Improvised explosive device

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Why is in news? Bengalurbomb blast: What are improvised explosive devices, or IEDs?

At least nine people were injured after an explosion at the bustling Rameshwaram Cafe in Bengaluru's Whitefield area on Friday (March 1), possibly by an improvised explosive device (IED)

Ruling out a gas leak, Karnataka Chief Minister Siddaramaiah said that CCTV footage has revealed that a "man was seen keeping a bag in the cafe." He added: "It is not a high-intensity blast but an improvised one."

IEDs:

An improvised explosive device (IED) is a bomb **constructed and deployed in ways other than in conventional military action.**

It may be constructed of conventional military explosives, such as an artillery shell, attached to a detonating mechanism. IEDs are commonly used as **roadside bombs, or homemade bombs**.

According to a **factsheet by the United States Department of Homeland Security**, "because they are improvised, IEDs can come in many forms, **ranging from a small pipe bomb to a sophisticated device** capable of causing massive damage and loss of life."

IEDs can be deployed using a vehicle, carried, placed, or thrown by a person, delivered in a package, or concealed on the roadside.

The term "IED" was **coined by the British Army** during the Northern Ireland conflict to **refer to booby traps** made by the IRA, and **entered common use in the U.S. during the Iraq War**.

IEDs are **generally utilized in terrorist operations or in asymmetric unconventional warfare or urban warfare** by insurgent guerrillas or commando forces in a theatre of operations.

In the **Iraq War (2003–2011),** insurgents used IEDs extensively against U.S.-led forces, and by the end of 2007, IEDs were responsible for approximately 63% of coalition deaths in Iraq.

They were also used in Afghanistan by insurgent groups, and caused over 66% of coalition casualties in the 2001–2021 Afghanistan War.

IEDs were also used frequently by the **Liberation Tigers of Tamil Eelam (LTTE) in Sri Lanka** during the Sri Lankan Civil War and by **Ambazonian separatists in the ongoing Anglophone Crisis**.

In India, some notable instances of IEDs being used in the past include the 1993 Mumbai serial blasts, the 2008 Jaipur blasts, the 2006 Jama Masjid bombings, and the 2013 Bodh Gaya bombings. IEDs have also been **commonly used by Maoist insurgents, and Kashmiri militants**.

Components of an IED:

Each IED comprises a few basic components, which can come in various forms, depending on resources available to the bomb-maker.

These include an initiator or a triggering mechanism, (which sets the explosion off), a switch (which arms the explosive), a main charge (which causes the explosion), a power source (since most IEDs contain an electric initiator, they require an electronic power source), and a container.

Additionally, IEDs may be packed with additional materials or "enhancements" such as nails, glass, or metal fragments designed to increase the amount of shrapnel released by the explosion — and thus the damage it causes. Enhancement may also include hazardous materials such as toxic chemicals, or radio-active circumstances — an IED packed with, say, **depleted Uranium** will be colloquially called a **"dirty bomb**".

Some common materials used to build IEDs include **fertilisers such as ammonium nitrate and urea nitrate, gunpowder, and hydrogen peroxide**

The reasons why passengers are not allowed to carry beyond a certain quantity of liquids aboard commercial aircraft is the possibility of creating IEDs on site by mixing some commonly available liquids.

	Common uses	Common form	Known IED use
High explosives			
Ammonium nitrate and fuel oil (ANFO)	Mining and blasting[2]	Solid	Oklahoma City bombing
Triacetone Triperoxide (TATP)	No common uses; mixed from other materials	Crystalline solid	2005 bombings in London
Semtex, C-4	Primarily military	Plastic solid	Irish Republican Army bombings
Ethylene glycol dinitrate (EGDN)	Component of low-freezing dynamite	Liquid	Millennium Bomber, intended for Los Angeles airport, 1999
Urea nitrate	Fertilizer	Crystalline solid	World Trade Center 1993
Low explosive			
Smokeless powder	Ammunition	Solid	Olympic Park bombings

Effects due to the explosion of IEDs:

IEDs are **not simply used to kill and injure** — they have often, especially in active war zones, been used as distractions.

The extent of damage caused by an IED depends on its size, construction, and placement, and whether it incorporates a high explosive or propellant.

Typically, IEDs come with a very clear trade-off. While smaller bombs are easier to hide, carry, and deploy, they are also generally much less damaging than larger ones, especially ones deployed using vehicles.

The explosion causes **damage to structures and infrastructures** in the region.

The explosion of a bomb can **cause secondary explosions** if gasoline, natural gas, or other flammable material is ignited. Secondary hazards that result can include fire with possibly toxic smoke, disruption of electric power, ruptured natural gas lines and water mains, and debris.

Explosions **create a high-pressure blast** that sends debris flying and lifts people off the ground.

The type of injuries and the number of people hurt will vary depending on: the physical environment and the size of the blast; the amount of shielding between victims and the blast; fires, or structural damage that result from the explosion; and whether the explosion occurs in a closed space or an open area.

Some health effects caused by IEDs, including **eye injuries and abdominal injuries**, may not be apparent initially, but can cause symptoms and even fatalities hours to months after the event.

Psychological effects in attack survivors, first responders, and others are not unusual in the aftermath of a high-casualty event.

Challenges associated with IEDs in India:

Militants have the 'first mover advantage', on triggering a landmine or an IED on a mobile Army vehicle or opening burst fire with an AK- 47 on a static CRPF sentry post.

In all such scenarios, the reaction or the response time available for what is called "**Immediate Action (IA) or Counter Ambush drill"** is a few seconds, and that too, if a few of the security personnel are lucky enough to survive the initial IED ambush.

Hence, all standard operating systems and procedures, technological measures etc. are directed towards identification and detection of IEDs/landmines and to avoid being caught in them.

Policy measures required:

Regulating explosives: Legislative measures are required for the mandatory addition of odoriferous chemicals and/or biosensors to explosives used in industry and mining for their easy detection during transport.

Collaboration with international organizations: Other countries have taken several counter-IED measures, such as the U.S. setting up the Joint Improvised-Threat Defeat Organization and spending about $20 billion on counter-IED measures since 2005.

Overarching agency: It is needed under the Ministry of Home Affairs to coordinate the efforts of both the GoI and the states, and to provide legislative, technological, and procedural support to law enforcement agencies.

Way ahead:

Stealth, camouflage and concealment are integral to anti-terrorist operations.

Rigorous and regular implementation of various detection methods, such as metal detectors, ground-penetrating radar, and trained sniffer dogs, to locate and clear landmines and IEDs, is essential.

Aerial surveillance carried out through drones and road opening parties equipped with UGVs (Unmanned Ground Vehicles) is the need of hour.

Relationships have to be cultivated and goodwill generated among the local population on a long-term basis beyond and above transactional levels.

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