law enforcement community.

(b) There are four basic situations in which police might utilize body armor:

(1) The barricaded criminal or psychotic

(2) Riot control situations

(3) Protection of certain prominent and highly vulnerable individuals

(4) Bomb squad operations

(c) There are basically three questions which must be considered in the selection of body armor for any police operation:

(1) What protection should the armor give?

Content: **Notes:**

(2) What loss of mobility and efficiency will be caused by the wearing of armor?

(3) What is the cost of armor in relation to the protection provided?

15.31
Protection Requirements

(1) How much protection should the armor give? Ideally, armor should be able to stop a 20mm cannon shell and weigh no more than a few ounces. However, the state of the art precludes development of such armor, and some compromise must be reached that reflects the capability of the armorer.

(2) Armor is essentially a means of providing protection for personnel against a given threat. The damage inflicted by fragmentation when it strikes an individual or object depends on factors such as weight, velocity, and configuration. All other things being equal, the impact energy, function of its weight and velocity, is one of the most important factors to be considered in the selection of protective armor.

(3) A consideration related to mobility and efficiency involves the speed with which an armor unit can be employed. In some cases it may be required to get into body armor while inside,or crouched behind,vehicles. In addition, how restrictive is the uniform, can the man walk, bend over, work with his hands, etc.

15.32
Cost of Body Armor

(1) Like the weight of body armor, the cost is also roughly proportional to the degree of protection provided.

Content: **Notes:**

(2) Departments must consider the cost of armor against the real and intangible costs of losing a trained officer as well as against the loss of efficiency which may ensue from wearing excessively heavy armor.

15.33
Body Armor Materials

(1) Types of materials - There are five types of materials currently considered appropriate for use in the manufacture of body armor:

(a) Ballistic nylon or other cloth, felted or nonfelted.

(b) Glass reinforced plastic, either compressed (Doron) or in the form of woven rovings.

(c) Metals such as steel, titanium and aluminum.

(d) Ceramics, such as boron carbide or aluminum oxide.

(e) Polycarbonate resin.

(2) Ballistic Nylon

(a) The original body armor developed during World War II was composed of eight layers of heavy nylon cloth, which partially protected the wearer against flak fragments from anti-aircraft shells. In Korea, the U.S. Army provided infantrymen with the M1952 vest composed of twelve layers of ballistic nylon, which afforded protection against shell fragments and, hopefully, ricocheting small arms bullets. The U.S. Marine Corps later developed their M1955 jacket which combined thirteen layers of ballistic nylon with inserts of glass reinforced plastic.

Content: **Notes:**

(b) In general, ballistic nylon alone is useful as protection against fragments from shells and grenades.

(3) Glass Reinforced Plastic - Glass reinforced plastic is usually called "Fiberglass," although the term is a registered trade name for one specific brand of glass reinforced plastic.

15.331
Metals

(1) There are four metallic, lightweight armor materials and all except dual hardness steel are homogenous materials:

(a) Aluminum Alloy

(b) Titanium Alloy

(c) Homogenous Steel

(d) Dual Hardness Steel

(2) Unlike ceramic armor, the metallic armors are considered structured materials. As such, they are most suitable for vehicle application where extra weight can be handled without undue penalty.

(3) In the manufacture of armor, aluminum and titanium alloys are readily formed and welded by conventional methods, while steel armor such as homogenous steel armor and dual hardness armor are more difficult to form and weld.

(4) Presently, dual hardness armor is considered the best metallic armor available. This material is a composite steel armor consisting of two kinds of steel matallurgically bonded together. The steel on the front face or attack side, is harder but less tough than the

Content: **Notes:**

equally thick steel on the back face. One steel combination finding considerable application at the present time is a dual hardness steel armor designated DPSA-2 (Dual Property Steel Armor).

15.332
Ceramics

(1) The most common ceramics used in body armor are boron carbide, aluminum oxide (alumina), and silicon carbide. These materials are stronger and lighter than most metals and would be ideal, except that none developed to date can provide multi-hit protection since they are excessively brittle.

(2) Usually, the hard face or attack side consists of a very hard ceramic material that has been either molded in one piece to fit the contour of the part of the body that is to be protected or has been made up as small flat plates that are carried in pockets in the armor vest.

(3) The back face, or back-up material, is normally fabricated of glass reinforced plastic (GRP) which is bonded to the ceramic by an adhesive.

(4) It should be pointed out that in order for the ceramic to function properly, it must be completely bonded to the back-up material which is less tough and brittle than the ceramic face. This is analogous to the nonshattering safety glass composite used in all modern automobiles.

15.333
Polycarbonate Resin

(1) This material, a synthetic resin developed by General Electric Company under

Content: **Notes:**

the trade name "lexan," is a rigid, transparent material which is suitable for body armor. Like all polymers, it has no true melting point, but under strain the material will dissolve at about 308°F and can be poured.

(2) Lexan is a relatively soft material and scratches easily. For this reason, it is to be treated with caution in fabricating helmet face shields or other sections where vision is of primary importance.

15.34
Construction of Body Armor

(1) Basic designs - There are two basic designs represented by body armor currently in use:

(a) Rigid Armor

(1) Armor composed of sections molded to fit a certain part of the body is called rigid armor. For example, one piece is usually molded to cover the front portion of the chest and extends part way around the sides of the upper body, while a second section is designed to cover the upper back region and extends around the sides to meet (or overlap) the front section. This design eliminates the joints present when using small individual plates of armor. Most commercially available armor is of the rigid type constructed of glass reinforced plastic, metals or ceramics.

(2) Rigid ceramic armor vests are now being made for the armed forces in limited quantities, and two

Content: **Notes:**

units, the Carborundum KT and the AVCO PA500, are available for police purchase. However, this type of armor is expensive and difficult to manufacture, and problems of quality control are still present. The weight of rigid armor pieces depends on the area to be protected, but is approximately as follows:

Chest Protection	10.0 pounds
Back Protection	12.5 pounds
Groin Protection	4.2 pounds
Coccyx Protection (crotch and spine base)	5.9 pounds
	32.6 pounds

(3) This weight is for a man of average size, 67½ to 70 inches tall. The total weight range of rigid ceramic armor for small to large men for full protection would be from about 29 to 35 pounds.

(b) Variable Armor

(1) This concept on which the U.S. Army has devoted much time and money, includes the use of pockets in a nylon vest or jacket, into which overlapping armor segments or plastic are placed. The basic vest itself is made of closely woven nylon fibers and, in the medium size, has a total weight of about five pounds without armor plates.

(2) As the level of threat increases, armor segments are inserted into the vest to upgrade it. In this manner, various levels of protection can be obtained from a vests that may weigh from 5 to 27 pounds.

Content: **Notes:**

(3) In some cases, metallic armor plates made from titanium alloy or Hadfield manganese steel could be inserted into bariable armor pockets instead of ceramic plates. However, for the same protection, the weight of a vest with metal plates would be heavier than one with ceramic segments therefore, metal segments would be used by law enforcement personnel only for limited purposes. An important advantage of the variable armor concept is that damaged plates can be readily replaced, and this is especially important in the case of ceramic-faced plates which have no multihit capability.

15.38
Summary

(1) While I have discussed various means of designing armor and the materials involved, I must state that a 100% safe body armor has not been developed. For the suit to stop all fragments it is so heavy and inflexable that the mobility and agility loss overcomes the value of the suit.

(2) In addition, little if any testing has been accomplished in the blast pressure area as applied to the effects on the human body. The over pressure caused by detonations will kill even when no fragmentation is involved. For example, 150 PSI overpressure will rupture ear drums and lungs while pressures of 300 PSI will most likely produce instant death.

(3) Some of the vest type armor suit are shown here. Remember this armor while designed for protection against bullets it does offer some protection against fragmentation. Samples of protective vests are:

Note:
Show and discuss the following Visual Aids depicting examples of body armor.

Content:	**Notes:**
Lancer Vest (Nylon)	S2-1-1104 T2-1-1104
AVCO Vest (Glass Plastic)	S2-1-1105 T2-1-1105
Carborundum KT-1 Vest (Ceramic)	S2-1-1106 T2-1-1106
Davis Vest (Nylon and Steel)	S2-1-1107 T2-1-1107
Defensor Vest (Nylon and Steel)	S2-1-1108 T2-1-1108
Spooner (Nylon and Steel)	S2-1-1109 T2-1-1109
GOEC Barrier (Nylon and Steel)	S2-1-1110 T2-1-1110
Rolls Royce Vest (Ceramic)	S2-1-1111 T2-1-1111
Tabor-Colt Vest (Nylon and Steel)	S2-1-1112 T2-1-1112
Super Shield	S2-1-1113 T2-1-1113
Transcon Vest	S2-1-1114 T2-1-1114

15.4 TRANSPORT VEHICLES

15.41 General

(1) It would be ideal to completely contain all the blast pressure, fragmentation, and heat results from the detonation of any type of bomb. Unfortunately, it is neither possible nor practical to construct such a container, since its size,

Content: **Notes:**

weight, and cost would be prohibitive. Consequently, what is generally attempted is the reduction or control of the explosive effects rather than complete containment.

(2) Blast pressure may be controlled by diffusing the blast pressure wave, thus causing it to dissipate in force as it travels outward, or by causing the wave to be deflected in a way that will avoid intensification through the focusing effect described previously. Similarly, fragmentation may be controlled by deflecting the paths of the fragments and/or by attempting to slow down or capture the fragments in some kind of material. The effects of the heat generated by a detonation can generally be safely ignored if only non-combustible material is selected for the construction of the bomb container and its accessories.

(3) In the design of bomb containers, the term nondirectional is used to describe those units which attempt total containment of fragmentation and total or partial containment of blast pressure. On the other hand, containers that attempt to vent or direct fragmentation and blast pressure are referred to as directional units. Obviously, the nondirectional container would have to be larger and heavier because of the large volume of gases and the total fragmentation to be contained. However, this weight and size may have to be accepted if the container is intended for use in high-rise and heavily populated areas where the risk of releasing any significant blast pressure and fragmentation would not be accepted. Directional containers are smaller and lighter and are usually mounted vertically. The blast pressure and fragmentation are vented either upward and downward depending upon whether the container has a closed botton or has been left open at both ends.

Content: **Notes:**

(4) Thus, both nondirectional and directional containers are designed to deflect and/or entrap the fragmentation and to control the venting of the blast pressure wave. They may additionally be equipped with accessory fragmentation blankets or shields which, when placed over openings or vents, further confine or reduce the velocity of the fragments. Reduction or elimination of the secondary blast pressure effects is attempted through mounting the container in sand or other super-absorbent material, and through the suspension system and tires of the vehicle on which the container is mounted.

15.42 Acquiring A Bomb Transport Vehicle

Caught between the conflicting values of full protection and budget limitations, the public safety official must reach some compromise regarding the acquisition of bomb transport capability. While decisions of this kind can only be made on the basis of local conditions, several points should be considered.

15.421 Need

The actual or potential need for a bomb transport vehicle can only be based upon local bomb experience and the availability of outside bomb incident support. If a nearby public agency is willing to share a transport vehicle, it may be difficult to justify the procurement of a special-purpose vehicle even when the level of bomb activity suggests that a need exists.

15.422 Protection

(1) Perhaps the greatest single factor affecting the cost of a bomb transport unit is the level of protection desired. Since it is generally agreed that the

current state of the art in explosive containment precludes the design of a practical mobil unit that will meet the threat of any size bomb, some decision must be made regarding the level of protection that will be acceptable.

(2) As a purely practical matter, the amount of explosive in a homemade bomb would probably not exceed the weight that could be carried to the target by a single person. While this level of protection may not always be achievable within cost parameters, it is technically feasible and least furnishes a point of reference.

(3) Evaluation and rating of a bomb transport vehicle should be carried out whether the unit is locally constructed or purchased. The explosive rating should be based upon the weight of explosive, 60% dynamite for example, that can be detonated repeatedly in the unit without causing permanent deformation of the container. Qualitative-type blast gauges should be located around the unit during evaluation to mointor the blast wave from the detonation to determine the degree of danger to users in the event of an unplanned explosion as well as to assist in establishing safe working distances and zones around the unit.

(4) It is also essential in the rating of a bomb container and vehicle that the container and vehicle be evaluated as a complete unit, as both are subjected to blast pressures during the detonation of bombs or explosive devices. The container is directly exposed to the rapidly expanding gas from the explosion and possibly the fragments, and the trailer is subjected to a downward reactive thrust equal to the upward thrust of the blast.

Content: **Notes:**

15.423
Cost

(1) The total cost of bomb transport vehicle is largely established by the size, containment capacity, and material of the container as well as the type and size of the truck or trailer required to transport the container from the location of a bomb or explosive device to a designated safe area.

(2) Labor costs must also be absorbed if the unit is constructed locally by public or private enterprise.

(3) Because of their high cost and infrequent use, a bomb transport vehicle is a poor investment for most communities. In urban areas, regionalization or sharing of a bomb transport vehicle can result in considerable savings to individual agencies.

(4) In those jurisdictions where bombing activity is rare, a transporter can be improvised from such materials as aircraft tires and sandbags.

(5) However, local fabrication of steel containers should be attempted only if expert advice and craftsmanshop are available. For example, the material selected for the construction of the container should be based upon the following considerations:

   (a) Toughness as defined by the Charpy V-notch impact values.

   (b) The Nil Ductility Temperature as defined by the Naval Research Laboratory.

   (c) Weldability.

Content: **Notes:**

(d) Availability

(e) Cost, heat

(f) Treatment

(g) Yield strength

(h) The steel to be selected should be ASTM grade A537A pressure-vessel steel in the normalized condition. This steel, when properly welded, exhibits high levels of strength and toughness at the range of ambient temperatures normally encountered throughout the United States.

15.424
Implemenatation

(1) Finally, is should be recognized that the bomb transport vehicle is only one component of what should be a total system for the handling of suspicious devices of bombs.

(2) Trained personnel must be available to remove the actual or suspected bomb from a building and to disarm or destroy the device when it has been moved to a safe area.

(3) Without effective procedures and skilled personnel, the bomb transport vehicle will make little contribution to the quality of public safety response to bomb incidents.

15.50
Typical Bomb Transport Units

This section will describe a number of bomb transport vehicles currently in use in the United States and Canada. The three types of vehicles for the transportation of potentially dangerous devices are:

Content: **Notes:**

(1) Nondirectional containers.

(2) Directional containers with single venting.

(3) Directional containers with double venting.

15.51
Nondirectional Containers

(1) The first specifically designed bomb transporter was fabricated by the New York City Police Department's bomb squad in 1941. The bomb container consists of two concentric cylinders of woven 5/8-inch steel cable, with a 10-inch air space between the inner and outer cylinders. The inner cylinder is 9 feet 4 inches in length and 5 feet 8 inches in diameter. A steel door hinged at the center permits access to the inner cage. Both cylinders are supported by a steelframe extending though, around and on both ends of the container. The overall weight of the bomb container is 18,000 pounds.

(2) The container was mounted on a lowboy semitrailer, with an overall weight of 25,000 pounds.

(3) The nondirectional principle was selected by New York City because if was felt that the blast pressure and fragmentation believed associated with a directional type bomb container would pose a danger to upper floors of the tall buildings common to New York City. The New York bomb container is designed so that fragmentation will be fully retained within the bomb container, while the blast pressure will be scattered by passing through the interstices of the woven 5/8-inch steel cable netting of the inner and outer cylinders of the container. Although there have been no instances reported where the bomb transporter has had to withstand the

Content: **Notes:**

detonation of an actual bomb, it has repeatedly withstood test detonations of up to 25 sticks of 40% dynamite.

(4) The advantages of a bomb container of this type of construction are that, with fragmentation designed to be contained, there is little or no fragmentation hazard to citizens or public safety personnel and that, with the blast pressures being dissipated and scattered, there is minimal danger to nearby structures. The secondary blast pressure effects are also minimized through the use of this to nearby structures. The secondary blast pressure effects are also minimized through the use of this design.

(5) The disadvantages of the New York City design are that the weight and size of the container nessitate the use of a suitably large truck-tractor which may pose problems in moving through crowded city streets and alleys. Also, the required use of a truck-tractor may create a response problem if it is not available at all times, or on reasonably short call. The availability of a trained tractor-trailer operator may also be a limiting factor in timely response.

15.52
Directional Containers, Single Venting

Show VA S2-1-1116
T2-1-1116

15.521
Dade County, Florida - Truck

(1) The bomb container on the Dade County truck was constructed in 1962 and is made of 3/4 inch cold rolled steel, triple welded to form a cylinder 3 feet 6 inches wide and 4 feet 6 inches deep. A 3/4 inch spun steel rounded boiler head is welded to the bottom. The bottom of the bomb container is filled with one

Content: **Notes:**

foot of dry sand and the container itself is embedded in two feet of dry sand to a depth of one foot.

(2) The truck, is a standard, two-ton, 1962 heavy-duty International with a long chassis and heavy-duty springs. A deflecting plate of ½ inch steel is located on the front of the truck bed at a 45 degree angle, with the top extending over the top of the cab for crew protection. Ten-gauge steel was used in the fabrication of sides for the truck bed, and compartments are included for storage of minimum amounts of equipment.

(3) The Dade County bomb container has never been subjected to an operational detonation, but has been successfully tested using 24 sticks of 40% dynamite with no resulting damage or deformation of the bomb container or transporter. The advantages and disadvantages of this bomb transporter are similar to those mentioned in connection with the Nassau County bomb transporter.

15.522
Toronto, Canada - Truck

Show VA S2-1-1117
T2-1-1117

(1) The bomb container used by the Toronto Police Department was built in 1962 and put into use in 1963. It is made of 3/4 inch cold rolled steel and is 3 feet 6 inches in diameter and 4 feet deep. Sand is placed in the bottom of the container.

(2) The Toronto bomb container is presently mounted on a truck as a carrier vehicle, but the users believe that a trailer mounting would be preferable.

(3) The Toronto container has been tested

Content: **Notes:**

successfully using up to 29 sticks of 40% dynamite. The advantage associated with other bomb transporters having a truck as a carrier apply to this unit.

15.523
Columbus, Ohio - Trailer

Show VA S2-1-1118
T2-1-1118

(1) The bomb trailer in use by the Columbus Fire Department was built in 1965 with the bomb container as an integral part of the bomb transporter. It has an angle-sided box constructed of ¼-inch steel plate with inside dimensions of 4 feet by 3 feet at the top and approximately 3 feet by 2 feet at the bottom. The inner walls incline inward 10 degrees from top to bottom. The walls and bottom are of double wall construction, 3 inches apart and filled with dry silicone sand. One foot of dry sand or several sandbags cover the bottom of the bomb container.

(2) A danger of the Columbus design, that of sharp inner corners, has been recognized and is being corrected by the inclusion of a welded steel plate at 45 degree angles to each corner and lapped some distance in both directions along the side plates. Sharp corners are a disadvantage because such angles tend to intensify the blast pressure waves, but the addition of the angle plates will break up the corner wave reflection pattern.

(3) The trailer can be towed by any light truck or passenger car with standard ball and socket towing equipment at speeds up to 85 m.p.h. Although the Columbus bomb vehicle has never suffered an operational detonation, it has been tested and has satisfactorily withstood the detonation of 10 sticks of 40% dynamite.

Content: **Notes:**

(4) This unit has the advantage of being extremely mobile and provides great flexibility since it can be towed by several types of common vehicles.

(5) A disadvantage might be its comparatively light construction should a known or suspected bomb of a size larger than 10 pounds detonate in the transporter.

(6) A second disadvantage is the 10 degree angle of the sides which permits a larger direct fragment escape area than would be found in a vertical-sided container.

15.524
Battelle/IACP Prototype Trailer

Show VA S2-1-1119
T2-1-1119

(1) As an outgrowth of a 1970 conference attended by major city bomb technicians, personnel of the IACP and scientists of the Battelle Memorial Institute, Columbus, Ohio, it was agreed that the design of an effective low-cost bomb transporter was needed by many jurisdictions.

(2) The Personnel from PCJA then subsequently contracted with Battelle Memorial Institute to design, construct and evaluate a prototype bomb transporter that could be locally manufactured using standard specifications and materials. It is anticipated that this unit will cost between $2,000 and $3,000, which is considered to be within budgetary limitations of most public safety agencies.

(3) The bomb container is cylindrical with a closed dish-shaped top. The trailer has been developed and tested. It is considered safe for 50 pounds of dynamite, however trailer used for the test did not stand up under blast pressure. The container will have to be mounted on a very substantial trailer.

Content: **Notes:**

15.53
Summary

These are but a few of the bomb trailers in use around the country today. Many more types exist but these examples give you the general idea.

15.6
IMPROVISED TRUCK OR TRAILER

Show VA S2-1-1120
T2-1-1120

(1) Now for those who cannot afford a fancy rig, an improvised carrier can be designed by using aircraft tires or heavy truck tires.

(2) In 1970, an improvised bomb container, built of used aircraft tires, was designed and tested by the United States Marine Corps EOD team at Cherry Point Marine Air Station, North Carolina. The bomb container was constructed of three or four dirt-filled (later revised to dry sand) used aircraft tires tightly tied down with a rope (later chained) to a metal pallet. The pallet and tires can be used on either a trailer or a truck, with a bed of approximately one foot of dry sand underneath the pallet.

(3) The unit was tested using, in separate tests, up to seven sticks of dynamite, two pounds of black powder, and three high explosive 60 mm mortar shells. The tests indicated a significant reduction and entrapment of horizontally projected fragments as well as a reduction in direct horizontal blast pressure. A bomb blanket over the top of the tires would serve to retard fragmentation.

Show VA S2-1-1121
T2-1-1121

15.7
SUMMARY

Review the salient teaching points and be sure to cover those areas that will be presented as

Issue
STUDENT HANDOUT
5145-15-1. This handout gives typical transportation situations and practical solutions.

Content: **Notes:**

questions in a quiz or examination.

15.8
VISUAL AIDS - Unit XV - Bomb Safety Equipment

The visual aids listed below are for use in lesson 5145-15.

Slides		Transparancies
Unit XV	Description	Kit #79
S2-1-1100	Man Carrying A Bomb	T2-1-1100
S2-1-1101	Pipe Bomb	T2-1-1101
S2-1-1102	Pipe Fragmentation	T2-1-1102
S2-1-1103	Effects of an Explosion	T2-1-1103
S2-1-1104	Lancer Vest	T2-1-1104
S2-1-1105	AVCO Vest	T2-1-1105
S2-1-1106	KT-1 Armor	T2-1-1106
S2-1-1107	Davis Vest	T2-1-1107
S2-1-1108	Defensor Vest	T2-1-1108
S2-1-1109	Federal Spooner	T2-1-1109
S2-1-1110	Goel Barrier	T2-1-1110
S2-1-1111	Rolls Royce	T2-1-1111
S2-1-1112	Tabor Vest	T2-1-1112
S2-1-1113	Super Shield	T2-1-1113
S2-1-1114	Transcon Vest	T2-1-1114
S2-1-1115	Non-Directional Container	T2-1-1115
S2-1-1116	Dade County Florida Truck	T2-1-1116
S2-1-1117	Toronto Canada	T2-1-1117
S2-1-1118	Columbus Ohio Trailer	T2-1-1118
S2-1-1119	Battelle Prototype Trailer	T2-1-1119
S2-1-1120	Improvised Bomb Container	T2-1-1120
S2-1-1121	Improvised Bomb Container Mounted on a Truck	T2-1-1121

GPO 936-255

END