



Office of Intelligence and Analysis

**Homeland  
Security**

**Federal Bureau  
of Investigation**



## Joint Homeland Security Assessment

# **(U//FOUO) Improvised Explosive Initiators**

**20 July 2007**

*(U//FOUO) Prepared by the DHS/CBRNE Branch, Borders and CBRNE Threat Analysis Division, and the FBI/Threat Analysis Unit..*

## **(U) Scope**

(U//FOUO) DHS and the FBI are providing this assessment for general terrorism-related awareness. It is intended to alert law enforcement personnel, first responders, and Homeland security personnel about techniques terrorists can use to make improvised explosive initiators.

## **(U) Key Findings**

*(U//FOUO) Government controls for safety and security instituted over the past several years are making the procurement of commercial or military initiation devices to detonate explosives more difficult. Incidents in the United States and abroad indicate that terrorists and other criminals are instead improvising initiators. These improvised initiators are easy to assemble and can be made from commonly available materials.*

*(U//FOUO) DHS and the FBI lack specific information that domestic or international terrorists intend to use explosive devices, including those with improvised initiators, against specific Homeland targets. Even so, law enforcement officials and Homeland security personnel should be aware of unconventional methods that terrorists could use to initiate explosives. Recognizing improvised detonators could be a key in preventing an attack.*

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## (U) Improved Initiation Devices

(U//FOUO) Strict laws and licensing requirements in the United States, the United Kingdom, and several other countries require regulation of the storage and sale of commercial and military blasting caps, making it difficult for terrorists and other criminals to obtain them. Therefore, these groups have resorted to improvising initiators.

- (U//FOUO) The July 2005 London subway bombers used homemade peroxide-based explosives to create improvised initiators.
- (U//FOUO) In July 2006 authorities found improvised initiators at a Texas City, Texas apartment complex in which an explosion occurred. An improvised initiator also was used in a December 2003 bombing of a California biotechnology company. The FBI is investigating these incidents.

(U//FOUO) With increasing frequency directions for synthesis of triacetone triperoxide (TATP) and other homemade explosives, to include proper safety protocols, can be obtained from Internet sites. Many of these initiation devices have been described in terrorist handbooks and can be made by a novice from readily available materials. Some of the devices discussed in recent terrorist literature are described below.

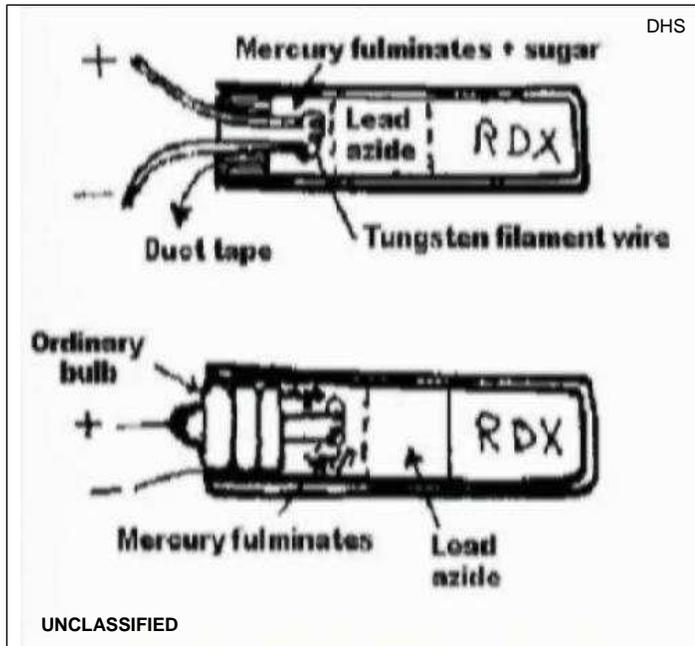
(U//FOUO) An improvised initiator that was posted on a terrorist-affiliated, Arabic-language website describes a method of using ground-up match heads, containing sulfur and potassium chlorate, to initiate a primary explosive—TATP—which then detonates a larger main charge of picric acid.

(U//FOUO) Figure 1 depicts improvised detonators displayed on a terrorist website. The secondary explosive is packed in the bottom of the plastic tube, followed by the primary explosive. After the explosives are loaded, a sulfur and potassium chlorate mixture is added. A light bulb filament, connected to electrical wires and a power source, is used to ignite the sulfur and potassium chlorate mixture, thereby initiating the detonation of the primary and secondary explosives.

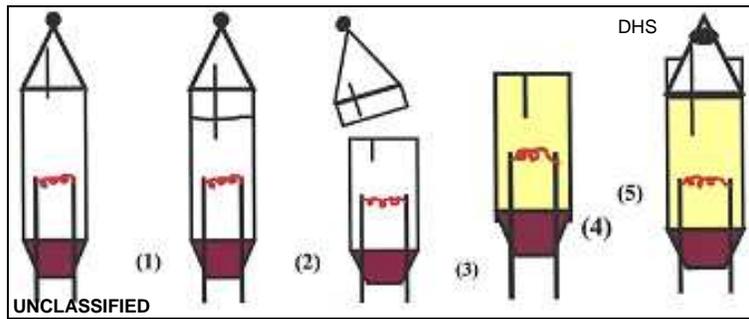


(U) Figure 1: Tubes filled with explosives to be used as detonators.

(U//FOUO) Figure 2, also posted on a terrorist-affiliated, Arabic-language website, illustrates two versions of basic improvised electric blasting caps. The top version uses two wires connected with tungsten filament wire surrounded by a mixture of sugar and mercury fulminate. The bottom version uses the base of a small light bulb, filament, and mercury fulminate. In both cases, the mercury fulminate sets off the primary explosive—lead azide—which, in turn, detonates the insensitive secondary explosive cyclotrimethylenetrinitramine (RDX). Both devices are insulated with duct tape and require an electrical power source to function.



(U) Figure 2: Improved electric blasting caps.



(U) Figure 3: Miniature bulb improvised detonator.

(U//FOUO) Figure 3 illustrates another method for making homemade initiators, which also was retrieved from an online terrorist forum. The head of a small light bulb, such as those commonly used in decorations, is cut off and the base filled with incendiary materials such as potassium chlorate and sugar. The bulb head then can be reattached with adhesive. Attached to a battery or other power supply, this device can be used to initiate a primary explosive such as TATP.

## (U) Commercial Initiation Devices

*(U//FOUO) The energy required to detonate explosive materials varies. Primary explosives—such as lead azide—are sensitive to friction, heat, and shock; are easy to detonate; and thus require little initiation energy. Secondary explosives, such as dynamite and trinitrotoluene (TNT), are difficult to detonate and require more energy. An initiator is used to detonate the more sensitive primary explosive, which, in turn, detonates a less sensitive secondary explosive. The secondary explosive is the main charge, responsible for the majority of the explosive power.*

*(U//FOUO) The initiator, also known as a blasting cap or detonator shown in Figure 4, historically was believed to be the most critical component for constructing an improvised explosive device. A blasting cap is a small explosive device containing primary explosives that is used to detonate larger quantities of less sensitive secondary explosives. Blasting caps are used in commercial mining and demolition and in military applications.*



(U) Figure 4: Common electrical detonators.

## (U) Outlook

(U//FOUO) Law enforcement officials and Homeland security personnel need to be aware that terrorists and criminals may not use commercial, off-the-shelf components such as blasting caps in their explosive attacks. Improvised explosive initiation devices are limited only by the resources and imagination of the bomber. Recognizing the designs and the materials used to construct improvised initiators can help law enforcement personnel identify explosives-related activity.

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