

DEPLETED URANIUM (DU) & WARFARE

Lieutenant Commander A S Bishnoi



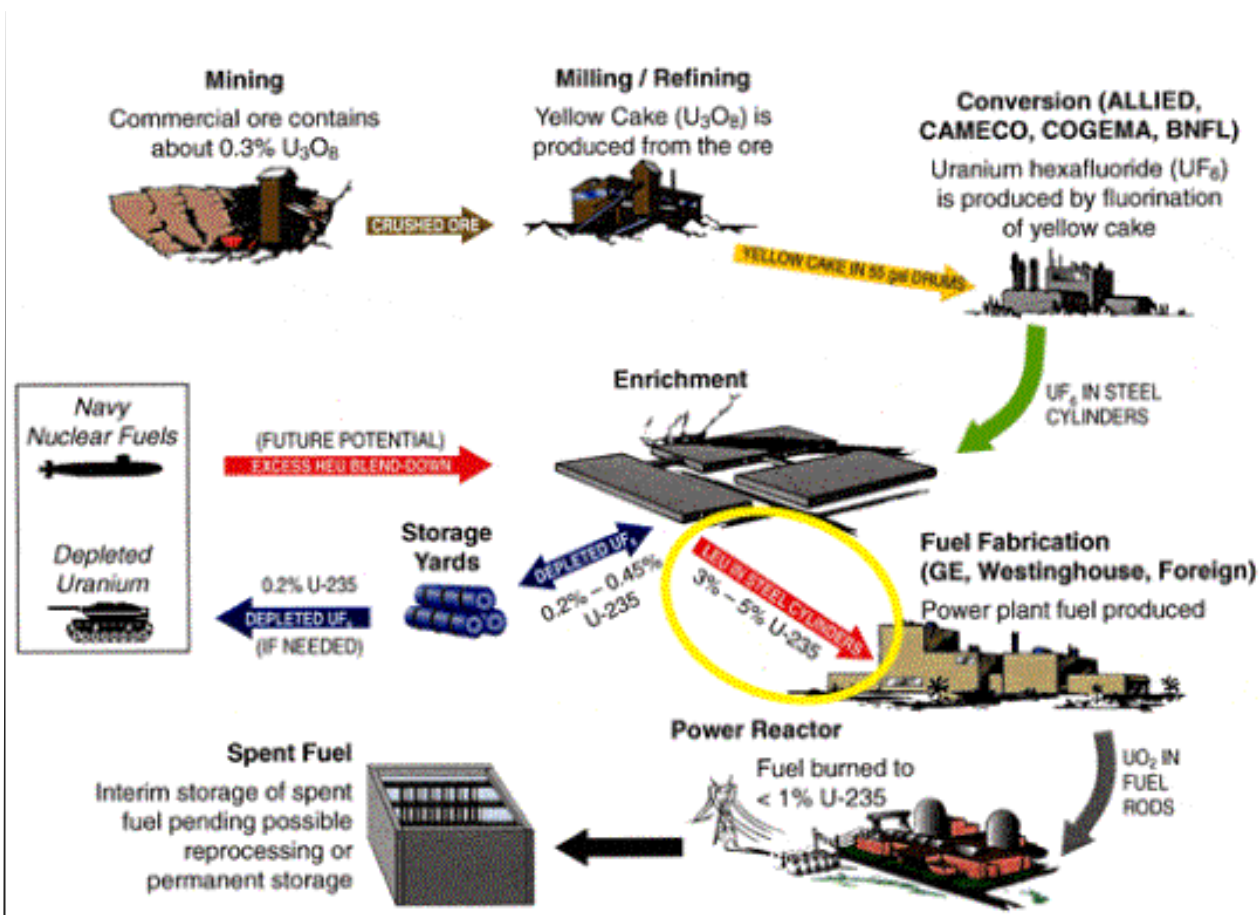
Introduction

Depleted Uranium (DU) ammunition is a very recent advancement in military weapons use. Due to its effectiveness against piercing armour, DU ammunition has recently become a popular item among NATO armies and will most likely become a mainstream form of conventional ammunition among many other armies of the world. However, massive amounts of circumstantial evidence strongly suggests that the use of DU ammunition has been known to cause dramatic side effects, such as health problems, stillborn babies, toxic and poisonous land and water supplies. Hence an important question arises, is it ethical to use DU ammunition on the battlefield?



Depleted Uranium (DU). Uranium is one of the heaviest elements found in nature and it emits alpha, beta, and gamma particles. Natural Uranium is 99.274% U^{238} , 0.720% U^{235} , and 0.0055% U^{234} . Uranium is enriched when its content of U^{235} reaches 3.2 - 3.6%. Weapon grade Uranium is 90% U^{235} . Enriched Uranium is extracted from natural Uranium for nuclear fuel and weaponry. The leftover from the extraction process is something very similar to natural Uranium, known as "Depleted Uranium". The only

steel. Incendiary and high explosive rounds are made with chemical explosive compounds. Depleted Uranium ammunition is basically DU + conventional ammunition. In this ammunition, either the ammunition is coated in DU or the conventional ammunition has a DU core. Tungsten that is generally used in ammunition core is generally very expensive, has a higher melting point and doesn't cut armour as well as DU. Depleted Uranium is cheap and abundant. DU is employed in tank rounds, heavy machine guns, gatling guns and artillery. The most



Uranium enrichment and processing in U.S

difference is that DU has 0.202% of U^{235} and 0.0008% of U^{234} .

Use of DU in Conventional Ammunition.

DU is extensively used in military grade ammunition. Regular low calibre bullets are made of compacted hardened lead. Armour piercing rounds (usually of higher calibre) are made out of

common DU round is a high kinetic energy projectile. The projectile can pierce all forms of heavy armour. Contact temperature between the projectile and the armour is 1132 degrees C. DU also burns easily, just like magnesium, upon penetration, adding to the effectiveness of the ammunition as an armour piercing device. When the projectile cuts through the armour,



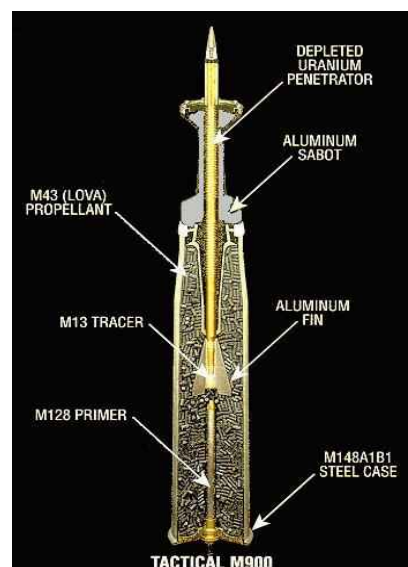


Photograph showing a wide range of DU ammunition

the DU penetrates and parts of the tank get so hot that it literally vapourises. Another important characteristic of DU ammunition is that it dramatically increases the lethal range of conventional weaponry. For lower calibre weapons, DU round can easily destroy an enemy tank from 3-5km. DU is extremely toxic and still contains much of the radiation as natural Uranium. For example, US Army field manuals indicate that those who handle DU contaminated vehicles or DU injured individuals must wear gas masks and protective radiological suits. There are at least 15-17 countries that currently possess DU ammunition (eg. US, Britain, France, Israel, Egypt, Russia, South Korea, Taiwan, etc).

Recent Examples Of DU Ammunition Usage

Case 1: Iraq (The Gulf War). Gulf War is an older case but it was the first time that the US military employed DU weaponry on a large scale against an enemy. DU ammunition has been accredited during and after the Gulf War as one of the main reasons why the Allied military had such a swift victory over Iraqi military forces. DU allowed tanks to penetrate enemy armour easily and at far greater distances. Allied tanks could directly engage enemy tanks while in the enemy's line of sight with little worry from retaliatory fire. Also due to DU armour, not a single US tank was penetrated



from enemy fire. US tanks took many close direct hits from Iraqi Soviet made T-72 tanks, some as close as 400m, but enemy rounds were simply not able to penetrate the DU armour.

Due to the extensive use of DU weaponry in the Gulf War, one needs to consider the chemical, biological, environmental, and radiological effects that resulted. Analysis of incidents of friendly fire revealed that the vehicles hit by friendly fire have had abnormally high amount of radiation levels. Soldiers have been affected by radiation poisoning also.

There are serious long term effects of DU that still exist in Iraq today. In regions heavily hit by DU, studies have shown that numerous civilians have malignant cancers, heart problems, bizarre abnormal birth defects and extensive problems with their immune



Iraqi Soviet-made T-72 hit by 120 mm tank shell fired from M1 tank.





systems. Contaminated agriculture and water supplies help spread the DU dust which continues to hurt people in different regions where DU ammunition was not used.

Case 2: The Balkans. A more recent case of DU ammunition use was during the conflicts in Kosovo and Bosnia. At first, NATO claimed that DU ammunition was not being used at all. No mention was made until a small group of NATO soldiers started dying from blood/renal/rectal related cancers in a very short period of time and the term "Balkan War Syndrome" came into full force. New Tomahawk cruise missiles armed with a 3kg DU warhead core were first used in Bosnia and later in Kosovo. Over 31,000 A-10 30mm rounds were fired and over 1,500 cruise missiles (armed with DU) were used. Some regions in Bosnia and especially Kosovo are so contaminated with DU that the soil there is permanently destroyed. NATO soldiers are constantly told not to eat local foods or drink from local water supplies (since ingestion of DU dust is very common by eating foods or drinking water contaminated with DU dust). Soldiers were also told to stay away from military sites hit by DU and not to pick up any possible DU fragments.

Advantages and Disadvantages of DU Ammunition

Advantages. It is a highly effective armour piercing device. It doesn't just damage an enemy tank, it pulverises it and easily annihilates the crew as well. Most non-DU rounds tend to "mushroom" as they hit their targets. However, as DU contacts enemy armour, it gets extremely hot and "self-sharpens" as it enters the armour. Another crucial benefit of DU is that it increases the effectiveness of military weapons at even greater distances. Another benefit proved during the Gulf War was using DU as tank armour. 645 out of 2058 US tanks used in the Gulf were fitted with DU armour. Iraqi tank rounds directly struck US tanks but there was no puncture of the DU armour. Unfortunately, another significant characteristic of DU was also discovered during the Gulf War, that DU ammunition can easily puncture DU armour (as was found out by US tanks hit by friendly fire).

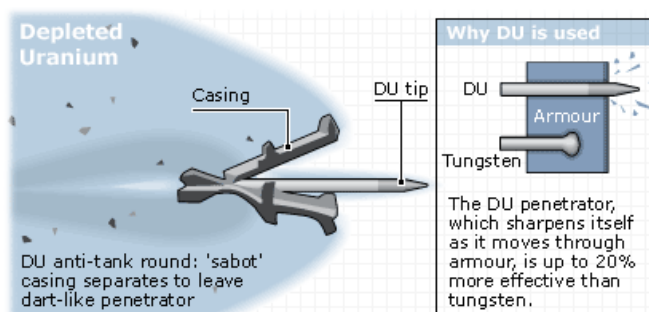
Disadvantages. There is overwhelming circumstantial evidence that clearly points out that DU and DU ammunition causes extensive radiological, environmental, chemical, and biological effects. There was one tested case in the Gulf War where DU dust spread up to 42 km from an enemy target site pulverised with DU rounds.



Artist Depiction



X-ray Image





Just recently, the UNEP (United Nations Environment Program) stated that they still found traces of DU dust in the air two years after the end of the bombing of Kosovo. DU has a half life of 4.5 billion years. This means that local environments contaminated with poisonous DU dust will remain that way for a very long time and will continue to spread.

DU ammunition can also cause extreme biological effects to those exposed to it. DU dust is commonly inhaled and digested through simple inhalation of air and consumption of food. Insoluble and soluble Uranium Oxide enters the body and eventually enters the bloodstream. Soluble Uranium is expelled through urination, but insoluble Uranium (around 50% of DU) stays in the body and travels from the bloodstream and settles in bone and organ tissue. War veterans and civilians exposed to DU have experienced extensive irreversible damage to kidney and partial kidney failure. Cancers related to blood, bone and immune system become common. There are also various other biological effects claimed from DU, such as chronic fatigue, respiratory problems, heart problems, digestive organ damage, etc.

Finally DU ammunition can be shown to have radiological effects. DU dust that enters the body can be quite harmful, depending on the amount of exposure. When DU enters the body, alpha particles directly bombard the cell tissues. On an average 1 in 70,000 human cells that are bombarded by alpha particles emitted from DU turn into cancer cells. Hence depending on the length of exposure and concentration any person exposed to large amounts of DU would most likely suffer long-term cancer-related effects.

Conclusion. DU ammunition needs to be banned completely. Use of DU ammunition is extremely unethical. To use such tactical weapons for a war without considering its horrible side effects or ramifications for future generations is unacceptable. DU ammunition is not the ultimate alternative in the battlefield. It is an overkill technology and not necessary at all for victory in battle. The only time an army has any tactical advantage with DU ammunition is if your enemy doesn't have it. But due to the ease of constructing DU ammunition, it is obvious that it won't be long before every major military has armed themselves with DU ammunition. Hence, in the long run DU will become obsolete.

ABOUT THE AUTHOR



Lt Cdr A S Bishnoi (05202Y) is a X(NAI) officer. He completed his BE (Electronics) from Sardar Patel University in the year 2000 and joined the Indian Navy in NAI Cadre on 09 Jul 01. Post completion of sub-courses, the Officer completed his PTSC from DIAT Pune in the year 2004. The Officer has completed his M.Tech (Electronics) Spl in Nuclear Engg in Sep 11 and is currently working in the Ammunition Workshop at Controllerate of Naval Armament Inspection, Visakhapatnam (CNAI(V)).

BONNE BOUCHE

- ★ Did you hear about the guy whose whole left side was cut off ? He's all right now.
- ★ Police were called to a daycare where a three-year-old was resisting a rest.
- ★ Pencils could be made with erasers at both ends, but what would be the point ?





INS SHIVAJI



Advisory Council Meeting held on 11 Jul 12

NAVAL WAR COLLEGE



**Combined Operation Readiness
Evaluation Programme (CORE 12) - Sep 12**

