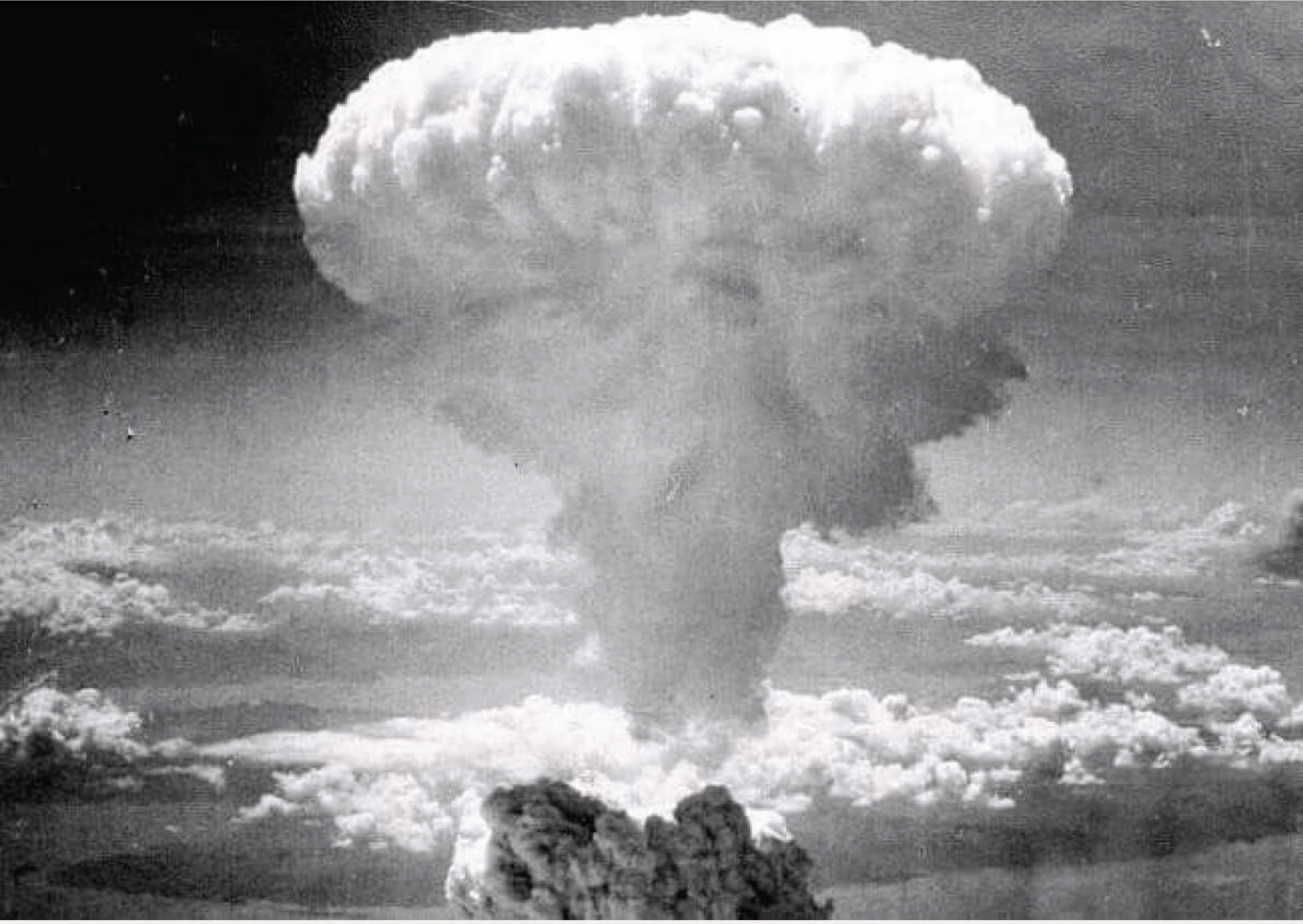
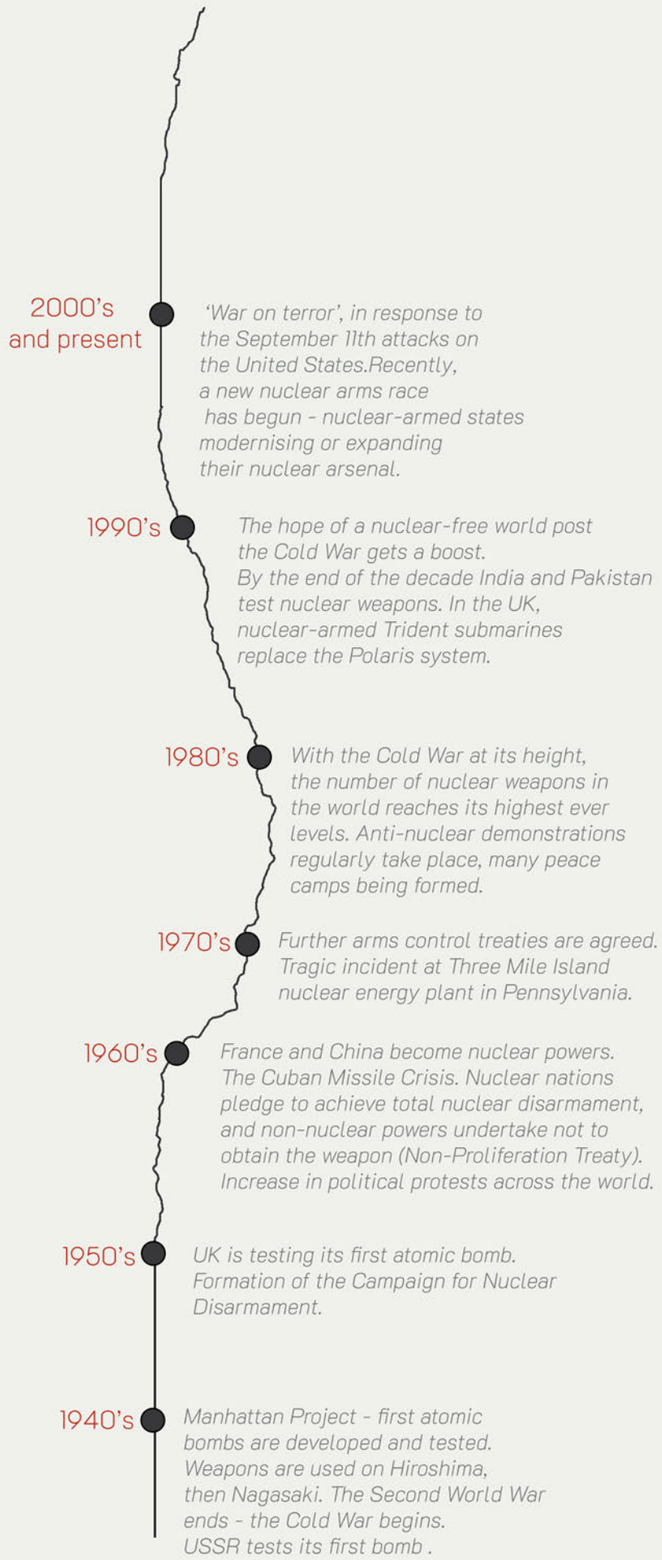


Age of Nuclear Threat:

A Study on the Origins and Comparative Design of Fallout Shelters and Cold War Civil Defense

Contents

Nuclear history timeline



Abstract

The nuclear weapons stood for the ultimate defence and saved from the potential large-scale conflicts between global superpowers

The aim of this paper is to discuss, understand the origins and compare the designs of fallout shelters by analysing outcomes of earlier use of nuclear weapons in Hiroshima and Nagasaki, discovering data collected by Nevada project and studying historical context of the Cold War. The knowledge that was gained during the Nevada tests between 1953 and 1955 as well as the Japanese experience, created a powerful base for the development of protective shelters and development of civil defence strategies around the world. The possession of such a dangerous weapon impacted millions of people by sowing the seed of fear in their hearts.

Introduction

I do not know with what weapons World War 3 will be fought, but World War 4 will be fought with sticks and stones.
A. Einstein

At the verge of different military conflicts around the world, and tense political situations between countries that are recognised as global superpowers, the topic of possible nuclear war is being increasingly publicly discussed. Rising interest in a global political situation, especially the war in Ukraine, is depicted by the number of articles in the press evaluating the current situation and even analysing the state of existing nuclear shelters that have been forgotten since the Cold War (1947-1991). Russian political scientist and publicist Ekaterina Shulman (March 2022) who is considered as s foreign agent in Russia (The Ministry of Justice of the Russian Federation, 2022) due to her political views and open criticism towards the government, mentions that Putin's threats to use nuclear weapons in war with Ukraine does not sound like anti-utopia and strengthening his position in negotiations with Ukraine anymore. The Telegraph acknowledges that the risks of a nuclear attack are more pronounced than ever since Cold War (Kelly, Newey, 2022).

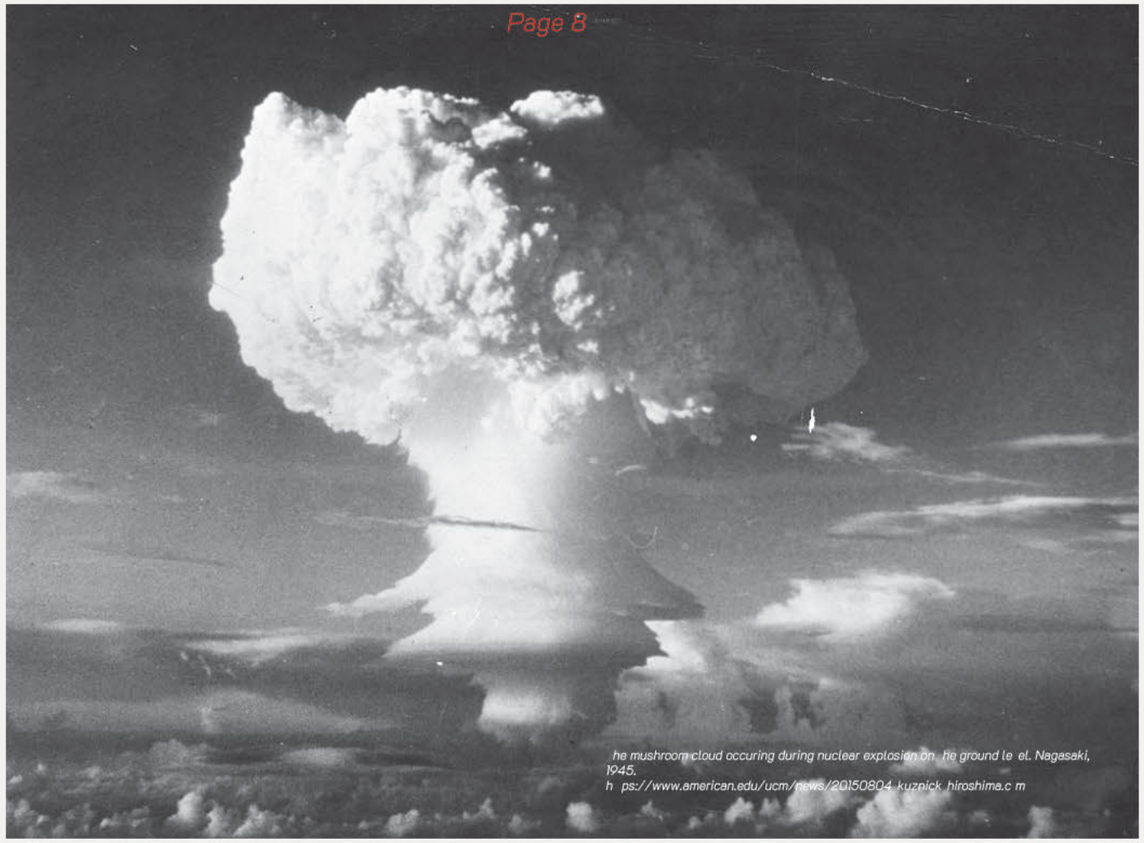
It is not widely known that in 1983 the world was on the edge of a nuclear conflict that could potentially lead to great disaster. On September 26th command centre in Serpukhov –15, a secret military village received a notification from an early track satellite about the potential launch of intercontinental ballistic measles from an American military base. Meantime, the possibility of a potential measle launch was extraordinarily high since the beginning of the Cold War because of the incident that occurred a couple of weeks before. All 269 occupants of a Korean Air Lines commercial flight, including a congressman from Georgia, were killed when the Soviets shot it down after it entered Soviet airspace due to a faulty navigation system. This terrible event resulted in the aggravation of tense relations between America and the USSR which could be considered a great reason for to launch the of measles.

Despite that, lieutenant colonel Stanislav Petrov, who that day handled the situation, stayed cool hearted and calmly reported the general staff of Soviet Military and proclaimed that the launch report most likely was false alarmed (Anthony, 2014).

His opinion was considered by general secretary of CPSU Yuri Andropov when deciding on start of counterattack. After five minutes nothing happened, and Stanislav Petrov was proven to be right – he became a hero, who prevented the outbreak of nuclear war.

This incident as well as the Carribean crisis were growing the fear of nuclear war in people's hearts. Mentioned in Tom W. Smith's report (1988) nuclear anxiety is a complex concept (Diamond, Bachman 1985) featuring expectation of the nuclear war and evaluation of its consequences. The fear encouraged people to think of a way to help themselves survive the potential nuclear attack and soothe the consequences of radiation by designing the fallout shelters.

The aim of this paper is to discuss, understand the origins and compare the designs of fallout shelters by analysing outcomes of earlier use of nuclear weapons in Hiroshima and Nagasaki, discovering data collected by Nevada project and studying historical context of the Cold War.

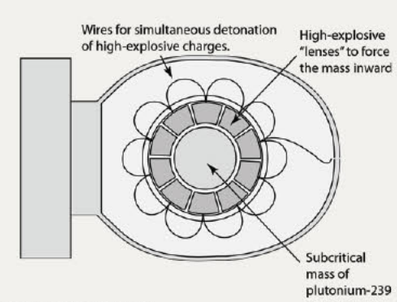


he mushroom cloud occuring during nuclear explosion on he ground le el. Nagasaki, 1945.
h ps://www.american.edu/ucm/news/20150804 kuznick hiroshima.c m

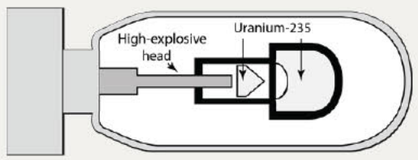
PART I.

Manhattan project, Hiroshima and Nagasaki, Nevada tests – principles of work of the nuclear weapons and occurring structural damage.

The history of nuclear weapons started in the 1930s when Leo Szilard (1898 – 1964) presented the patent for nuclear chain reactions in neutrons (British patent 630,726). Szilard promptly put up a series of tests to analyse the idea after learning that German scientists had discovered nuclear fission. He originally tried utilising beryllium and indium to start a chain reaction, but neither produced the desired outcome. He concluded that uranium would be the element capable of the chain reaction after learning about fission in the late 1930s. Soon after the Manhattan project started to be developed. This project aimed to collaborate with the greatest minds of the USA, United Kingdom, and France to develop nuclear weapons (s). During the research conducted by the scientists, two types of explosive nuclear weapons were discovered – gun-type bombs and implosion-type bombs.



Implosion type atomic bomb.
http://hyperphysics.phy astr.gsu.edu/hbase/NucEne/bomb3.html



Gun type bomb.
http://hyperphysics.phy astr.gsu.edu/hbase/NucEne/bomb3.html

The nature of first nuclear weapons

During his lecture, physician Mattew Bunn (2013) analysed and explained the main principles of the work of nuclear weapons by focusing on the Little Boy and Fat Guy used in 1945 by the American military to destroy Hiroshima and Nagasaki. The simplest description of essential processes in the nuclear reaction includes having a small bowl of material that will start to heat up, turn into gas and blow itself apart. The fundamental assumption he listed when explaining the ways to create reaction is meeting the following criteria: having enough material (critical mass); finding a way to reflect the neutrons; or increasing the density of the material, he also notes, that a promising idea is to have the material in a sphere. The Little Boy, which is a gun-type bomb, activates by slabbing two pieces of 2/3 of a critical mass of material so fast that Uranium does not blow itself apart during the reaction – this bomb was used in Hiroshima. When it comes to Fat Man, an implosion-type gun, it works by crushing down nuclear material to a higher density. Even though this type of bomb is more efficient, it is extremely difficult to detonate the explosives at the same time to start the reaction. Both atomic bombs are fission-type guns, which means they are powered by the splitting of an atom into smaller ones. Modern nuclear weapons combine both – fission and fusion – reactions for boosted effect.

Hiroshima and Nagasaki tradegy

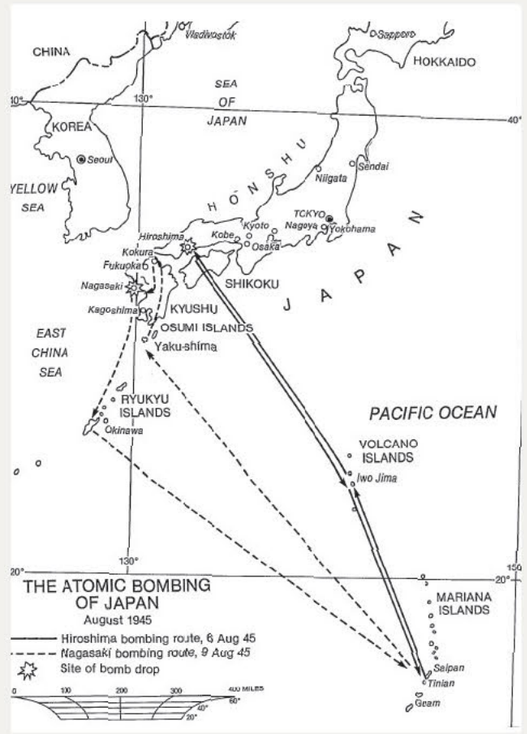
Nowadays, Hiroshima and Nagasaki are strongly precepted as remarkable locations of death and misery (Siegenthaler, 2002). Before the bombings, certain US military authorities, including General Dwight D. Eisenhower, who was then in charge of the Allied Forces in Europe, and some of the nuclear physicists involved in the Manhattan Project believed that the use of the bombs on people was unethical because of their immense size (Eisenhower 1963). Despite that, in August 1945, American president Harry Truman gave the order to destroy the Japanese cities of Hiroshima and Nagasaki (Harry S. Truman Library Museum, 2016). When comparing the destruction in the two cities, it is important to keep in mind that the damages in the two cities varied greatly due to the topography and shape of the cities. While Nagasaki was irregularly shaped and heavily broken up by hills and mountain spurs, Hiroshima was on low, flat terrain. As it is described on the Atomic Archives website (2020), except for a small number of heavily reinforced concrete buildings, the majority of which were specifically built to withstand earthquake shock, and which were not collapsed by the blast, everything in Hiroshima up to about one mile from ground zero was destroyed. The interiors of most of these buildings were gutted, with all windows, doors, sashes, and frames being torn out. Nearly everything in a half-mile radius of the explosion in Nagasaki was destroyed, including substantial buildings. Within 1.5 kilometres of ground zero, every Japanese residence was destroyed.

Hiroshima after nuclear bombing.
https://www.icanw.org/hiroshima_and_nagasaki_bombings

Nagasaki after nuclear bombing.
https://www.trumanlibrary.gov/photograph records/2015 3113

Calculations show that the structural steel and reinforced concrete frames that survived the blast could not have withstood the estimated peak pressures developed against the total areas presented by the sides and roof of the buildings. The atomic bomb damaged reinforced concrete buildings by ripping out steel window sashes, ripping doors from hinges, damaging suspended wood, metal, and plaster ceilings, and destroying equipment by tumbling and battering. Fires generally of secondary origin consumed practically all combustible material, caused plaster to crack off, burned all wooden trim, and damaged electrical wiring.

The blast severely damaged most masonry buildings, and the wreckage of a church was one of the few recognizable structures. Nearly all wooden buildings collapsed, and a considerable number were consumed by fire. Although most buildings were destroyed or severely damaged, many chimneys were left standing, apparently uninjured by the concussion. This may be because concrete chimneys offer less wind resistance than flat surfaces such as buildings, or because more modern buildings were constructed to withstand earthquakes. Although many bridges were damaged by the blast, the damage was on the whole slight in comparison to that suffered by buildings. The bomb explosion caused little primary damage to roads or railroads, and most damages to railroads occurred from secondary causes, such as fires and damage to bridges or other structures. The bomb damaged the electric supply and gas works in Nagasaki, and the water supply system was severely damaged. Six weeks after the attack, there was still a water shortage inside the city (Bui, H.T., Yoshida, K. and Lee, T., no date)



flight paths for Hiroshima and Nagasaki missions.
https://www.osti.gov/opennet/manhattan project history/images/mission_map_image.htm

Some of the initial proposals for reconstruction projects suggested the idea of moving the cities to different locations, but the idea was not adopted for various reasons. Instead, the concept of the memorial city of peace was approved to emphasise the importance of events (Hiroshima for global peace, no date).

Nevada tests

A few years after the end of World War II, the Soviet Union threatened a nuclear strike, leading to the establishment of the Nevada Test Site. America required a handy location to design and construct its nuclear arsenal as the Cold War gained root.

The US government conducted nearly a thousand nuclear explosions at this test site between 1951 and 1974, giving it the title “most bombed location on Earth.” Here, they improved the devastating capacity of the primitive nuclear weapons that had been launched over Hiroshima and Nagasaki in 1945. Each nuclear blast at the site was a deliberate practice run. The scientists and engineers were interested in understanding and characterising how the bombs would function in the various military-requested weapon configurations (Topham, Jha, Franklin, 2015).
The data that have been carefully collected during the tests on the Nevada site was presented by Samuel Glasstone and Philip J. Dolan in their textbook The effects of nuclear weapons (1957).The main goals of the tests performed on residential structures in Nevada between 1953 and 1955 were to: identify the components most vulnerable to blast damage and, as a result, develop strategies for strengthening structures of different types; and provide details on the potential damage to dwellings that could be expected if a nuclear explosion and the extent to which these structures would thereafter be made habitable without extensive reconstruction.

The scientists run the tests on several types of structures including single and two-story wood frame houses, brick-wall houses, precast concrete houses, and reinforced masonry houses, creating 1,7 psi and 5 psi overpressure. When being exposed to the peak overpressure of 1.7 psi, structures of all the above-listed types of buildings survived relatively minor damage – most of the doors and windows were crushed into pieces when, and interiors were ruined, but the structures remained not collapsed or slightly damaged. The 5 psi overpressure caused absolute demolishment of both wood frame houses and brick wall houses making these inhabitable after the explosion when precast concrete and reinforced masonry houses faced mostly the same level of damage as being exposed to 1,7 psi peak overpressure with slightly more serious but fixable structural damage.

Images illustrate the wood frame house (top image) exposed to nuclear expolsion with the peak overpressure 5 psi (middle) and 1.7 psi (bottom). Last image shows the colllapse of utility poles on line (5psi peak over pressure) Nevada test site.

https://www.atomicarchive.com/resources/documents/effects/glasstone_dolan/chapter5.html

Other tests run in Nevada included analysis of the effects of a nuclear blast on utilities - electrical distribution systems and gas, water, and sewage systems.
Because the dead-end tower and another suspension tower were of similar heavy construction, the suspension tower’s collapse had only a minimal impact on the high-voltage transmission line. The transformer substation was sufficiently sound to allow manual operation after withstanding the blast with just minor damage to crucial components. The water supply system was damaged, making it almost impossible to extinguish fires. The exception was a case where pipes were 3 feet below grade and failed due to unequal displacements. Up to 1.1 miles (1.7 km) from ground zero, gas holders experienced severe blast damage, and the escaping gas was ignited but there was no explosion. The bomb appears to have had a minor impact on underground gas mains.
The knowledge that was gained during the Nevada tests between 1953 and 1955 as well as the Japanese experience, created a powerful base for the development of protective fallout shelters and development of civil defence strategies around the world. What is more, it gave a clearer understanding of the threatening and destructive nature of nuclear weapons and the outcomes of potential future use with.

Cold War caricature. 1967
https://www.library.wales/discover learn/digital exhibitions/illingworth/illing worth cartoon galleries/cold war#&gid=1&pid=1

PART II.

Fallout shelter design during Cold War.

Peace for the world! The demand of the age is the unification of all peace loving forces of humankind.
Leonid Brezhnev

Many fallout shelters were built during the Cold War in fear of approaching nuclear war. During the 1950s, architects supplied discursive, representational, and practical support for the two primary strategies: urban dispersal or atomic bomb shelters, which helped to reinforce the assumptions that nuclear war was inevitable and survivable (Monteyne, 2011).

Soviet Union. Civil Defence shelters.

Special facilities for protection against weapons of mass destruction, including nuclear weapons, are a real mirror of society and worldviews: by learning how and where shelters were arranged, one can understand a lot about the people and ideas of the time (Bronin, 2015). For example, in the United States, there were many individual and even personal shelters, while in the USSR there were exclusively joint and state shelters. The main reason for that is the fact, that in the Soviet Union, only the government could build this type of structure: all equipment was government and military, and no one would sell a citizen, for example, a unique radiation filter. What is more, many Cold War-era Americans had already moved into heavily sprawling suburbs, and it was difficult for them to get to large shelters, so many panicked and built their shelters in their backyards.

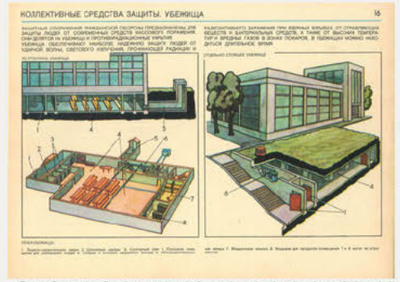
According to building codes released by the Central Institute of Standard Design and Urban Planning (1977), the shelters should have a main room and auxiliary rooms. The primary buildings include first-aid stations, control centers, and rooms for sheltering. Auxiliary rooms are filtering, ventilating, and sanitary units protected by diesel power plants, electric control rooms, food storage rooms, pumping stations, balloon rooms, chamber airlocks, and vestibules.

The first thing one would see when entering the shelter would be the massive metal doors with vestibules behind them. Doors in vestibules should be provided: in the outer wall - hermetic protective, in the inner wall - hermetic. Everything was done in such a way that people could run in here even after the explosion, without radiation or poisonous gases getting into the shelter itself. The airtightness was supported not only through powerful doors but also through the fact that higher pressure was artificially set in the shelter: air still escaped slightly through microcracks and gaps in the doors but did not enter inside.

The standard floor area of the main room per shelter should be taken as 0.5 m2 for two-tier and 0.4 m2 - for three-tier layout of the bunk beds. The internal volume of the room shall be not less than 1.5 m2 per one sheltering person. The height of the shelters should be no more than 3.5 m. If the height of the premises is from 2,15 m to 2,9 m, the two-tier location of the bunks should be provided, and if the height is 2,9 m and more - the three-tier location. The seating places in the premises for the sheltered should be of the dimensions 0.45x0.45 m per one person and the lying places 0.55x1.8 m. The height of the first-tier benches shall be 0.45 m, the second-tier benches - 1.4 m, the third tier - 2.15 m from the floor. The distance from the top tier to the ceiling or projecting structures shall be at least 0.75 m.

It was quite common to build fallout shelters under the existing structures, such as schools, hospitals, factories, or government buildings to save as many people as possible in case of a potential disaster. As a result of that, it was important to place the structure of shelters to supply the reliance of the above-ground structure of the building on the roof of the built-in shelter. It was recommended to use the frame method to build shelters. The walls were designed from prefabricated reinforced concrete panels, concrete blocks, monolithic reinforced concrete, and other construction materials that meet the strength requirements. If the walls facing the ground level were 50 cm or less, it was recommended to use thermal insulation to protect from heat exposure in fires. When designing precast walls, the joints between the wall panels would be filled in with concrete or mortar in the grooves of the foundation slab. The wall junctions (corners, intersections) made concrete blocks should be reinforced.

The most important part of the proper functioning of fallout shelters was hidden behind the service room doors, here were found air purifiers, electricity generators, and water supplies (Civil defense department of USSR, 1971). The air entering the rooms had to be filtered and then distributed to the rooms. The incoming oxygen had to be purified from many hazardous substances at once.



Page from the Soviet textbook featuring the basic plan of the civil defence shelter.
https://disgustingmen.com/history/ussr vault fallout shelter

Soviet civil defence shelter hermetic door leading to an abandoned shelter.
https://loveopium.ru/arxitektura/bomboubezhishha i bunkery rossii.html

Radiation dust and smoke filters, bacteriological weapons filters, chemical weapons filters, and a system for cooling air heated by explosions and fire-all this was present even in the smallest Soviet shelters. The air was cooled by passing through chambers of sand and gravel, or on the principle of a moonshine machine, by tubes with ice water flowing through them. The primary source of electricity in shelters was planned to come from the municipal electricity system, but in case of an explosion happening close to the services point, every shelter was equipped with a diesel-electric generator. The water supply was connected to the city's utility system, but in case of the municipal water supply system was unusable, shelters had water supply tanks.

Nowadays, the majority of fallout shelters across the former Soviet Union countries are abandoned or refurbished. Some of the shelters now function as museums when others, mainly ones that were not found in the basements of other buildings, became a home for the homeless.

USA. Do - it - yourself fallout shelters.

Similarly, in the USA, The Federal Civil Defence Administration oversaw the nation's fallout shelter programme in the 1960s. It built and supplied fallout shelters all around the nation. As a result, there are many fallout shelters spread out across the nation. They are often located in the cellars of public structures like theatres, banks, and universities. Fallout shelters are also found in a lot of residential apartment complexes constructed in the 1950s and 1960s (Olito, 2020). The programme was finished in the 1970s, many fallout shelters were repurposed – for example, the majority of these shelters in New York now function as laundry facilities.

Alternatively, the Office of Civil Defence encouraged people to build their fallout shelters by releasing instructions with basic floorplans to do so. Booklet The Family fallout shelter (1959) lists a few basic shelter designs that can protect the population in case of a nuclear attack – these include basement concrete block shelters, aboveground double wall shelters, preshaped metal shelters, and underground concrete shelters.

The concrete block shelter, which is the cheapest one of the above listed types (200$ in May 1959) is also considered the easiest to incorporate in existing home design. Along lines drawn on the basement floor, a row of solid concrete blocks is laid out in about three-eighths of an inch (around 1 cm) of wet mortar. The corner is built to a height of nearly six blocks. After that, the rest of the wall is raised to the same height. The wall is once more lifted to its level and the corner is once more built up. The basement walls should not reach the designated ceiling level for the later building of the shelter roof, there must be at least 16 inches (40 cm) of clear space above. After the roof is installed, the top rows of concrete blocks are not positioned on the wall. An open entryway and vents on a wall close to the floor provide ventilation. A layer of blocks has four little openings that serve as vents.

The primary shelter walls should be the same height as the wall enclosing the entrance to the shelter from direct radiation. Anchor bolts are used to connect the posts that support the roof beams to the basement walls. From one corner post to the other, a wall beam is placed against the back wall. The uprights on which the beam rests must be secured with nails. After the mortar in the block wall has dried for at least a day, the roof beams are put in place. Each roof beam is fastened to the wall beam at one end. On the edge are the roof beams. Wooden bracing keeps them in position. The roof is reinforced with an additional layer of wooden bracing filled with mortar to complete the radiation shielding, then the roof boards are installed. The last rows of wall blocks are mortared into position once the roof blocks are all installed. The structure is finished. This shelter is made of sturdy, dense, and hefty concrete blocks. It is rarely necessary to cut a block to fit because they are offered in a variety of sizes. Because solid blocks would need to be filled with concrete to provide enough protection, solid blocks are advised. Bricks are a substitute. To provide the same protection as the 8-inch (20cm) solid concrete blocks, if they are used, the walls and roof should be 10 inches thick.

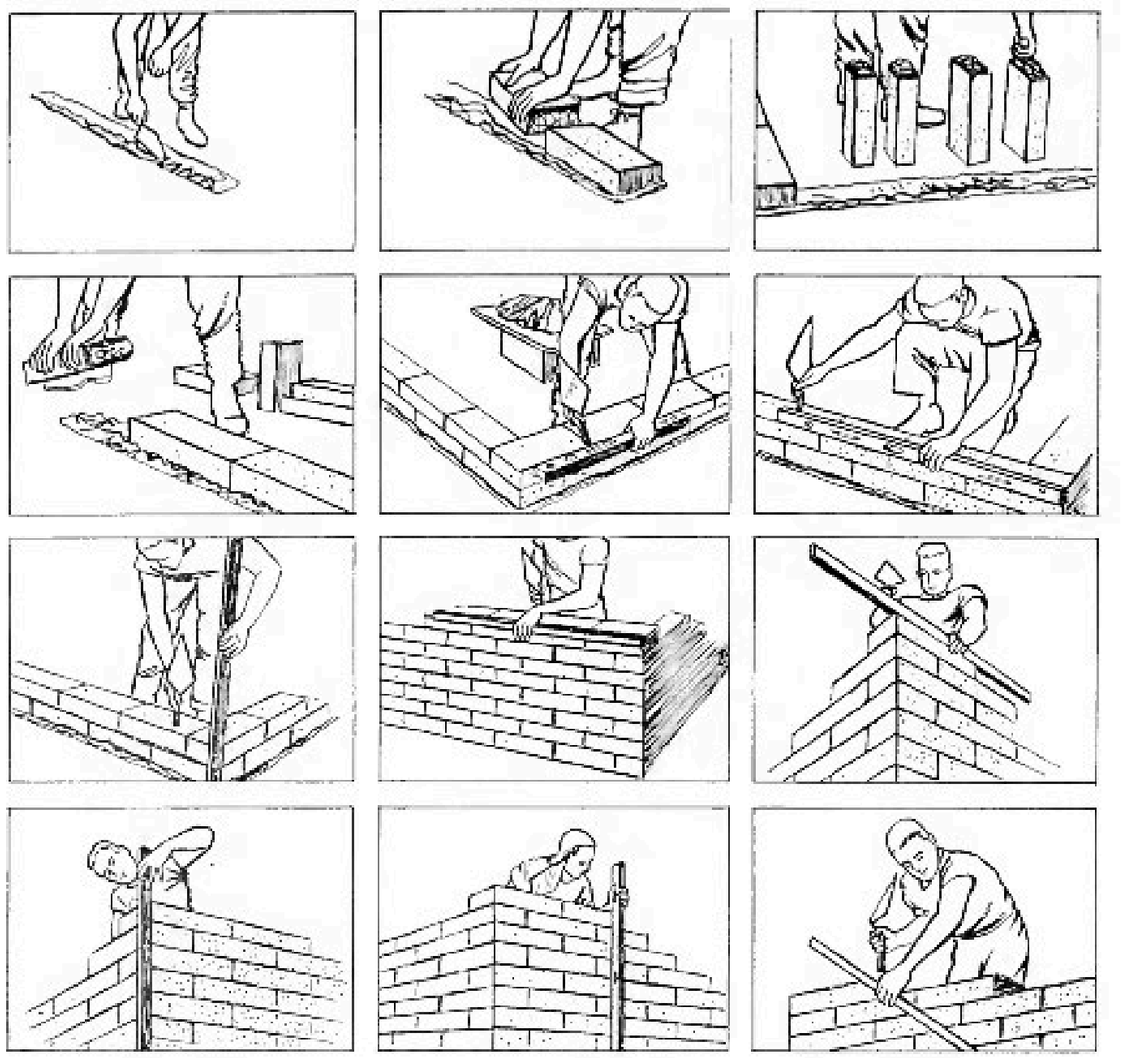


Illustration showing the brick laying process in do it yourself fallout shelter.

Familly fallout shelter (1959)

PART III.

Modern fallout shelters. Contemporary fallout shelter businesses offering Swiss standard and luxury survival condos.

In 2006 it was announced by Swiss authorities, that there are enough shelters to accommodate 114% of the population in the country (Mariani, 2009). Compared to other countries, that is the highest number of shelters in the world.

The Cold War saw the construction of a network of nuclear bunkers around the world. Many of these shelters, nevertheless, are now in need of repair and do not meet contemporary standards.

Supporting that, in the UK there is a noticable shoretage of nuclear shelters that could save many lifes in the event of nuclear attack. According to Subterranea Britannica, there are about 408 private properties with their own nuclear bunker in addition to an estimated 258 community nuclear shelters. These shelters are not dispersed equally across the nation, either. The South East of England, where the population is densest, is where the most of the shelters are situated. Furthermore, there are no plans for the UK government to maintain or renovate existing shelters. Although majority of contry's population will not be able to access the shelter, bunkers will be accessible to important figures in the central government, the military, and the royal family, as well as the personnel required to operate the country after an attack, civil defence historian Nathan Hazlehurst says (Trait, 2022).

Switzerland - the most prepared contry for the nuclear attac.

Neutrality is no guarantee against radioactivity – that is a popular Swiss slogan in 1960s. Here, as soon as the Cold War started and the fear of nuclear thread became more discussed publicly, the government released a regulation to incorporate a nuclear shelter in every new dwelling to make the protected space accessible for everyone from their place of residence (The Federal Assembly of the Swiss Confederation, 2002). After the release of Samuels Glasstone first textbook on the effects of nuclear weapons (1957) and realisation that full protection against nuclear effects is impossible to achieve, Swiss scientists aimed to optimise the data to create the most efficient structures of civil defence. Weapons impacts graphs were created to make it easier to compare the synthesised data and to make it clear which effects of particular weapons, at a given distance from ground zero, were essential for the design of protective buildings and which could be safely ignored (Berger Ziauddin, 2017)

Swiss fallout shelter design regulations are recognised internationally as a standard, and many countries around the world export the equipment to build protective shelters from Switzerland directly.

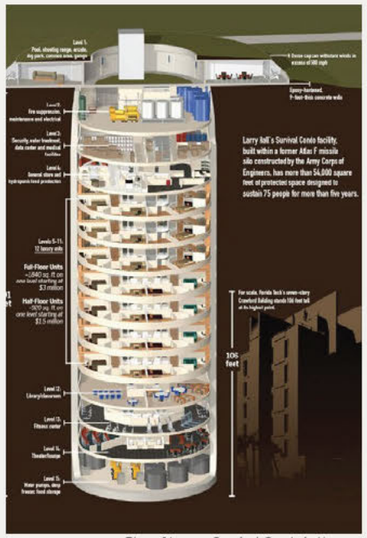
According to Swiss engineer for the Federal Office of Public Defence Cedric Vuilleumier, there are some criteria to achieve a proficient level of protection based on the Swiss experience gained throughout the years of perfecting the design recommendations and standards (Wollan, 2017). The shelter must be located underground but not deeper than 10 feet (3 m). Even though the packed earth makes great insulation against radiation, in some cases the destruction caused by the blast may block the exits and the person may need to dig themselves out. He also strongly recommends using reinforced concrete as a material of choice to build the walls of protective shelters and never building near anything flammable as it may result in an unwanted explosion that can reduce the efficiency of the shelter. Planning for a minimum of nine square feet per person, which is what Switzerland provides, is enough space for a couple of days. There is also important to install eight-inch-thick concrete and steel doors that open out and add a ventilation and air-filtration system that can be run with a hand crank in case of a power failure. Food, a bathroom, a place to sleep, and a radio are other essential items when staying in the fallout shelter. As it is mandatory by law to have a nuclear shelter in your home, sometimes people may get a visit from the special supervising team that may check the state of the shelter. What is more, Swiss citizens are obliged to check the equipment, such as air filters, regularly to ensure that it is working properly.

Sonnenberg tunnel. largest fallout shelter in Switzerland. https://www.timeout.com/switzerland/things to do/sonnenberg bunker tours

Entrance to a Swiss bunker. https://www.thelocal.ch/20220124/what are switzerlands nuclear bunkers and why does each home need one

USA - Luxury survival condos in Kansas.

When some Americans chose to build their shelters to survive a possible nuclear attack, others bought the room in luxury fallout defence units. The Survival Condo is a unique luxury bunker built in a former Atlas ICBM missile silo. This 15-story superstructure is designed to accommodate up to 75 people and ensure the food, energy, and water supply for around 5 years in total. According to the facility's website (The survival Condo, 2023), it features several electric sources, a minimum of 75000 gallons of water supply, redundant air filtration including Nuclear, Biological, and Chemical filtration, and organic hydroponic and aquaculture food production. The Survival Condo has an indoor spa and pool, gym, medical center, library, classroom, bar and lounge, rock climbing wall, and an indoor shooting range. Luxury Condo can be bought as a full floor or half floor and the price may vary between $1,5 to $4 million. The living spaces are furnished by designers, have fully equipped kitchens with high-end stainless-steel appliances, bathrooms feature Kohler fixtures and spa baths in master bedrooms, and all living units have LED lighting throughout as well as TV and automation systems with remote off-site access. The owner of the luxury Doomsday bunker Larry Hall (CNET, 2020) mentions a couple of its interesting features – firstly, he notices, that the existing monolithic dome of the missile silo was reinforced with an extra layer to ensure it withstands the wind up to 500 MPH and the entrance doors are 8t each, made of armoured steel filled with concrete, so there are hardly any safer places to survive the apocalypse. Secondly, every room has a window imitation with changing scenery to create a sense of home which, as he mentions, is crucial to create a home-like pleasant environment in an excluded underground bunker.



Plan of Luxury Survival Condo in Kansas. https://www.re thinkingthefuture.com/designing for typologies/a3311 11 luxury doomsday bunkers around the world/

Survival Condo. Room interiors. https://www.businessinsider.com/photos of survival condo project luxury dooms day shelter 2017 4?r=US&IR=T

Professor Bryan Toon (CNET, 2020), who is an atmospheric scientist, explains the phenomenon of Nuclear Winter as potentially the most dangerous outcome of the nuclear war. He compares the explosion to a piece of the sun coming down to the earth that sends everything on fire, and as a result, lots of smoke is sent to the stratosphere where it takes years to clear completely, creating a Nuclear Winter. Blocking the sun to reach the ground will create a climate change leading to 90% of the global population dying from starvation, making the idea of spending a couple of years in a facility like a Survival Condo even more appealing.

Independent civil defence shelter resellers

There are plenty of options to ensure your safety in case of nuclear attack. According to Protect and Survive (1980) booklet, the last public advice released by the UK government, the priority should be creating a safe space to shelter within your house. Unfortunately, this advice works best only within the concrete and brick premises which are most likely to withstand the blast and radioactive fallout. The safest place to stay during the explosion would be a basement, however, less than 2% of newly built properties in the UK have basements (2020).
Given that the situation with civil defence sheltering is similar in many countries, many independent civil defence reselling businesses have risen in the recent decade. These companies sell civil defence structures designed to withstand natural disasters such as tornadoes, earthquakes, and hurricanes, as well as human - caused disasters including chemical, biological, or nuclear attacks. Although there are many resellers at the market right now offering several types of sheltering – compact shelters providing the secure stay for 1 or 2 people for a short time, safe rooms designed to accommodate a family of 4, or large structures ensuring safety for up to 100 people - many of these companies refer to Swiss standards of construction.

Bunker designs by SBMX.
https://swissbunkermx.com/en/products/

Mexican company SBMX, which offers wide range civil defence bunkers and is actively implementing Swiss and Israeli standards, uses the reinforced concrete and high-quality architectural armour to create protected bunkers (2022). Other essential features of these shelters include fire resistance, filtered ventilation and excellent level of noise cancellation. All the shelters would be installed under the ground to double the structure's security. What is more, shelters have a pleasing interior with all the necessities for a comfortable stay, including bedrooms, bathrooms with water tanks, joint kitchen and living room spaces. Additionally, spaces are supplied with CO2 detection systems, Independent CCTV, Alarms to outside and even Wi-Fi, which similarly to telephone signal, may be disrupted or unavailable, FEMA reports (2018).
Similarly, American company Vivos is offering an extremely prominent level of security (2023). It is impossible for a person, an aggressor, or a non-military entity to attempt a breach or compromise of a shelter without suffering profound consequences, even when specific security measures cannot be made public. All surface-exposed hatches, vents, materials, and equipment are fortified to withstand forced entrance from armed, biological, chemical, or incendiary assaults. The surrounding fencing, blast doors, and air vents are only a few of the defences that each Vivos complex includes. Before a burglar could approach the shelter and blast-proof entry doors, there are numerous tiers of security that would need to be breached which makes it safe to survive various treats within the premises.

Bunker design by Vivos.
https://www.terravivos.com/shelters.php

For people and businesses who want to safeguard themselves and their loved ones from natural disasters and other hazards, purchasing a civil defence bunker might be a wise investment. However, there are other ways to assure your safety in the event of nuclear attack and it is important to analyse all the options that are available beforehand.

Conclusion

Mankind must put an end to war or war will put an end to mankind.
John F. Kennedy

Fallout shelters are common in countries such as China, South Korea, Singapore, India, and other places, but coverage is never higher than 50%.

Two-thirds of the population in Israel has access to shelters, although many of these buildings are merely concrete shells with openings and are not totally fallout-proof. When it comes to the situation in Europe, Finland and Sweden have the closest number of shelters comparing to Switzerland. However, they are still far behind, standing for roughly 81% and 70% coverage, respectively. Other European nations' conditions are by no means comparable. For instance, coverage in Austria is 30%, yet most shelters lack ventilation. The national level of coverage in Germany is a pitiful 3%. This statistic data reveals that since the end of the Cold War the subject of civil defence in case of nuclear war was neglected in majority countries in Europe, as well as around the world, as it seemed less threatening.

Summarising, the invention of the nuclear weapons, undoubtedly, was one of the most impactful events in modern human history. It has played a huge role in development of Civil Defence strategies around the world and encouraged to reconsider available safety matters. At the certain time, the nuclear weapons stood for the ultimate defence and saved from the potential large-scale conflicts between global superpowers (Younger, 2000). On the other hand, the possession of such a dangerous weapon impacted millions of people by sowing the seed of fear in their hearts.

From the well-known tale of Sadako's 1000 paper cranes to the Hibakusha's ongoing efforts to rid the world of nuclear weapons, their stories are ones of hope and perseverance that must not be forgotten (ICAN, 2017). Living witnesses to the tragedy of nuclear war are those who survived the atomic bombings of Hiroshima and Nagasaki, therefore when we discuss nuclear weapons, we must also discuss the very negative impact they have on people. Nowadays, when the world is on werdge of the nuclear war, in my opinion, it is important to remember the catastrophic outcomes it may cause for all humankind and never allow this deadly and destructive weapon to be used again.

Nuclear explosion action guide

Inspired by FEMA P-2149/March 2018

What to expect:

Flash

Blast wave

Fire and Heat

Radiation

Electromagnetic pulse

Fallout

Tips:

Fallout is most dangerous in the first few hours after the detonation when it is giving off the highest levels of radiation.

Outdoor areas, vehicles and mobile homes do NOT provide adequate shelter. Look for basements or the center of large multi-story buildings.

It is safe to eat or drink packaged food items or items that were inside a building. Do not consume food or liquids that were outdoors uncovered and may be contaminated by fallout.

130mg potassium iodide (KI) blocks the radioactive material from being absorbed by thyroid.

In the first 72 hours after fallout, conditions are at their worst, therefore it's critical to either leave right away or seek shelter.

Before

Get inside

- *Get inside the nearest building*
- *Remove contaminated clothing and wipe off or wash unprotected skin*
- *Go to the basement or middle of the building.*

Stay inside

- *Stay inside for 24 hours unless local authorities provide other instructions.*
- *Family should stay where they are inside*
- *Keep your pets inside.*

Stay tuned

- *Tune into any media available for official information such as when it is safe to exit and where you should go.*
- *Battery operated and hand crank radios will unction after a nuclear detonation.*
- *Cell phone, text messaging, television, and internet services may be disrupted or unavailable.*

During

- If warned about upcomming explosion, immideately get inside
- If you are outside when detonation occurs, take cover from blast.
- Get inside the nearest shelter location

After

- Take off outdoor clothes and clean yourself
- Clean any pets that were outside before the fallout
- Stay tuned

Before

- Identify nearest shelter location
- Get an emergency supply kit
- Get a battery powered radio

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