

Wonkblog

How China used more cement in 3 years than the U.S. did in the entire 20th Century

By [Ana Swanson](#) March 24

China used more cement between 2011 and 2013 than the U.S. used in the entire 20th Century.

It's a [statistic](#) so mind-blowing that it [stunned Bill Gates](#) and [inspired haiku](#). But can it be true, and, if so, how? Yes, China's economy has grown at an extraordinary rate, and it has more than four times as many people as the United States. But the 1900s were America's great period of expansion, the century in which the U.S. built almost all of its roads and bridges, the Interstate system, the Hoover Dam, and many of the world's tallest skyscrapers. And China and the U.S. are roughly the same size in terms of geographic area, ranking third and fourth in the world, respectively.

The statistic seems incredible, but according to government and industry sources, it appears accurate. What's more, once you dive into the figures, they have a surprisingly logical explanation that reveals some fascinating differences between the two countries, and some ominous realities about China.

Gates plucked the statistic from the historian Vaclav Smil, who [calls](#) cement "the most important material in terms of sheer mass in our civilization." (In case you need a refresher, cement is a powdery lime-and-clay substance that is combined with water and gravel or sand to make concrete.) Smil got his estimates from the U.S. Geological Survey, whose figures for the

[American use of cement](#) in the 20th Century are below.

This chart shows some interesting economic trends – including dips in construction during the Great Depression, World War II and [the recession of the early 1980s](#). All of America's cement consumption during the century adds up to around 4.4 gigatons (1 gigaton is roughly 1 billion metric tons).

In comparison, China used around 6.4 gigatons of cement in the three years of 2011, 2012 and 2013, as data below from the [International Cement Review](#), an industry publication based in London, shows. U.S. Geological Survey estimates on China's cement consumption are similar: According to Hendrik van Oss, a mineral commodity specialist at the USGS, China's cement consumption between 2010–12 was about 140 percent of U.S. consumption for 1900–99.

Clearly, the amount of cement that China has used in recent years is just stunningly huge. Here it is as a cube, overlooking Chicago.

As a parking lot, it would cover Hawaii's big island:

So how did China use so much cement? First, the country is urbanizing at a historic rate, much faster than the U.S. did in the 20th Century. More than 20 million Chinese relocate to cities each year, which is more people than live in downtown New York City, Los Angeles and Chicago combined. This massive change has taken place in less than 50 years. In 1978, less than a fifth of China's population lived in cities. By 2020, that proportion will be 60 percent.

China's cities have been transformed to make room for this influx of people. By some estimates, half of China's infrastructure has been built since 2000, with new rail networks, interstates, dams, airports and high-rise apartment buildings springing up across the country. For example, the gif below shows how Shanghai's Eastern Pudong District changed between 1987 and 2013. You can see why Spike Jonze chose Pudong as the setting for a city of the future in the recent movie "Her."

More stunning than Shanghai's transformation is the growth of the Pearl River Delta, a megalopolis on the Chinese mainland across from Hong Kong. The manufacturing hub had 42 million inhabitants in 2010, according to [the World Bank](#). If considered a single urban area

which makes sense, since the cities there all run together -- the Pearl River Delta would be the world's largest city by both area and population.

What's almost more impressive than China's biggest cities is the incredible number of "small" cities that no one has ever heard of. In 2009, China had 221 cities with more than a million people in them, compared with only 35 in Europe. Even relatively minor cities like Zhengzhou and Jinan are more populous than Los Angeles or Chicago.

Beyond China's incredible urbanization, there are a few more facts that make the cement stat even more believable. As Goldman Sachs pointed out in [a note](#), China's population today is only about four times as large as the U.S., but it is 15 times as large as the U.S. was in the early 20th Century, and nine times the size of the U.S. in 1950.

The world also experienced a shift in building materials over the 20th Century. In 1950, the world manufactured roughly as much steel as cement; by 2010, steel production had grown by a factor of eight, but cement had gone up by [a factor of 25](#). And where many houses in the U.S. are made of wood, China suffers from a relative lack of lumber. Unlike in the U.S., many people in China live in high- or low-rise buildings made out of cement.

Finally, China's cement industry is much larger than it should be. Many of China's cement manufacturers are state-owned, and they benefit from government support and access to cheap capital. As in other overcapacity state-owned industries -- aluminum, [steel](#), and shipbuilding -- China's cement sector has undergone a period of explosive growth without much regard for product quality or [profits](#).

This massive cement industry also takes a heavy toll on the environment. Scientists estimate that the global cement industry accounts for around [5 percent](#) of the world's carbon emissions, and more than [half](#) of the world's cement production capacity is based in China.

What's more, low standards for construction quality mean some of China's concrete buildings may have to be knocked down and replaced in as little as [20 or 30 years](#). According to [Goldman Sachs](#), about a third of the cement that China uses is low-grade stuff that wouldn't be used in

When Bill Gates wrote [in his blog](#) about China's stunning cement consumption, he pointed out that the issue of materials is key to helping the world's poorest people improve their lives. Replacing mud floors with concrete improves sanitation; paving roads with concrete allows vegetables to get to market, kids to get to school, and the economy to flourish. In China, the building boom has spurred economic growth that has lifted hundreds of millions of people out of poverty.

And yet, China's massive cement use also points to a darker side of the economy: The waste that occurs with too much top-down economic planning, and the environmental toll of growth at all costs. China's cement splurge is impressive, yes, but it may hold the seeds of a more ominous story.

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