

Video 16: How To Survive Doomsday

There is a scene in the movie Armageddon where the U.S. president, played by Morgan Freeman, announces that a mission to blow up a meteor heading toward Earth has failed, and he continues:

“Why only one million? It’s just 0.3 % of the U.S. population. What about the rest? No plans for them at all? Should they peacefully sit on top of the hills to avoid drowning and then die of starvation?”

If there is a threat out there and doomsday is in front of us, whether it be a big meteorite, alien ship, the Sun doubling its activity, nuclear war, a rapid increase in global warming, or whatever else you might think of, the movie suggests that only burying us underground would save us.

We will try to answer the question of how long it would take to bring us all underground to avoid the catastrophe by using the Deep Underground concept.

In case of a serious disaster, we would have to be fully independent from the surface, so we would need to have space for the following underground:

- Food
- Living
- Industry and offices
- Public areas

Let’s take a look at how much space we would need for each underground citizen.

Some sources say that the surface necessary to feed a person is about 1,000 square meters. However, in an environment where heat, humidity, water, and light can be controlled, food production can be multiplied by a factor of five. Therefore, 200 square meters of stable underground structure per person is a good approximation for the space needed to feed a single person.

Everyone needs some privacy. We should consider the necessity of a room for a single person or a flat for a family. Let’s say, for example, a 25-square-meter private room per person and maybe about the same amount of space per person for other needs. Therefore, we estimate 50 square meters per person for living.

In the average city, the proportion between private spaces, businesses, and other public areas is not far from being equal. So, it is reasonable to assign another 50 square meters per person in this area.

We use a great deal of surface for public places, like squares or parks or schools, but we need to limit underground public spaces to 100 square meters per individual.

To summarize, a single person would need about 400 square meters of underground space to live independently underground.

There are two types of underground construction. The first, a molehill, is simply a construction covered by a thin layer, say 1-2 m of soil, and is quite safe against most threats, like bad weather, high-velocity wind, polluted water, and air. Such a construction can be built using materials like steel, wood, concrete, or clay.

The second one is pure underground construction. The Deep Underground concept provides an economical version that involves the excavation of several circular tunnels of certain lengths by one another, later cutting the walls in between.

For places that require height, the Deep Underground concept provides a larger construction, which must have a circular or elliptic shape, such as a giant tunnel or cave.

We determined the types of underground construction we need, but how much of each type do we need?

Molehills can offer private rooms, common spaces, and offices. It's not unreasonable to say that they can provide 25 percent of underground space for individual needs, which is 100 square meters. Economical underground construction, such as an underground hall, could cover most of the needs for farming and industry, say 250 square meters. For the rest, 50 square meters, we should use larger underground construction.

This table shows the yearly production of concrete, steel, wood, and straw materials and the approximate use of materials per square meter of a molehill. The results show that if all of the available world resources of construction material are used to construct molehills, theoretically, enough molehill space for 500 million people could be provided every year.

This means, of course, that theoretically, if we assume that someday there will be 10 billion people on Earth, enough space in molehills can be assured for all the people in the world in 20 years.

The Deep Underground concept proposes using newly developed mechanization with the price, technical complexity, and time required for the production of an average car. There are close to 100 million cars produced every year, so if we assume that all car production is replaced by equipment production, we will have about 100 million pieces of equipment available each year.

According to the Deep Underground concept, each piece of equipment can be expected to construct about 100 square meters of type one and about 10 square meters of type two of underground construction every year.

This table shows us how much space can be constructed each year with the available equipment for each type of underground construction.

For each person, we need 250 square meters of economical underground construction and 50 square meters for type two underground construction. With both types, by

sharing production capacities, this can be achieved in 40 years for every person, assuming that there will 10 billion people in the world someday.

To summarize, the results are rather interesting. If we decide today to put all our resources into play and develop the technology of the Deep Underground concept, we can ensure that in 40 years, there will be enough underground space for every person in this world to hide and have everything they might need if a disaster hits.

There are a lot of ifs, of course, but it shows that the task of bringing all humanity underground in a time of need is not a mission impossible nor a 1000-year project. So, Morgan Freeman, you should learn something from this.