

Bomb Defusal Handbook: Techniques and Procedures

Explosive Ordnance Disposal Training Division

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Introduction

This handbook provides essential information about improvised explosive devices (IEDs), focusing specifically on pipe bomb construction, identification, and safe defusal procedures. The content is designed for training purposes only and should be used by qualified personnel.

1 Pipe Bomb Fundamentals

1.1 Basic Construction

A standard pipe bomb consists of three primary components:

- **Container:** Typically a steel or PVC pipe (1-4 inch diameter) with threaded end caps
- **Explosive Filler:** Common materials include:
 - Black powder
 - Smokeless powder
 - Flash powder
 - ANFO (Ammonium Nitrate/Fuel Oil)
- **Initiation System:** Various triggering mechanisms (detailed below)

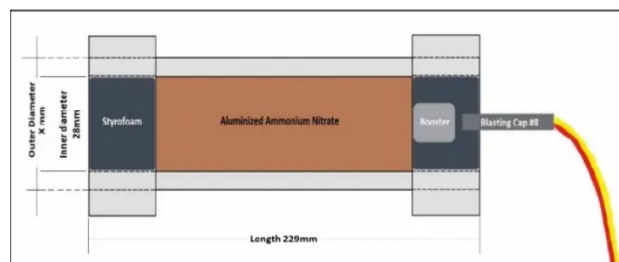


Figure 2 - Diagrammatic representation of Pipe Bomb construction for all test samples with an outer diameter of X being either 34 or 38 mm.

Figure 1: Cross-section of typical pipe bomb components

Container (metallic or polymer) : The outer casing of the bomb, which can be made from either metal or polymer materials. This container serves as the structural housing for the internal components.

Fuse : Located at the top of the device, the fuse is a pyrotechnic component used to ignite the main charge. It is typically connected to the detonator via wires.

Battery : Positioned near the middle of the device, the battery provides the electrical power necessary to activate the timer and other electronic components.



Figure 2: Cross-section of typical pipe bomb components

Indicator : A small light or display that indicates the device’s status, such as whether it is armed or active. This helps in identifying the operational state of the bomb.

Detonator : Situated below the battery, the detonator is a sensitive explosive component that initiates the explosion when triggered by an electrical pulse from the timer or fuse.

Timer : Located towards the bottom of the device, the timer controls the delay before the detonator is activated. It is often programmable and can be set to explode after a specific duration.

Wires : Connecting various components, these wires transmit electrical signals between the battery, timer, detonator, and fuse, ensuring the device functions as intended.

1.2 Initiation Mechanisms

Pipe bombs employ different activation methods:

Table 1: Common Initiation Systems

Type	Characteristics
Fuse-Triggered	Pyrotechnic delay (safety fuse)
Impact-Activated	Sensitive to shock or pressure
Timed Device	Electronic/mechanical timer
Remote-Controlled	Radio or wired trigger

2 Defusal Procedures

2.1 Safety Precautions

Before attempting any defusal:

- Establish a 300m safety perimeter
- Wear proper protective equipment (bomb suit, face shield)

- Use non-sparking tools (brass or plastic)
- Maintain constant communication with team

2.2 Step-by-Step Defusal

2.2.1 1. Visual Inspection

- Document device orientation
- Identify visible components (wires, switches, timers)
- Check for anti-tampering devices

2.2.2 2. Fuse Removal

- Locate fuse assembly (often protruding from end cap)
- Grip firmly with needle-nose pliers
- Pull straight out with steady pressure

2.2.3 3. Tape/Cover Removal

- Identify all adhesive points
- Cut tape using hooked blade
- Peel back covering material slowly

2.2.4 4. Cap Disassembly

- Mark current position of end caps
- Apply even pressure to prevent binding

2.2.5 5. Blasting Cap Neutralization

- Locate primary initiator
- Isolate from main charge
- Remove using specialized tools

2.2.6 6. Wire Management

Handle wires in this exact sequence:

Table 2: Wire Identification and Handling

Color	Function	Procedure
Yellow	Live/detonation	Cut last with insulated cutters
Red	Trigger circuit	Isolate before cutting
Blue (thick)	Power supply	Disconnect after timer neutralized
Blue (thin)	Control circuit	Cut third

3 Post-Defusal Actions

3.1 Device Rendering Safe

After successful defusal:

- Separate all components
- Soak explosive material in oil/water solution
- Bag components separately for forensic analysis

3.2 Forensic Documentation

- Photograph all components
- Note construction details:
 - Pipe material and dimensions
 - Filler type and quantity
 - Trigger mechanism type
- Document tool marks and construction quality

Conclusion

This handbook provides fundamental knowledge for identifying and safely neutralizing pipe bomb threats. Remember that actual field conditions may vary - always prioritize safety and consult with senior EOD personnel when in doubt. Regular training with this material is essential for maintaining proficiency.

References

- [1] ATF Explosives Identification Guide, 2023 Edition
- [2] U.S. Army Explosive Ordnance Disposal Field Manual, FM 4-30.51
- [3] Smith, J. "Forensic Analysis of IED Components", Journal of EOD Technology, 2022