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PRESENTATION ON

**CLASSIFICATION OF EXPLOSIVES- BASED ON
FOF I, NATURE, MOLECULAR GROUP, HAZARD, EXPLOSIVE
USE, EXPLOSION PROCESS, CHEMICAL PROPERTY**

CUFS 2416 EXPLOSIVE AND POST BLAST INVESTIGATION

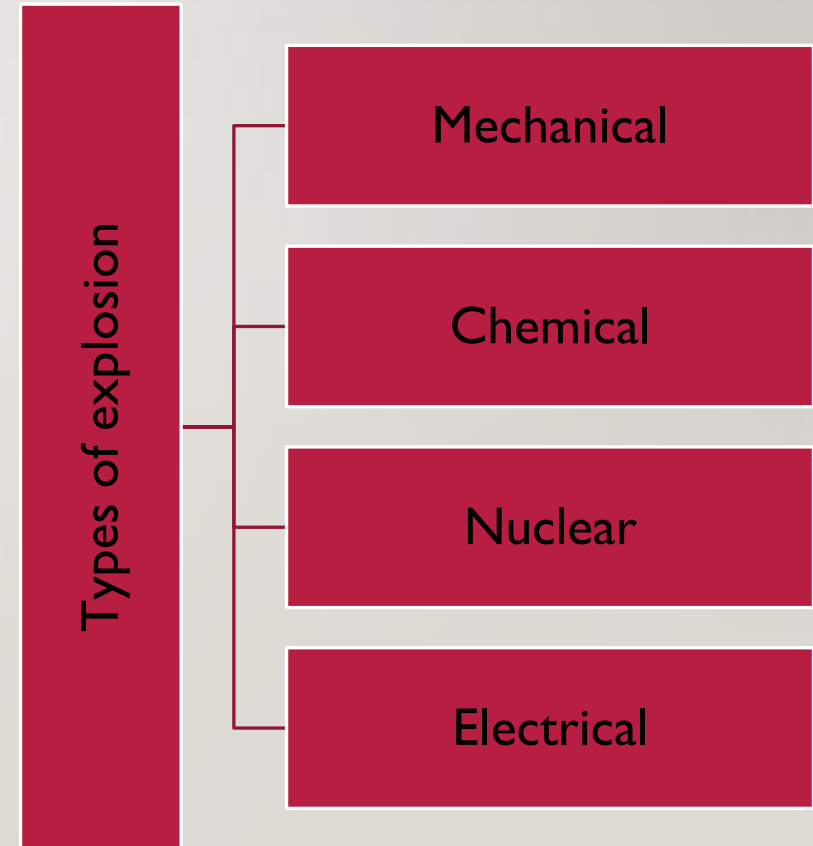
B.SC. FORENSIC SCIENCE (SEM 6)
SCHOOL OF FORENSIC SCIENCES
BHUBANESHWAR CAMPUS

CONTENT

- Introduction-Explosive
- Classification of explosives
 - Based on F of I
 - Based on Nature
 - Based on molecular group
 - Based on hazard
 - Based on explosive use
 - Based on explosion process
 - Based on chemical property

INTRODUCTION

- An explosive is a reactive substance that contains a great amount of potential energy that can produce an explosion if released suddenly, usually accompanied by the production of light, heat, sound, and pressure.



CLASSIFICATION OF EXPLOSIVES

- Based on Figure of Insensitivity (F of I):

1. Very sensitive ($F \text{ of } I \leq 50$)

Primary explosive

- Eg: Mercury Fulminate

Secondary explosive

- Eg: Nitroglycerine, nitrocellulose

1. Sensitive (≥ 50 F of I ≤ 100): Eg- RDX

2. Comparitively insensitive (F of I ≥ 100): Eg-TNT, Picric acid etc.

- Based on nature of explosives:

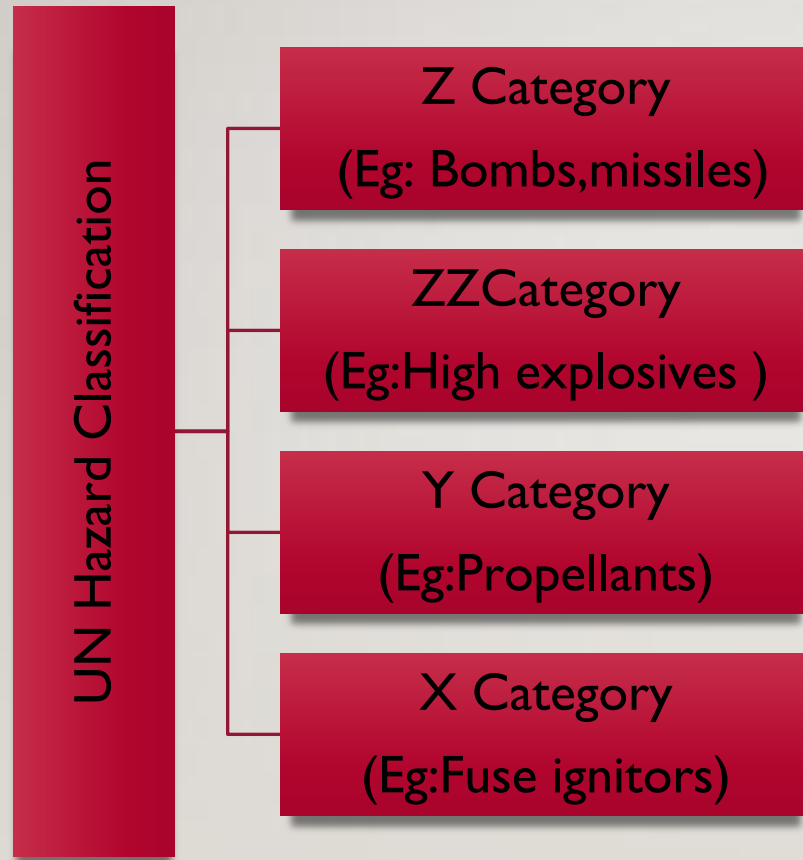
- Nitro compounds(Eg: Picric acid, Styphnic acid)
- Nitric Esters(Eg: PETN, Erythritol tetranitrate)
- Nitro Amines(Eg: RDX and HMX)
- Derivatives of chlorides and perchlorides (Eg: Picryl Chloride, Sodium peroxides)
- Azides(Eg: Lead azide)
- Miscallenous compounds



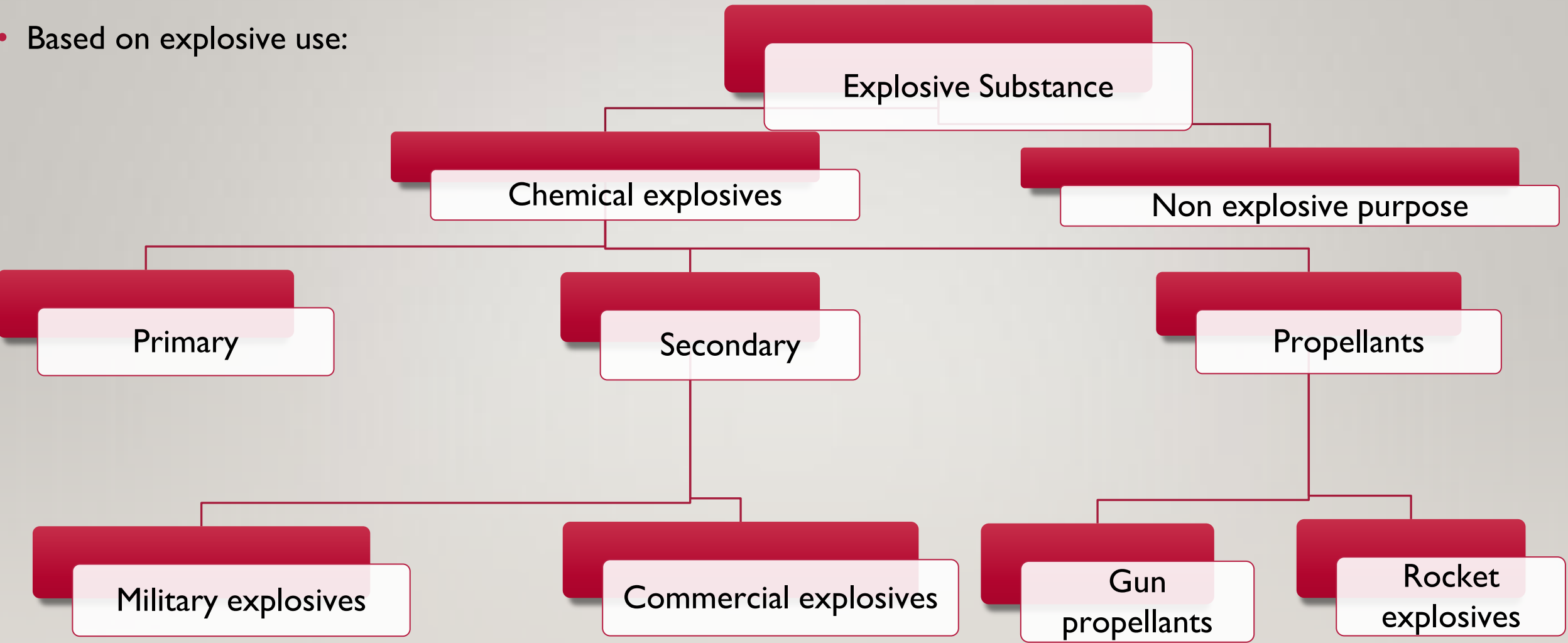
- Based on molecular group:

GROUP	EXPLOSIVE COMPOUNDS	EXAMPLES
O-O and -O-O-O	Inorganic and organic peroxides and ozonides	Peroxyacetic acid, Potassium ozonide
-OCIO ₂ , -OCIO ₃	Inorganic and organic chlorate and perchlorate	Sodium chlorate, Ammonium perchlorate
-N-X ₂ , -NO ₂ , -ONO ₂	Inorganic and organic nitro compounds	Trinitrophenol, Trinitrotoluene
-N==N and -N=N=N	Inorganic and organic azides	Sodium azide, Lead azide
-N=C	Fulminates	Mercury fulminate
-C=C-	Acetylene and metal acetylides	Silver acetylide, gold acetylide
M-C	Metal bonded with carbon in some organo-metallic compounds	Tetracarbonyl nickel, Dimethyl magnesium

- Based on hazard:



• Based on explosive use:



- Based on explosion process:

Detonation

Detonation is a shock reaction where the flames travel at supersonic speeds.

The detonation of the explosives charge causes a high-velocity shock wave and a tremendous release of gas.

Deflagration

Deflagrations are where the flames are traveling at subsonic speeds.

A rapid chemical reaction in which the output of heat is sufficient to enable the reaction to proceed and accelerate without input of heat from another source.

Explosives

- Based on chemical property:

Pure compounds

Mixtures

Primary explosives

High explosives

Non-explosive

Eg: Ethyl centralites,
Methyl centralites

Low explosives

High explosives

Eg: Amatol,
Torpex, Pentolite

Black powder

Smokeless powder

Rocket propellant

Liquid propellant

- Fulminates
- Azides
- Diazo compounds
- Aminoguanidine derivatives
- Nitrophenol salts
- Organic peroxides

High explosives

Nitro compounds

Aliphatic

- Eg: Di, Tri or Tetranitromethane

Aromatic

- Benzene
- Toluene
- Phenol
- Cresol
- Anisole
- Aniline

Nitric Esters

Mono-hydroxylic alcohol

- Eg: Ethyl and methyl nitrates

Poly-hydroxylic alcohols

- Glycol esters
- Glycerol esters
- Tetra-hydroxylic esters
- Hexa-hydroxylic esters

Nitramines

Aromatic

Aliphatic

Heterocyclic

Salt of Inorganic acids

Salts of nitric acid

- Eg: Ammonium nitrate

Salts of chloric and perchloric acid

- Eg: Ammonium perchlorate

THANK YOU.

