

Explosives Recognition and Response for First Responders

I. Training Briefing

- A. A brief history of the civilian Bomb Squads in the United States.
 - 1. Hazardous Devices School: began official training of all civilian Bomb Technicians in 1971.
 - a. Butte County has had an accredited Bomb Squad since the early 1990's.
 - (1) Information about the current members.
 - 2. Training requirements for Bomb Technicians
- B. Overview of training.
 - 1. Commercial explosives, military ordnance, Improvised Explosive Devices (IEDs), statutes and response to possible explosives related incident.

II. Chemical Explosives

- A. Rapid conversion of a solid or liquid explosive compound into gases.
 - 1. Explosion - a rapid form of combustion.
 - 2. The speed of the burning reaction constitutes the difference between combustion, explosion, and detonation.
 - a. Detonation is defined as instantaneous combustion.
- B. Effects of an explosion
 - 1. Blast Pressure
 - a. Detonation produces expanding gases in a period of 1/10,000 of a second and reaches velocities of up to 13,000 mile per hour, producing 700 tons of pressure per square inch.
 - b. The blast front will vaporize flesh and bone and pulverize concrete.
 - c. Mass of expanding gas rolls outward in a spherical pattern like a giant wave.
 - 2. Fragmentation
 - a. Pipe bomb will reach about the same velocity as a military rifle bullet - approximately 2,700 feet per second.
 - 3. Incendiary Thermal Effect
 - a. High explosives will reach temperatures of about 8,000 degrees F.
- C. Explosives
 - 1. Classification
 - a. Low Explosives
 - (1) Deflagrate (burn) rather than detonate
 - (a) Burning is transmitted from one grain to the next

- (2) Initiated by a flame/safety fuse
 - (3) Primarily used as propellants and have pushing or heaving effect
 - (4) Black powder/smokeless powder
 - (5) Must be confined to explode
 - (6) Burning rate of under 3,280 fps
- b. High explosives
- (1) Detonate – instantaneous combustion (has its own oxidizers)
 - (2) Must generally be initiated by a blasting cap or booster
 - (3) Primary purpose is to shatter or destroy
 - (4) Detonating velocity from 3,300 fps to 29,000 fps
 - (5) Does not require confinement
2. Common Explosives
- a. Black powder
- (1) One of the most dangerous explosives known to man
 - (2) High sensitivity to friction, heat, impact and sparks
 - (3) May be set off by static electricity
 - (4) Readily available and therefore is a favorite of bombers
 - (5) Frequently used in pipe bombs
- b. Smokeless Powder
- (1) Small arms ammunition
 - (2) Vary in both color and form
 - (3) Same sensitivity as with black powder
 - (4) Frequently used in pipe bombs
- c. Dynamite
- (1) Used in earth moving operations.
 - (2) In the past, was mostly made of liquid nitroglycerin (NG) and oxidizers.
 - (3) Present dynamite consists of a mixture of ethylene glycol dinitrate and a small amount of nitroglycerin with oxidizers.
 - (4) Packaging varies in color and has a bin wax paper. Unwrapped it will usually appear have a light tan to reddish brown color.
 - (5) 4” to 36” in length, and has a heavy pungent, sweet odor. The NG can cause severe headaches.
 - (6) Other dynamites – Ammonia Dynamites have a portion of their nitro replaced by ammonium nitrate gelatin.
- d. Ammonium Nitrate
- (1) Least sensitive and most readily available commercial fertilizer
 - (2) Small compressed pellets called “prills”
 - (3) Needs a booster
 - (4) ANFO=Ammonium Nitrate and fuel oil

- e. Sheet Explosives
 - (1) Detasheet (Commercial), Flex-X (Military) is a flexible explosive easily cut with a knife and is waterproof.
 - (2) Military sheet explosives have a pressure sensitive adhesive backing for applying to surfaces – Military is dark green, commercial can vary in color.

 - f. TNT
 - (1) Very common military explosive used as a booster charge, bursting charge, and demolition charge
 - (2) Most common form is $\frac{1}{4}$, $\frac{1}{2}$, and 1 pound blocks.
 - (3) Very stable, 20 year shelf life.

 - g. Composition C-3
 - (1) Plastic explosive of RDX and plasticizers
 - (2) Has a distinct, heavy, sweet odor and is a yellow putty-like substance
 - (3) Most commonly encountered in a M-3 block weighing about 2 $\frac{1}{4}$ pounds

 - h. Composition C-4
 - (1) Is replacing C-3
 - (2) Has no odor and comes in different block sizes
 - (3) Used for demolition purposes
 - (4) White in color
3. Initiation Devices
- a. Safety fuse
 - (1) Contains a black powder filler – Approximately 40 seconds per foot burn rate
 - (2) Used for detonating explosives non-electrically or can be used for a direct means for initiation of a low explosive main charge

 - b. Blasting Caps
 - (1) Used for initiating high explosives and a contain a small amount of a primary explosives
 - (2) Initiated either electrically or non-electrically
 - (3) Must be protected from Friction, Impact, Shock, Heat (fire) and Electrostatic Discharge (FISHED)
 - (4) Vary in size from 1” to several inches in length
 - (5) Blasting caps are high explosives and can become unstable even when stored in ideal conditions.
 - (a) The mercury fulminate used in old blasting caps reacts with the copper used in the cap to create extremely sensitive and explosive crystals.

1. On Oct 2, 1997, Sgt Richard J. Schuenning of the Oregon State Bomb Squad was killed while disposing crystallized copper caps.
- c. Detonating Cord
 - (1) Resembles safety fuse but has a white or pink core
 - (2) Used to detonate high explosives - usually by wrapping it around the explosives
 - (3) It is also used for simultaneous detonations of a number of charges – Trunk line is laid connecting the charges.
 - (4) Travels about 4 miles per second
 - d. Friction type igniters
 - e. Percussion type igniters
 - f. Electric Squibs
 - g. Improvised igniters
4. Fusing and Firing
 - a. Time – chemical delay, fuse, clock (digital circuitry provides years of time), etc.
 - b. Action – (Victim actuated) electrical, pressure sensitive, mechanical, light sensitive
 - c. Command – radio controlled (servo), hard wired, missile projected
5. Improvised Explosive Device
 - a. Components
 - (1) Power supply
 - (2) Initiator
 - (3) Explosive
 - (4) Switch
 - b. Constructed in a non-standard manner, incorporating explosives or destructive, lethal, noxious, pyrotechnic, or incendiary chemicals
 - c. Designed to kill, injure, destroy, disfigure, distract, or harass
 - d. Delivered to target
6. Military ordnance
 - a. Easily identified by first responders:
 - (1) Hand grenades
 - (2) Projected munitions
 - (a) 40MM grenades are considered one of the most unstable due to numerous injuries
 - (3) Sub-munitions
 - (4) Mines
 - (5) Igniters
 - b. Every military in the world uses similar types of ordnance.

- c. Because an item is painted or marked as inert, you should never consider the item as safe.
7. Peroxide-base explosives
- a. Two explosive mixtures used in the fabrication of IEDs are;
 - (1) HMTD (hexamethylene triperoxide diamine).
 - (2) TATP (triacetone triperoxide).
 - b. Both are extremely sensitive and, thus, dangerous.
 - c. Similar in appearance to crack cocaine and methamphetamine
 - (1) Drug testing kits can cause hypergolic chemical reaction.

III. Response

A. Safety

- 1. Work within your level of expertise
- 2. Stay within your capacity.
- 3. Any response that stimulates your curiosity should also arouse your officer survival instincts
- 4. Law Enforcement responsibility:
 - a. Recognize
 - b. Retreat
 - c. Report components (get the best description without disturbing the item or staying on scene).

B. Priority Actions

- 1. Life Safety
 - a. Care must be taken to avoid endangering either the responders or the public.
 - b. Proper standoff distances and shielding must be considered when positioning response vehicles and other equipment and when moving or evacuating personnel.
 - c. Requesting and providing proper and sufficient resources from the onset is essential to a safe and successful operation.
- 2. Identification and preservation of evidence
 - a. Second priority
 - b. To facilitate identification, apprehension, and prosecution of the perpetrator(s)

C. Safety Rules

- 1. DO NOT TOUCH THE ITEM.
- 2. Always move people away from the suspicious item – DO NOT MOVE ITEM.
- 3. Never use a radio, cellular telephone, or other transmitter within a minimum of 300 feet of a location where there is a suspected or actual explosive device.
- 4. If you can see a suspicious item, it can see you.

5. Pay close attention to appropriate evacuation distances.
6. Be aware of the potential for secondary devices.

D. Render Safe

1. Specialized training and equipment is required.
2. Keep everyone else out of harm's way.
 - a. If you can see the device, it can "see" you.
3. Never handle a device or suspected device (unless you have training).
4. Render safe with evidence in mind.
 - a. There are two priorities during render safe procedures (RSP):
 - (1) Safety
 - (2) Preservation of evidence, in that order.

IV. Bomb Squad Equipment

A. Bomb Suits

1. Specially designed suits for Bomb Technicians

B. Robot

1. Designed for remote operations as a weapons platform
2. Video and audio

C. Percussion Actuated Non-Electric (PAN) Disrupter

1. Modified shotgun designed especially for render safe operations
2. Uses 12 gauge shotgun rounds for various applications

D. X-Ray

1. Digital scanner for developing on scene
2. Provides the Bomb Tech with detailed information of item

E. Rigging equipment

1. Allows Bomb Tech to operate remotely

F. Single vent trailer

1. Allows for the transportation of explosives
2. Not designed for RSP

G. Hand entry-tools

1. Various tools for hand-entry into a suspected device – although it is discouraged except when the situation dictates.

H. Miscellaneous other equipment

V. Statutes/Overview

A. Bomb Threats/Facsimile Bomb

1. 148.1 PC – F/M – False report of secretion of explosive or facsimile bomb; sending or placing false or facsimile bomb.

B. Terrorism

1. 11413 PC – F – Use of destruction device or explosive or commission of arson in certain places (hate crimes).

C. Possession of explosives, concealed

1. 12020(a)(1) PC – F – Any bullet containing or carrying and explosive, any metal military practice hand grenade or metal replica hand grenade
 - a. This section does not apply to any plastic toy hand grenade, or any metal military practice hand grenade or metal replica hand grenade that is a relic, curio, memorabilia, or display item, that is filled with a permanent inert substance or that is otherwise permanently altered in a manner that prevents ready modification for use as a grenade.
- D. Destructive Device
1. 12301 PC – Definitions
 - a. 12301(a)(1)-Any projectile containing an explosive or incendiary material-commonly known as tracer rounds (except for use in shotguns).
 - b. 13201(a)(2)-Any bomb, grenade, explosive missile, similar device.
 - c. 12301(a)(3)-Any weapon of a caliber greater than 0.60 caliber which fires fixed ammunition.
 - d. 12301(a)(4)-Any rocket, rocket-propelled projectile or similar device with a diameter greater than 0.60 inch.
 - e. 12301(a)(5)-Any breakable container which contains a flammable liquid with a flash point of 150° F- ex. *Molotov cocktail*.
 - f. 12301(a)(6)-Any sealed device containing dry ice (CO₂) or other chemically reactive substance- ex. *Soda or acid bombs*.
 2. 12303 PC - F/M– Possession
 - a. Any person who possesses any destructive device, other than fixed ammunition of a caliber greater than .60 caliber.
 3. 12303.1 PC – F
 - a. Carrying or placement of explosive or destructive device on passenger vessel, aircraft, car or other vehicle.
 4. 12303.2 PC – F
 - a. Possession of destructive device or explosives in or near certain places
 - (1) Public street or highway, theater, hall, school, college, church, hotel, other public building, or private habitation.
 5. 12303.3 PC – F
 - a. Wrongful possession, explosion, etc., of destructive device or explosive with intent to injure or intimidate person or to injure or destroy property.
 6. 12303.6 PC – F
 - a. Sale or transportation of destructive device.
 7. 12308 PC – F
 - a. Use of explosives to attempt murder.
 8. 12309 PC – F
 - a. Unlawful explosion or ignition of destructive device or explosive causing bodily injury.
 9. 12310 PC – F
 - a. Unlawful explosion or ignition of destructive device or explosives causing death, mayhem or great bodily injury.
 10. 12312 PC – F
 - a. Possession of materials with intent to make explosive or destructive device.

- 11. 12355 PC - F/M
 - a. Booby traps.

VI. Demonstration

- A. Demonstration of the explosive effects of blasting caps.