AFE BABALOLA UNIVERSITY ADO EKITI

A TERMPAPER ON

NUCLEAR WEAPONS

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Nuclear weapon is a type of Weapons of mass destruction. They stand apart in the public imagination because of their horrific and unmatched destructive power: an all-out nuclear attack could annihilate billions of people within hours. For this reason, some argue that nuclear weapons should be distinguished from all other types of weapons of mass destruction. There are approximately 30,000 nuclear weapons in national stockpiles of the eight nuclear weapons states: Britain, China, France, India, Israel (assumed), North Korea (claimed), Pakistan, Russia, and the United States. Depending upon the yield and atmospheric conditions, a large thermonuclear weapon dropped on a densely populated city could kill millions of people in an instant. The detonation of just one "small" nuclear weapon could kill as many as 100,000 people.

An estimated 13,470 nuclear weapons are deployed worldwide by eight countries, with another 14,000 weapons held in reserve, according to the 2005 edition of the SIPRI Yearbook, published by the Stockholm International Peace Research Institute. Overall, the total number of nuclear weapons has decreased in the past few years, yet all eight nuclear weapon states continue to maintain and modernize their arsenals and assert (either publicly or covertly) that nuclear weapons play a crucial role in their national security.

Today, a handful of nations possess an inventory of about 30,000 nuclear weapons, roughly half the number that existed at the height of the Cold War. On average, these weapons each possess an explosive power 20 times greater than the nuclear weapons that destroyed much of Hiroshima and Nagasaki in Japan and killed roughly 250,000 people during World War II. Since 1945, no nuclear weapon has been used in a conflict, even though combatants—including nuclear weapons states—have fought approximately 100 wars in the intervening 60 years.

**HOW NUCLEAR WEAPONS WORK**

Nuclear weapons, like conventional bombs, are designed to cause damage through an explosion that releases a large amount of energy in a short period of time. In conventional bombs, the explosion is created by a chemical reaction, which involves the rearrangement of atoms to form new molecules. In nuclear weapons, however, the explosion is created by changing the atoms themselves, either by splitting them or fusing them together to create new atoms.

The amount of energy released in such a nuclear reaction is enormous—many orders of magnitude greater than that released in a chemical reaction resulting in the rearrangement of molecules. The amount of energy available within an atom is given by Einstein's famous formula E=mc2, where E = energy, m = the mass and c = the speed of light. Thus the energy available equals the mass multiplied by 9,000,000,000,000,000,000 (or the square of the speed of light represented in meters per second). As a result, a nuclear bomb using one kilogram of plutonium could have the same explosive force as approximately 15 million kilograms of the conventional explosive TNT.

**TYPES OF NUCLEAR WEAPONS**

There are two main types of nuclear weapons: fission weapons and fusion weapons.

1. **Fission weapons**: In fission weapons, atoms are split. The core of a fission bomb is made of either plutonium or highly enriched uranium. Plutonium and uranium atoms are both heavy, meaning they have a large number of protons and neutrons in the nucleus. During fission, when the heavy nucleus splits into two smaller nuclei, extra neutrons are released. If these neutrons are absorbed by other nuclei, they can, in turn, split, also releasing neutrons and setting off what is known as a chain reaction. Plutonium or highly enriched uranium are the only materials known that can, under carefully designed circumstances, achieve such a devastatingly powerful, self-sustaining fissile chain reaction.
2. **Fusion weapons**: In fusion weapons—often known colloquially as hydrogen bombs—deuterium and tritium, two isotopes of hydrogen, are fused together to create heavier atoms. This is the same reaction that occurs in the center of the sun. Fusion can only happen at extremely high temperatures and pressure. In a fusion weapon, such a state is created by using a fission explosion (i.e. an atom bomb) to trigger the fusion reaction. There is no theoretical limit to the explosive force of a fusion weapon. Typically, fusion weapons are 10 to 100 times as explosive as the fission bombs dropped on Hiroshima and Nagasaki.

**EFFECTS OF NUCLEAR WEAPONS**

To understand the effects of a nuclear weapon, it is important to realize that a nuclear explosion produces several distinct forms of energy that each has its own devastating set of consequences: blast, thermal radiation, electromagnetic pulse, direct nuclear radiation, and fallout.