EARTHSCRAPERS

Watch the video here: https://youtu.be/SoGcnJ15TlM

WHILE "skyscraper" is an extremely well-known term, and many people were made aware of "groundscrapers" by Google – who **popularised** the concept with plans for their new London headquarters – there is another term that is less well-known: "earthscrapers".

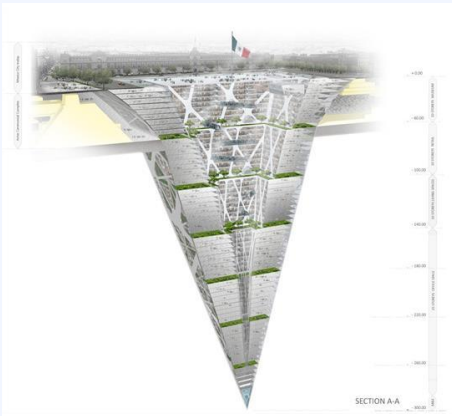
In our groundscrapers video we stated that these long, ground-hugging buildings were the opposite of skyscrapers. But as one of our viewers pointed out in the comments: "surely the opposite of a **skyscraper** would be an underground building?"

In fact there is a name for a building that extends from the surface, deep underground. These **inverted** skyscrapers are known as "earthscrapers".

WHAT DEFINES AN EARTHSCRAPER?

While **countless structures** are buried underground, such as car parks, **arenas** and **laboratories** these are not earthscrapers.

Earthscrapers are best described as an inverted skyscraper. They start at ground level and then extend a considerable distance downwards from the surface.



Above: Earthscrapers extend downwards into the earth

Although an extremely interesting **concept**, at present earthscrapers only exist as design concepts, either in fiction or **architectural proposals**. None have yet been built, as far as we are aware.

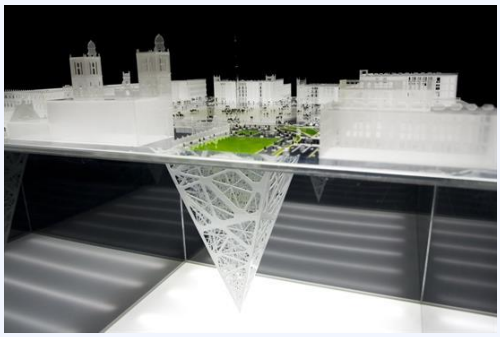
EARTHSCRAPER PROPOSALS

The best-known **proposal** to actually build an earthscraper was an entry to the Evolo Skyscraper Competition in 2012 by Mexican architectural practice BNKR Arquitectur.

Their **proposal** imagines a 65-**storey** deep earthscraper placed beneath Mexico City's central square, the Zócalo.

Plunging 1,000 feet into the earth (around 300 metres), the **inverted** pyramid is **intended** to contain a 10-floor museum, 10 storeys housing and 10 storeys of retail units, all above 35 storeys of **subterranean** office space.

Left: BNKR Arquitectur's proposal envisages a 65-storey deep earthscraper beneath Mexico.



All of these **habitable** spaces are arranged around a central void that allows light and **ventilation** into the **structure**. This vast hole would be covered with a **glazed** roof, acting as a floor surface in the square above.

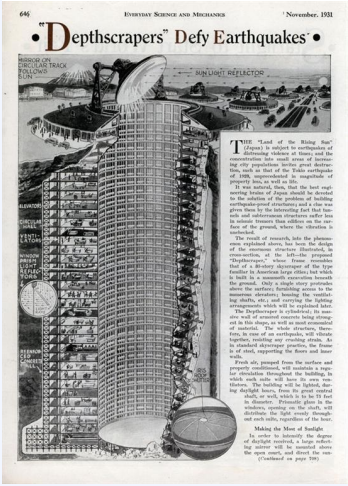
According to BNKR Arquitectur the **ambitious** plan is a solution that responds to Mexico City's height regulations limiting new **structures** to eight storeys in the historic centre, and a huge demand for centrally located property.

Above: The upside down pyramid would extend 1,000 feet into the earth (image courtesy of BNKR Arquitectur).

However, there are many **structural**, **logistical** and **regulatory** barriers for the project to overcome, and for the time being this earthscraper does not look like being built.

Along with this Mexican example there are several historical examples of earthscrapers, the most notable being one which was featured in a 1931 issue of *Popular Mechanics*.

Described then as a “depthscraper”, the cylindrical tower made from a steel frame and "armored concrete", was proposed to extend 35-storeys into the ground.


646 EVERYDAY SCIENCE AND MECHANICS November, 1931

"Depthscrapers" Defy Earthquakes

SUN LIGHT REFLECTOR

Left: The design for a "depthscraper" in Japan.

In this case the motivation for the structure was to provide a residential engineering solution for surviving earthquakes in Japan.

Whilst there are no earthscrapers at present, the continued growth of our cities is placing pressure on central urban areas and driving a number of **innovative proposals** (such as "micro apartments"). In such context, it's not a leap to imagine these **remarkable structures** becoming a reality one day soon.

Vocabulary words:

popularise - *verb* make understandable to the general public; cater to popular taste to make popular and present to the general public; bring into general or common use

skyscraper - *noun* a very tall building with many stories

invert - *verb* make an inversion (in a musical composition); turn inside out or upside down

countless - *adj.* too numerous to be counted

structure - *noun* a thing constructed; a complex entity constructed of many parts; the manner of construction of something and the arrangement of its parts; a particular complex anatomical part; the complex composition of knowledge as elements and their combinations; the people in a society considered as a system organized by a characteristic pattern of relationships; *verb* give a structure to

laboratory - *noun* a workplace for the conduct of scientific research; a region resembling a laboratory inasmuch as it offers opportunities for observation and practice and experimentation

arena - *noun* a playing field where sports events take place; the central area of an ancient Roman amphitheater where contests and spectacles were held; especially an area that was strewn with sand; a large structure for open-air sports or entertainments; a particular environment or walk of life

concept - *noun* an abstract or general idea inferred or derived from specific instances

architectural - *adj.* of or pertaining to the art and science of architecture

proposal - *noun* the act of making a proposal; something proposed (such as a plan or assumption); an offer of marriage

storey - *noun* a structure consisting of a room or set of rooms at a single position along a vertical scale

Intend - *verb* have in mind as a purpose; design or destine; denote or connote; mean or intend to express or convey

subterranean - *adj.* lying beyond what is openly revealed or avowed (especially being kept in the background or deliberately concealed); being or operating under the surface of the earth

habitable - *adj.* fit for habitation

ventilation - *noun* the act of supplying fresh air and getting rid of foul air; a mechanical system in a building that provides fresh air; the bodily process of inhalation and exhalation; the process of taking in oxygen from inhaled air and releasing carbon dioxide by exhalation; free and open discussion of (or debate on) some question of public interest

glaze - *noun* coating for fabrics, ceramics, metal, etc.; a glossy finish on a fabric; any of various thin shiny (savory or sweet) coatings applied to foods; *verb* become glassy or take on a glass-like appearance; coat with a glaze; coat with something sweet, such as a hard sugar glaze; furnish with glass

ambitious - *adj.* having a strong desire for success or achievement; requiring full use of your abilities or resources

regulation - *adj.* prescribed by or according to regulation; *noun* the act of controlling or directing according to rule; the act of bringing to uniformity; making regular; an authoritative rule; (embryology) the ability of an early embryo to continue normal development after its structure has been somehow damaged or altered; the state of being controlled or governed; a principle or condition that customarily governs behavior

structural - *adj.* concerned with systematic structure in a particular field of study; affecting or involved in structure or construction; relating to or having or characterized by structure; relating to or caused by structure, especially political or economic structure; relating to or concerned with the morphology of plants and animals; pertaining to geological structure

logistical - *adj.* of or relating to logistics

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nnovative - *adj.* being or producing something like nothing done or experienced or created before; ahead of the times

proposal - *noun* the act of making a proposal; something proposed (such as a plan or assumption); an offer of marriage

remarkable - *adj.* unusual or striking; worthy of notice

Reading Comprehension: Earthscrapers

Questions:

What is an earthscraper?

a) A building that extends deep underground

b) A building that stretches across the ground

c) A tall building above ground

d) A car park structure

What inspired the concept of earthscrapers?

a) The need for earthquake-resistant buildings

b) Regulations limiting building heights in urban centers

c) A lack of materials to build skyscrapers

d) A desire to mimic ancient pyramids

What problem does the Mexican earthscraper proposal aim to solve?

a) Increasing housing demand in Mexico City's central square

b) Lack of tall buildings in the area

c) The need for more parking spaces

d) Protecting against floods in urban areas

How would the central void in the earthscraper help the building?

a) By collecting rainwater

b) By providing ventilation and natural light

c) By preventing earthquakes

d) By creating more space for offices

Why haven't earthscrapers been built yet?

a) There is no need for underground buildings

b) They are too expensive

c) There are structural, logistical, and regulatory barriers

d) People prefer traditional skyscrapers

True or False:

1. The first earthscraper proposal was made in 2012 by a Mexican architectural firm.
2. Earthscrapers are similar to car parks and underground arenas.
3. Earthscrapers are considered inverted skyscrapers because they extend downward instead of upward.
4. The design of earthscrapers is mostly used in fiction and proposals, not in actual construction.
5. The main motivation behind earthscrapers is to create space in overpopulated urban centers.

Short Answer:

1. What are the main challenges that earthscraper designs face before becoming a reality?
2. Explain how the earthscraper's design helps manage light and ventilation.
3. Why is the concept of earthscrapers gaining attention in cities with dense populations?

This activity helps students practice comprehension, analyzing architectural innovations, and exploring futuristic solutions for urban development.