

Detonating Cord Examinations

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Detonating Cord Examinations

1 INTRODUCTION

Detonating cord is a commercially-available explosive component that can be used in improvised explosive devices (IEDs). It is manufactured as a cord that generally consists of a plastic sheath containing a high-explosive center, usually pentaerythritol tetranitrate (PETN), enclosed in textiles and waterproofing materials. In commercial blasting operations, detonating cord is typically initiated with a detonator to then assist with the initiation of other explosives that are intimate contact with the cord. In IEDs, detonating cord may be used either to initiate the main charge explosive or to serve as the main charge itself. Detonating cord is often completely consumed after its proper use; however in some cases it may be possible to recover post-blast fragments. Examination of detonating cord can sometimes assist in determining its functionality within an IED or provide possible manufacturer information. This information can assist the investigator in identifying the subject(s) responsible for constructing the device.

2 SCOPE

These procedures describe the process for detonating cord examinations and apply to explosives and hazardous devices personnel who examine detonating cord and its post-blast remains to determine identifying and functionality information.

3 EQUIPMENT

Below is a list of items that can be used to examine detonating cord and its post-blast remains. Explosives and hazardous devices personnel should choose the most appropriate items based on the nature of the evidence.

- Personal protective equipment (e.g., lab coat, eye protection, full face shield, gloves)
- Hand tools (e.g., tweezers, pliers, utility knife)
- Cleaning materials and disinfectants (e.g., cloths, bleach, rubbing alcohol)
- Stereomicroscope (various magnifications)
- Ruler (e.g., standard 12 inch length)
- Micrometer
- Caliper
- Pillboxes, glass containers, static-proof plastic bags
- FBI Laboratory Explosives Reference Tool (EXPeRT) Database
- Reference texts, manuals, manufacturers' literature, and known materials are maintained in the explosives library. Additional reference information can be obtained from direct contact with manufacturers and distributors.

4 PROCEDURE

These procedures are implemented as part of the overall examination process outlined in the Explosives and Hazardous Devices Examinations Technical Procedure (TP). Refer to the Safety section of this TP before starting any examinations.

Explosives and hazardous devices personnel will:

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- A. Before any examinations are conducted, ensure that the item(s), as well as its container(s) and packaging, have been appropriately marked in accordance with the [FBI Laboratory Operations Manual \(LOM\)](#) (i.e., item number, initials, and full Laboratory number, when practicable).
- B. Ensure care is taken to not obliterate any identifying marks which have been previously placed on the item(s), or obliterate any microscopic marks of value.
- C. Take photographs of the detonating cord to preserve any markings before disassembling the item for examination of the construction characteristics.
- D. Visually examine the item(s) for any trace evidence and possible end matches that could be of value. This evidence could include, but not limited to the following: hairs, fibers, blood, paint, or other particles. Consult with other units regarding the potential of them performing end match examinations.
 - 1. If the trace evidence is to be examined or preserved, contact the appropriate unit and determine if the material should be removed. Record the material by means of notes, sketches, or photographs before it is removed.
- E. Note the physical characteristics of the cord through visual/microscopic examination. Physical measurements should also be conducted to aid in determining as many of the following attributes as possible:
 - o Construction characteristics
 - o Manufacturer
 - o Brand
 - o Type
 - o Explosives present
 - o Special properties (e.g., physical condition, functionality, modifications made for use in IED)
- F. If possible, determine the manufacturer, brand, and type by searching the EXPeRT database, explosives reference files, manufacturers' literature, and/or reference or known materials collection. Identifications are made by comparison of observable/measurable physical characteristics with those provided in the above reference/literature materials.

5 LIMITATIONS

Refer to the Limitations section in the Explosives and Hazardous Devices Examinations TP and Appendix A of the Explosives and Hazardous Devices Report Writing Guidelines.

6 SAFETY

Safety protocols, contained within the [FBI Laboratory Safety Manual](#), will be observed at all times.

Detonating cord should be protected from sources of heat, shock, and friction. Should detonating cord be accidentally initiated, it has the capability of inflicting personal injury or death; therefore, it should be handled with care. Explosives and hazardous devices personnel should follow the below guidance regarding the handling of detonating cord:

- G. Protective gloves (e.g., latex, nitrile) should be worn when handling evidence.

- H. Detonating cord containing no more than five (5) grams of explosives will be examined in the FBI Laboratory. Extra explosives will be properly stored in approved, explosion-proof containers (e.g., explosives magazine, MK663 containers, as appropriate.)
- I. When not under examination, detonating cord will be stored in approved, explosion-proof containers (e.g., explosives magazine, MK663 containers, as appropriate).
- J. Detonating cord will be shipped in Department of Transportation (DOT) approved containers (e.g., MK663 containers).
- K. Appropriate facial protection (e.g., eye protection, full face shield) will be worn when handling detonating cord.
- L. Detonating cord and other types of explosive materials and components will not be examined at the same time or placed in close proximity to each other.
- M. Refer to the Electric and Non-Electric Detonators Examinations TPs if a detonator is submitted with detonating cord.
- N. Items containing blood or other body fluids can be cleaned with a bleach-based solution or other suitable disinfectant following discussions with personnel that may conduct other examinations of the items.

7 REVISION HISTORY

Revision	Issued	Changes
03	06/15/2022	Updated to new document template and updates made throughout for clarity.