

Skyscrapers

Skyscrapers were first invented in the 1880s, though these buildings are often considered small by today's standards. The term *skyscraper* originally applied to ten- to twenty-story buildings. Today, the word is generally used to describe buildings with forty or more stories.

A number of factors contributed to the literal rise of skyscrapers. From a geographic standpoint, the organization of cities, such as New York, had long been determined, and the average size of a plot of land in the city was restrictive. Businesses had one of two options: set up shop outside the city, or find a way to make use of the space available. Many businesses, wishing to remain in the heart of the city, opted for the latter option. The invention of passenger elevators in 1857 also contributed to the advent of skyscrapers. Now that occupants were not forced to climb multiple flights of stairs, buildings taller than four floors made more sense.

The earliest skyscrapers relied on a heavy masonry base comprised of thick walls. The base was crucial to supporting the load of the floors and roof above. However, this design was limiting. The base could only support a limited number of stories, and the thick walls infringed upon the available interior space of the building, limiting the size of rooms on the lower floors. At the same time, the exterior walls played an important role in supporting the building. In the mid-1800s, some builders began trading the masonry foundation for an iron framework. The Cast Iron Building, completed in New York in 1848, utilized such building techniques.

It was not until the adoption of the Bessemer process, however, that skyscrapers really took off. Steel, an iron and carbon alloy, is significantly lighter than iron. It is also stronger, making it an ideal building material, especially for tall structures. Chicago's Home Insurance Company building, completed in 1885, was the first building to employ steel girder construction. The exterior walls of the building played no structural role, instead supporting their own weight and acting as a barrier between the inside of the building and the elements outside. Throughout the late 1800s and the 1900s, skyscrapers grew across the country, especially in major cities like New York, Philadelphia, and Chicago. The exteriors of the buildings exhibit varied architectural details, reflecting when they were built. Over time, skyscrapers were used for both commercial and residential space.

Inner-City Transportation

While skyscrapers helped cities grow up, new forms of transportation helped cities grow out. In the early 1800s, cities were relatively limited in size. With few modes of transportation, city dwellers were forced to live within walking distance of their places of work, meaning that cities were unlikely to grow outward. This began to change, however, toward the end of the 1800s.

Horsecars and Streetcars

The first horsecar was introduced in 1832 by John Mason in New York City. The concept was simple: horses, or sometimes mules, dragged large cars down city streets. The average horsecar could accommodate up to thirty passengers who sat in one of two aisles. The car also had space for a conductor. In some instances, horsecars were double-decker. The innovative horsecar became very

popular and spread to other major cities around the United States and Europe. By the 1880s, some eighteen thousand horsecars existed across the United States. Within a decade, however, the majority would disappear thanks to the invention of the electric streetcar.

Also called a trolley or tram, the electric streetcar eliminated the need for animal labor. Though horsecars were effective and solved a growing transportation problem, they were often unreliable. Horses would grow tired or become injured in the line of duty, not to mention the refuse they created on city streets. Streetcars, like their predecessors, ran through the city streets. The wheels of the cars ran on tracks along fixed routes. Early models ran on inefficient and expensive batteries, but they were powered by electric motors after inventors figured out how to power them by generators in the 1860s. Streetcars were connected to electric cables that ran overhead and powered the car.

The cable car, a close relative of the electric streetcar, experienced the greatest popularity and use on the West Coast. Invented in 1873 in San Francisco, California, cable cars were connected to cable lines that ran through the tracks and pulled the cars forward. San Francisco's steep hills made the cable car preferential to the electric streetcars used in other cities. During the first two decades of the 1900s, electric streetcars became increasingly efficient and durable. Cars were made with steel, which afforded them a greater carrying capacity. Cities invested heavily in streetcar lines, often building tracks outward from city centers into outlying areas, effectively expanding the size of the city. Streetcars made it possible for people to more easily commute to work, and as a result, eliminated the need to live close by. Streetcars also led to the rise of shopping and cultural districts, which became destinations for commuters.

Subways and Els

As cities became increasingly crowded, the transportation industry was faced with a unique problem. City streets were filled with people, animals, and streetcars, making it difficult to construct a more efficient transportation system on the ground. However, building below and high above ground were viable options. The first subway line was finished in London in 1863. Less than four miles long, the line carried nearly ten million people in its first year. London expanded its underground transportation system rapidly through the early 1900s, and other major cities around the world followed suit. Boston opened its first stretch of subway in 1897. Only one and a half miles long, the line initially relied on streetcars to carry passengers. New York City opened its first subway in 1904, followed by Philadelphia in 1907, and eventually Chicago in 1943.

Cities like New York and Chicago also looked up when planning their transportation systems. Elevated railroads, known commonly as "Els," were built hovering over city streets at about the height of the second and third stories of surrounding buildings. Chicago opened its first elevated railroad line, the "Alley L," in 1892. Today, Chicago has more than two hundred miles of elevated rail and subway track.