AN INTRO TO

NUCLEAR WEAPONS DESIGN

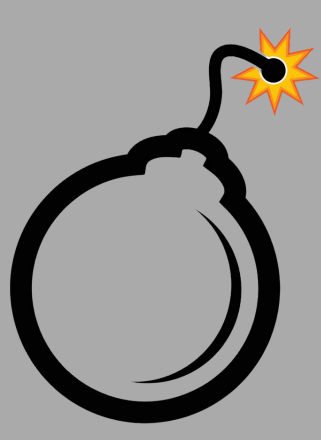
GUN-TYPE BOMB

A gun-type bomb relies on spontaneous fission of highly enriched uranium, or HEU, to detonate. This happens when two subcritical masses of HEU are pushed together by explosives, which sets off a chain reaction due to their combined spontaneous fission.

Works with HEU only, since Plutonium's (Pu) rate of spontaneous fission would blow itself apart before the masses came together, generating only a small explosive yield.

IMPLOSION BOMB

Implosion bombs are bombs that symmetrically compress subcritical masses of fissile material into a critical mass to explode. They are much smaller and are considered more efficient than gun-type weapons, as they require less material. They do, however, require a neutron generator, which can be either external or inside the bomb's shell casing.



Works with both HEU and Pu.

BOOSTED BOMB

A boosted bomb is a fission implosion weapon whose yield is "boosted" by the addition of fusion fuel in either gas or solid forms. The intention is to take advantage of conditions created by fission to allow fusion to occur. Fusion then releases neutrons, which will then cause more intense fission, which causes more intense fusion, and so on. Neutrons are the key component in this type of design.

THERMONUCLEAR BOMB

Most of the weapons in existence today are thermonuclear bombs. Comprised of two components, the primary stage is a fission detonation that releases radiation, which heats and compresses fusion fuel in the secondary stage. That fusion then compresses fissile material that's located in the secondary. The secondary stage is a fusion detonation which contains a 'sparkplug' in its core that gets compressed to create the fission reactions.

Compared to a boosted bomb, a type of bomb's yield comes from fusion itself. In a boosted bomb, the primary role of fusion is to generate neutrons; but in a thermonuclear bomb, the primary role of fusion is to add yield.

ACE