EVALUATING EXPLOSIVE SITUATIONS

FORENSIC SCIENCE

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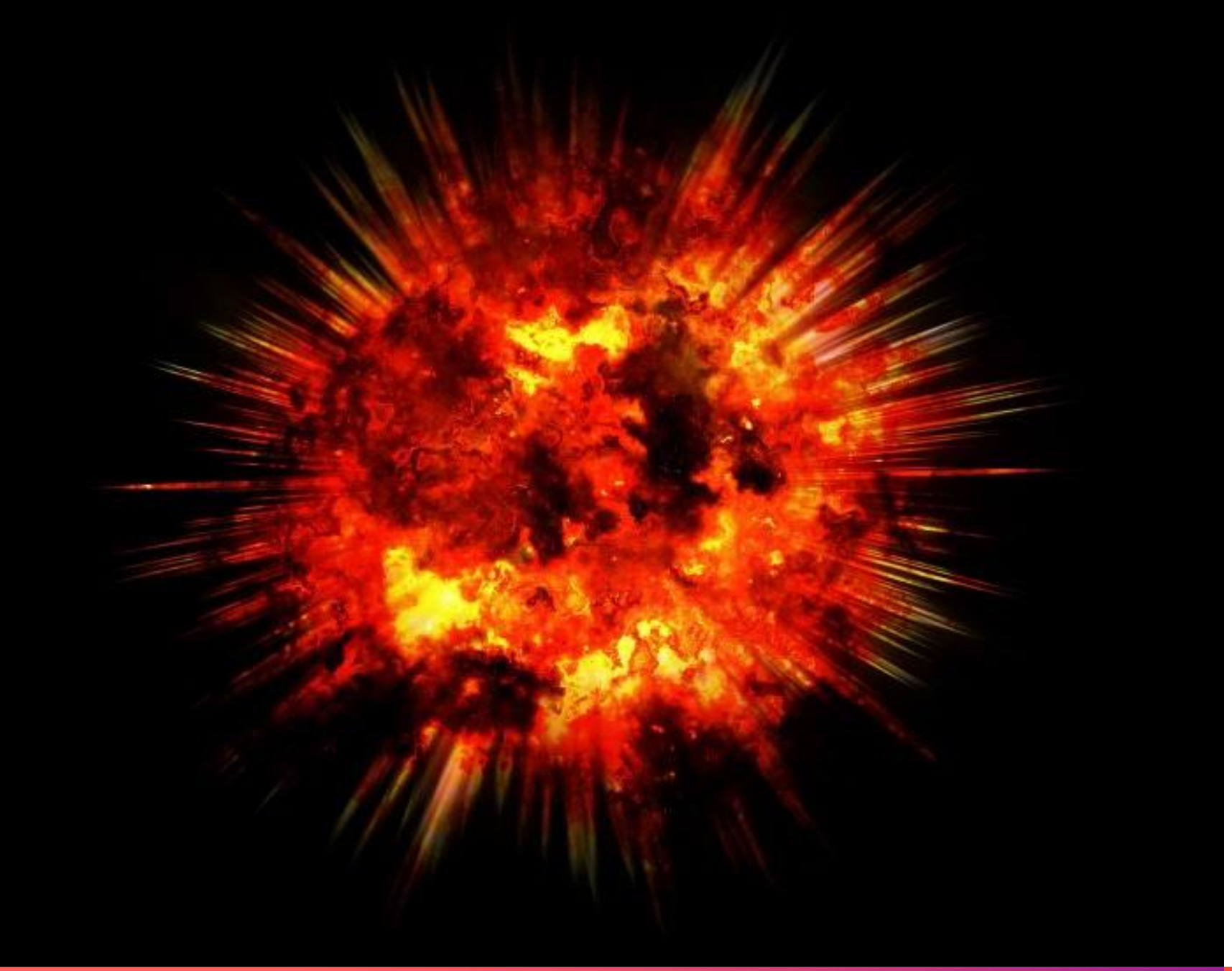
- What are the 5 reasons why someone might intentionally start a fire?
- Cover Their Tracks
- Insurance Fraud
- Psychological Reasons
- Murder
- Revenge

BELL RINGER

INTRODUCTION

- **Fire and Explosives-** similar reactions, both result from a combination of fuel and oxygen – the difference is the rate of reaction
- **Fires**- consume their fuel (Wood, Paper, Trees) more slowly than explosives
- **Explosions**- consume their fuel (gasoline, dynamite) almost instantaneously because the material is confined



SO…..

- If ignited in an unconfined space, the material simply burns, but if you tightly pack the material into a container, it **explodes** when you ignite it.
- **Explosions-** create numerous problems for investigators. The explosive device and any surrounding structures are heavily damaged, if not completely destroyed.

INTRODUCTION CONTINUED…

- Unless a secondary fire occurs, investigators usually can determine the point of origin with ease; however finding fragments of the device or any igniters or timers may be difficult.

DEFINING EXPLOSIVES

- **Explosives** are categorized as either high or low by the speed of their resulting pressure wave.
- **Low explosives** typically move at rates of 1,000 m/s or less.
- **High explosives** may reach speeds as high as 8,500 m/s.

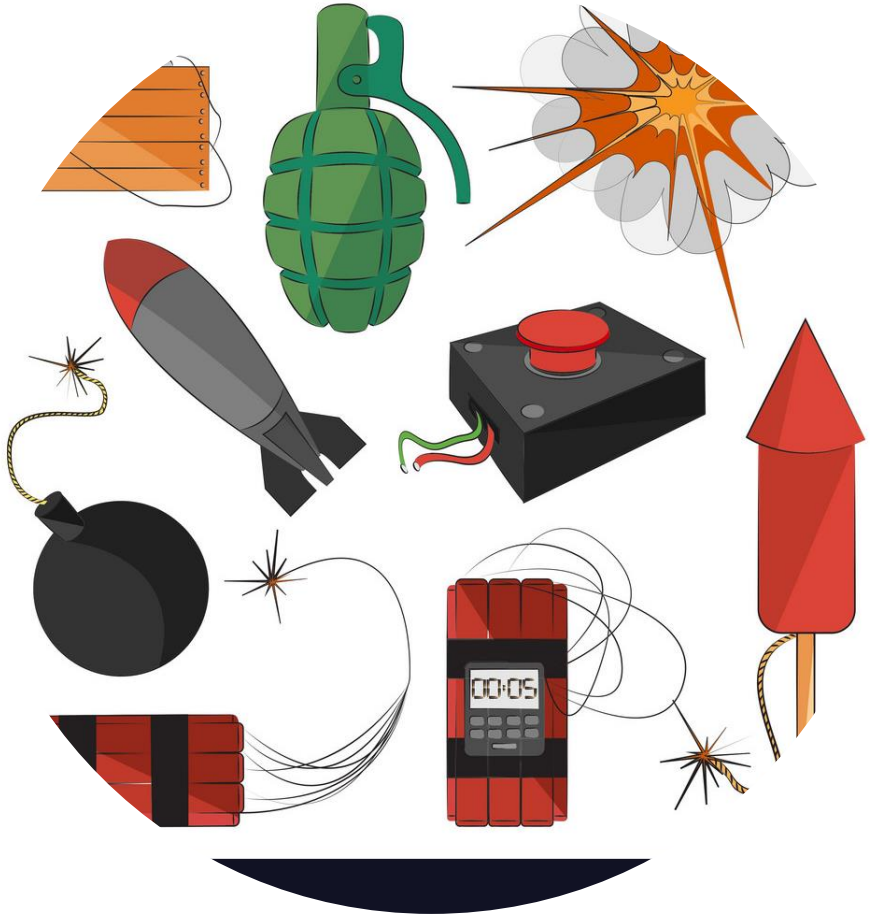
COMMONLY USED EXPLOSIVES

- The most readily available and commonly used low explosives are **black powder and smokeless gunpowder.**
- A combination of **sugar and potassium chlorate** makes another easy explosive.
- Bombers are not very sophisticated

- **<u>Question and Answer Session:</u>**
  - What is the difference between high and low explosives?
  - What causes the "Mushroom Cloud" after a nuclear explosion?

DIVISION OF EXPLOSIVES

- **High Explosives** can be divided into two categories, depending on their sensitivity to heat, friction, or mechanical shock.
- **Initiating Explosives** are very sensitive to these effects. Because of the potential for unexpected detonations, home manufactured bombs rarely use initiating explosives.



MORE ON EXPLOSIVES

- Appear in primers or blasting caps where they initiate other less sensitive non-initiating explosive materials.
- **Mercury Fulminate** and **Lead Azide** are commonly used in this way.

NON-INITIATING EXPLOSIVES

- **NIE** are less sensitive and more commonly used in commercial and military applications.
- These explosives include dynamite, **TNT, RDX, and PETN**.
- Although you can still find dynamite, other nitroglycerine-based explosives have largely been replaced by – based explosives.
- AFNO- an **ammonium nitrate** easily made explosive material, is a mixture of ammonium nitrate and fuel oil.

AMMONIUM NITRATE

- An oxygen rich oxidant that can be found in fertilizers.
- Bombs produced from this substance were involved in the Oklahoma City and 1993 World Trade Center Bombings.

INVESTIGATING A BOMBING SCENE

- Searching the scene for an explosion requires the same attention to detail as does the search for a fire scene.
- Finding fragments from the explosive device, igniter, and timer may be crucial to determining the type of explosive used, and the person responsible for the bombing.

CONTINUING THE INVESTIGATION

- In addition to locating the fragments, investigators direct their searches toward collecting debris to test for unexploded residue, which is almost always present.
- Microscopic examination of debris may reveal black powder or gunpowder, both which are easily recognizable by the color and shape of their particles.

CONTINUED ANALYSIS

- After the microscopic inspection, the lab technician rinses the debris with a solvent in which most explosives are soluble (acetone is a common one) and then analyze the resulting solution, using TLC or GC/MS.
- Identification of the explosive is made using a combination of these tests.
- After finding out what particular explosive was used, investigators focus on finding the seller and buyer of that explosive.

QUESTIONS AND COMMENTS