
Postgraduate Certificate in Explosive Engineering

Explosive Engineering Design and Analysis

Ammonium Nitrate (AN)

A chemical compound with the formula NH_4NO_3 , used as a fertilizer and, in its industrial form, as an oxidizing agent in explosives, such as in ANFO (ammonium nitrate/fuel oil) mixtures.

ANFO

A mixture of ammonium nitrate (AN) and fuel oil, used as an industrial explosive. ANFO is initiated by a booster explosive, usually a detonating cord.

Blast Analysis

The process of analyzing the effects of an explosion, considering factors such as charge weight, distance from the blast, and structural properties of the surrounding environment.

Blast Design

The process of planning and creating an explosion to achieve specific outcomes, taking into account factors such as charge weight, explosive type, and initiation sequence.

Blast Energy

The total energy released during an explosion, consisting of both kinetic energy (from the motion of gas products) and thermal energy (from the heat generated by the reaction).

Blast Fragmentation

The process by which an explosion breaks up materials into smaller pieces, often used in mining and quarrying.

Blast Pressure

The force exerted by an explosion on its surroundings, measured in pounds per square inch (psi) or pascals (Pa).

Blast Wave

The pressure wave generated by an explosion, characterized by a sudden increase in pressure followed by a decrease below atmospheric pressure.

Blast-Resistant Design

The practice of designing structures to withstand the effects of an explosion, minimizing damage and

ensuring occupant safety.

****Booster Explosive****

A high-explosive material used to initiate a larger charge, typically in the form of a detonating cord or a small quantity of a more sensitive explosive.

****Buried Explosives****

Explosive devices placed underground, used in applications such as mining, quarrying, and construction.

****Charge Weight****

The total weight of explosive material used in a blast, measured in kilograms or pounds.

****Confined Explosion****

An explosion that occurs in a limited space, resulting in higher pressures and potentially more destructive effects.

****Cratering****

The formation of a crater due to an explosion, caused by the ejection of material and the compaction of the ground.

****Detonation****

The rapid, supersonic decomposition of an explosive material, resulting in a shock wave and the release of energy.

****Detonating Cord****

A cord containing a high-explosive material, used to initiate other explosives or to create a linear explosion.

****Detonation Velocity****

The speed at which a detonation wave travels through an explosive material, measured in meters per second (m/s) or feet per second (ft/s).

****Explosive Limits****

The minimum and maximum concentrations of a flammable or explosive gas or vapor in air that will support combustion or explosion.

****Explosive Ordnance Disposal (EOD)****

The detection, identification, rendering safe, recovery, and disposal of explosive devices.

****Explosive Reaction****

A rapid chemical reaction that releases a large amount of energy in the form of heat, light, sound, and pressure, often accompanied by the production of gases.

****Explosive Train****

The sequence of explosive devices or components used to initiate a larger explosion, typically consisting of a detonator, booster, and main charge.

****Explosives Engineering****

The application of scientific, economic, social, and practical knowledge to the design, development, and use of explosives and explosive systems.

****Fly Rock****

Rocks or debris propelled through the air by an explosion, posing a hazard to people and structures in the vicinity.

****Gurney Energy****

The kinetic energy of the products of an explosion, calculated using the mass and velocity of the products.

****High-Explosive (HE)****

An explosive material that decomposes rapidly, releasing energy in the form of a shock wave, used in applications such as demolition, mining, and military munitions.

****Initiation****

The process of starting an explosion, typically involving a small explosive charge or an electrical spark.

****Insensitive Munitions (IM)****

Explosive devices designed to withstand accidental stimuli, such as fire, impact, or sympathetic detonation, and to minimize the risk of unintended explosion.

****Mine Clearance****

The process of removing landmines and other explosive remnants of war from an area, typically using specialized equipment and trained personnel.

****Nitroglycerin****

A heavy, colorless, oily, explosive liquid most commonly produced by nitrating glycerol with white fuming nitric acid under conditions appropriate to the formation of the nitric acid ester.

****Optimization****

The process of finding the best solution to a problem, often involving a trade-off between different factors,

such as cost, safety, and effectiveness.

****PETN (Pentaerythritol Tetranitrate)****

A high-explosive material with a detonation velocity of approximately 8,400 m/s, used in applications such as detonating cords and booster charges.

****Primary Explosive****

An explosive material that is highly sensitive to impact, friction, or heat, used in applications such as detonators and initiators.

****Promoters****

Chemical substances added to explosives to increase their sensitivity or to modify their properties, such as burning rate or detonation velocity.

****Pyrotechnics****

The art and science of creating and using chemical reactions that produce light, sound, heat, or motion, often used in fireworks, signals, and special effects.

****Reactive Armor****

A type of armor that uses explosive materials to defeat incoming projectiles, typically by detonating the explosive upon impact and directing the explosion away from the protected object.

****Risk Assessment****

The process of evaluating the likelihood and consequences of a hazardous event, such as an explosion, to determine the level of risk and to develop appropriate mitigation strategies.

****Risk Management****

The process of identifying, assessing, and controlling risks to minimize their impact on people, property, and the environment.

****Safety Distance****

The minimum distance from an explosion required to ensure the safety of people and structures, determined based on factors such as charge weight, explosive type, and initiation sequence.

****Sensitivity****

The degree to which an explosive material is susceptible to initiation by various stimuli, such as impact, friction, or heat.

****Shaped Charge****

An explosive device designed to focus the energy of the explosion in a particular direction, typically used in armor-piercing munitions.

****Sympathetic Detonation****

The triggering of an explosion in a nearby explosive material by the shock wave or fragments from an initial explosion.

****TNT (Trinitrotoluene)****

A high-explosive material with a detonation velocity of approximately 6,900 m/s, used as a standard for measuring the energy released by other explosives.

****Underwater Explosion****

An explosion that occurs underwater, characterized by the formation of a shock wave and a bubble of gas that rises to the surface.

****Vapor Cloud Explosion (VCE)****

An explosion caused by the ignition of a cloud of flammable vapor, often resulting from the release of a volatile liquid or gas.

****Void Analysis****

The process of analyzing the effects of an explosion on a structure with voids or open spaces, such as a building with hollow walls or a tunnel.

****Wave Propagation****

The transmission of energy through a medium, such as a shock wave through air or water, characterized by changes in pressure, density, and velocity.