A LMOST 40 people were killed recently when a land mine blast perpetrated by Maoist rebels blew up a civilian bus in the Dantewada district of the state of Chattisgarh. Innumerable unsuspecting lives are lost every year to such land mine blasts. Children, curious by nature, are the most at risk.

According to a report by the United Nations, children in at least 68 countries are today threatened by mines planted on the land they live on. Over 110 million land-mines of various types — plus millions more unexploded bombs, shells and grenades — remain hidden around the world, waiting to be triggered by the innocent and unsuspecting, the report says. So common are mines in Cambodia that they are now used for fishing, to protect private property and even to settle private disputes.

Once laid, a mine may remain active for up to 50 years. Unless vigorous action is taken, mines placed today will still be killing and maiming people well into the middle of the next century.

What is a Land Mine?
A land mine is a target-triggered explosive weapon; the target may be a person or vehicle. Surprisingly, this device was not invented in this century. Since ancient times their non-explosive predecessors like caltrops, stakes and spikes have been used on the battlefield.

Forces in ancient Rome sometimes dug small foot-sized holes, covered and armed with a sharpened spike. In the Middle Ages in Europe, small, four-pronged spiked devices called caltrops or crows’ feet could be scattered on the ground to delay the advance of an enemy, but these devices were not explosive. Today, however, land mines could be called silent explosives.

Land mines are designed to deter, channel, delay or kill an enemy. These are basically force multipliers that increase the efficiency and defending force without requiring more personnel in the operation in which they are involved. As the name itself indicates, their origin lies in the practice of mining, where to defeat an enemy a tunnel is dug and over there are placed explosives, the trigger of these explosives is placed somewhere in the path of the target.

A land mine has the following main components:
- Firing device that initiates (activates) the mines,
- Detonator or igniter that sets off the booster charge,
- Booster charge that may be attached to the fuse, or the igniter, or be part of the main charge,
- Main charge that is kept in a container and which usually forms the body of the mine, and
- Casing that covers the device.

How is it Triggered?
A land mine can be triggered by a number of things that include pressure of the target, movement of the target after application of pressure, vibration caused due to sound produced by the target, and attracting force of the target or magnetism. Mines commonly in use employ the pressure of a person’s foot as a trigger, but tripwires are frequently employed, as they are easy to make and set up.

Most modern anti-vehicle mines use a special type of magnetic trigger that detonates even if the tyres or tracks do not touch it. Today, even advanced mines are in use that are able to sense the difference between friendly and enemy vehicles by way of a built-in signature catalog. This enables all the
friendly forces to use the mined area while at the same time prohibiting enemy access to the area.

Most mines, with few exceptions, combine the main trigger with a touch or tilt trigger to make the work of enemy engineers who try to defuse it all the more difficult. Mines are designed in such a way that they use the least amount of metal to make searching with a metal detector much more difficult. Use of plastics has added advantage of being very inexpensive.

Since it is difficult to remove mines, some countries including United States have designed mines that have the ability to self-destruct, or chemically render themselves inert after a period of weeks or months to reduce the likelihood of civilian casualties at the conflict end. However, these self-destruct mechanisms are not absolutely reliable, and most land mines laid historically are not equipped in this manner. Self destruct mechanisms depend upon the weakening of the charge that triggers them—the battery or the charge kept in it withers away after a period of time.

Special types of mine, commonly called anti-tank mines, have a peculiar feature—they destroy only heavy targets such as trucks, tanks, buses because they have high pressure sensing capacity that works only for weights greater than 100 kg. The mine gets activated only when a heavy weight passes over it.

How are Mines Laid?
Laying of mines can be done by several means but the most preferred way of placing of mines at the executing spot is by taking help of specially trained engineers. This is the most laborious of all techniques used in the installation of the device and is also very reliable as well as economic. Another way of laying mines is through mine-laying vehicles, which are specially meant for the purpose. With the help of artillery mine-scattering shells can also be fired from a few kilometers. Mines can also be ejected from cluster bombs or cruise missiles or can be dropped down from helicopters or airplanes.

Laying of mines is quite easier and inexpensive in comparison to its removal. Since the mines have non-metallic body and are of relatively small size, this makes the process of demining expensive, time consuming and dangerous. Trained engineers, with special equipment, are required for the purpose. Nowadays hybrid techniques like dogs and rats are involved in the process of demining because of their specially trained sensing capability to detect metals and explosive. It has been estimated that laying of mines and defusing them costs in the ratio of 1:1000 (i.e. if 1 dollar is spent on the manufacturing then 1000 dollar is spent on defusing it).

A Lethal Threat
Much after the war has ended, land mines and unexploded bombs continue to pose a lethal threat to human life and claim casualties. According to estimates, every 30 minutes, someone, somewhere in the world is injured or killed by an encounter with this deadly debris, and at least one in every four victims is a child.

Mines remain dangerous after the conflict in which they were deployed, killing and injuring civilians and rendering land impassable and unusable for decades. Their deadly nature has led several countries to promote efforts to ban land mines.

One such effort is the Ottawa Treaty. It is a convention for the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and their Destruction. It came into force on 1 March 1999. The treaty was the result of the leadership of the Government of Canada working with the International Campaign to Ban Land mines, launched in 1992. The campaign and its leader, Jody Williams, won the Nobel Peace Prize in 1997 for the efforts. As of 2007, a total of 158 nations have agreed to the treaty. Thirty-seven countries have not agreed to the ban, which includes countries like China, India, Israel, Pakistan, Russia and the United States.

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