

When did New York start building slowly?



Brian Potter ✓
Mar 15

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Via [wikipedia](#)

It's good to be able to build things quickly.

The faster you build something, the quicker the benefits from it accrue, making it more valuable. Additionally, you can reallocate your resources to another project, letting you build more things overall. Building things faster also generally means building them cheaper. If you're building slowly, you're probably building inefficiently, spending more time and effort than is really required. It's also hard to avoid accumulating costs as a project drags on: you end up with more financing costs, more project status meetings, more time spent getting people up to speed as the team working on the project changes. And the longer a project takes, the more chances there are for something to go horribly wrong. Bent Flyvbjerg, who has spent his career studying megaprojects (projects costing a


billion dollars or more), notes that “projects that fail tend to drag on, while those that succeed tend to zip along and finish.” Flyvbjerg:

Think of the duration of a project as an open window. The longer the duration, the more open the window. The more open the window, the more opportunity for something to crash through and cause trouble...Solution? Close the window...That is a main means of reducing risk on any project.

Building things slowly also risks conditions in the world changing such that what you’re building isn’t needed anymore, or allowing someone else to capture the opportunity instead.

The US seems to build things much more slowly than it used to. As Patrick Collison notes in his list of (mostly American) fast projects, “The physical infrastructure projects enumerated above occurred before 1970 to a disproportionate degree.” The average time

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Mo... slowly. [One World Trade Center](#) took more than eight years to construct. The [Second Avenue Subway](#) took 12 years to build 3 stations, 5 years longer than originally planned.

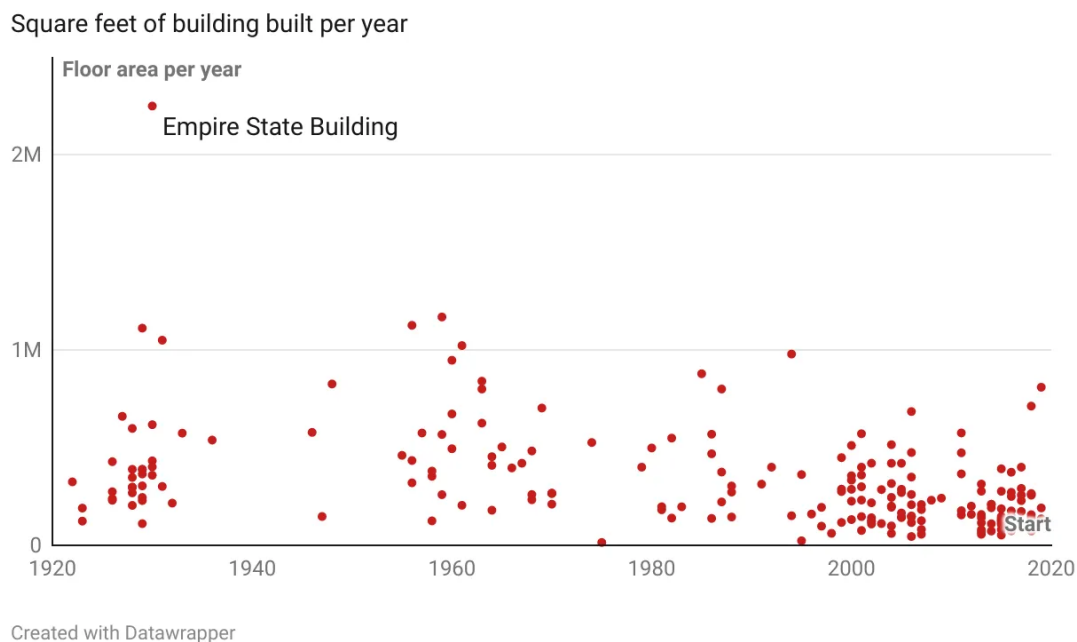
When did New York get so slow at building things?

To assess the slowdown, we can look at how the time required to build a skyscraper in New York has changed. New York builds a large number of skyscrapers, and has been building them for over a century, making it possible to look at trends rather than just isolated projects.

I used the Council on Tall Buildings and Urban Habitat's (CTBUH) [skyscraper database](#), which collects information on skyscrapers around the world. I pulled information on every New York skyscraper in the database taller than 100 meters which a) had a construction start date, b) had a completion date, and c) had a total floor area. This was just over 200 buildings (for a bit more on this dataset, see the footnotes [1]).

The chart below shows construction speed of New York skyscrapers (in square feet built per year) from 1920 to 2020.

Construction Speed of New York Skyscrapers



Though there's a lot of variation, we see what looks like a (noisy) trend downwards. Almost all recent skyscrapers were built slower than 500,000 square feet per year, when historically we see a large proportion built at almost twice that speed.

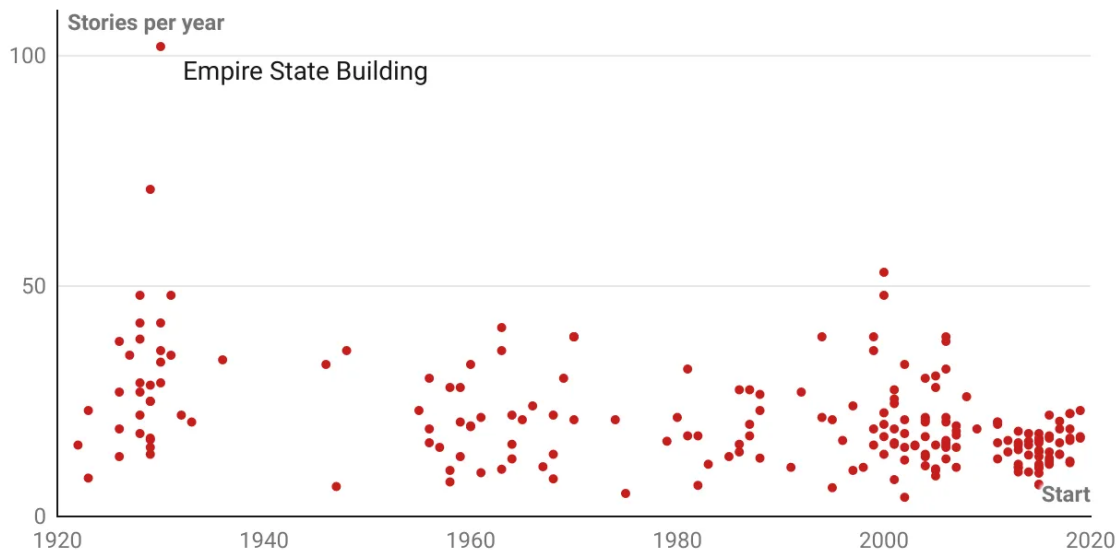
We also see what an enormous outlier the Empire State Building is. The size of the building (~2.2 million square feet) and the speed of its construction (just a year) combine

to give a rate of construction that dwarfs every other building in the dataset. On a square foot per year basis, no other building was built even half as fast.

We see roughly the same pattern if we look at stories built per year: a trend downward, with the Empire State Building a huge, speedy outlier.

Construction Speed of New York Skyscrapers

Stories built per year

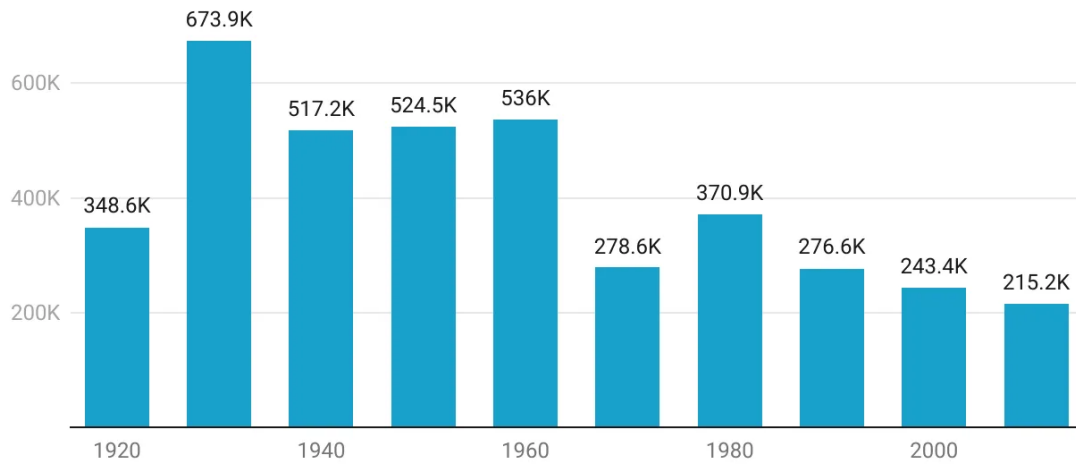


Created with Datawrapper

Since the data is noisy, we can get a better understanding by looking at average construction speed by decade:

New York Skyscraper Construction Speed

Average construction speed in ft² per year of New York skyscrapers, by decade



Created with Datawrapper

Average skyscraper construction speed in New York declined from over 500,000 square feet per year from the 1930s through the 60s to less than half that post-2000. We see a similar decline in speed if we look at stories built per year, though it's less pronounced:

We can even see the same decline in speed by floor area if we remove all the one-year duration buildings from the dataset, though the decline in speed by stories is now nearly imperceptible. [2]

If we look at construction speed broken down by building size, we see that larger buildings are built faster than smaller buildings (though within each bucket there's a decline in speed over time.)

However, we see almost no relationship between number of stories and construction speed [3], which suggests that what actually matters is size of the floor plate, not the size of the building. Here's construction speed by decade, broken down by floor plate size:

Larger floor plates get built significantly faster than smaller floor plates, though we see a (somewhat noisy) decline in construction speed within each bucket. This seems to broadly

bear out Collison's observation that things slowed down after 1970. What's more, New York skyscraper construction seems to be steadily getting slower. As measured by square footage per year, construction speed has declined by 40% since the 1980s, and in stories per year it's declined by 25% since the 2000s.

New York vs Chicago

There are many possible explanations for the decline in skyscraper construction speed:

- Skyscrapers have shifted from being primarily office buildings to primarily residential buildings, and residential buildings might take longer to complete (more plumbing, more interior walls that need to be built, etc).
- Safety and building code requirements have gotten stricter, which adds construction time
- Modern buildings have many more features and services than historic ones, all of which take longer to build.
- As a city gets built up, each new building must be built around more existing infrastructure, which slows down construction (fewer places to store construction materials, more existing underground services that need to be rerouted, etc.)

The easiest way to check these explanations is to compare New York skyscraper construction to another US city. If other cities have also slowed down, that suggests widespread effects like some combination of the above. If they haven't, it suggests New York's decline in construction speed is more due to local factors.

The most obvious comparison is Chicago. Like New York, Chicago has been building large numbers of skyscrapers since the 1920s (though it doesn't build as many as New York), and it's the only other US city with data going back far enough that we can look at trends in skyscraper construction speed. Here's construction speed of Chicago skyscrapers since 1920:

Interestingly, Chicago also has a single outlier building constructed far faster than every other building: in this case, it's the enormous [Merchandise Mart](#). It also doesn't seem to show the same decline in construction speed that we see in New York.

We can see this more clearly if we look at averages by decade:

The decline in construction speed, if it exists (it's not visible on a per-story basis), is much less consistent. Modern construction in Chicago is as fast, or faster, than it was in the

1950s and 1960s (though not as fast as the 1970s, 80s, and 90s). By square footage per year, Chicago skyscraper construction is almost twice as fast as New York. By stories per year it's almost 40% faster.

However, if we look at Chicago speeds broken down by floor plate size, we see something interesting:

About 33% of the New York skyscrapers in our dataset have floorplates smaller than 10,000 square feet. For Chicago, on the other hand, it's fewer than 3% (only 3 buildings out of 124 in the sample). If you compare Chicago to New York on a floor plate by floor

plate basis, Chicago still builds faster (the large floor plate Chicago buildings take about 80% the time as the New York ones), but the difference isn't nearly as stark.

If we look at average floor plate size, both Chicago and New York floor plates have gotten smaller over time, but New York's have decreased more than Chicago has:

Note that we don't see much change in the average number of stories. Newer buildings aren't shorter than older buildings, just skinnier.

Conclusion

To sum up, construction speed of New York skyscrapers has declined significantly over time, particularly after 1970. Depending on the metric you use, modern New York skyscrapers are built at 40-70% the speed of those built in the 1940s-60s, and around a third of the speed of those built in the 1930s (though the unusually fast Empire State Building distorts the data here.) Chicago, the only other US city that has built significant numbers of skyscrapers for many decades, doesn't show this same pattern of decline (though it also doesn't build as fast as it once did), and New York skyscrapers are built at around 50-70% the speed of Chicago skyscrapers. This seems partially due to New York constructing many more skinny skyscrapers with very small floor plates than Chicago does, which take proportionately longer to build.

We'll continue our look at skyscraper construction speed next week.

*[0] - Increasing apartment size is at best a partial explanation here. We only have the average apartment size going back to 1999, but it's **actually decreased since then**. Over that same period the average construction speed of 10-unit buildings went from 10.1 months to 15.5 months.*

[1] - This isn't an ideal dataset, for a few reasons. For one, there's no sourcing of the start/completion dates, and there's almost certainly errors in it. Spot checking revealed most dates were accurate, but some had mistakes (which I've corrected where I've seen them.) For another, the database only gives a start year and completion year, which puts an error bar of plus or minus a year on our construction times. A building that started in 1991 and completed in 1993 might have taken anywhere from 1 year (if it started on December 31st 1991 and completed January 1st 1993) to 3 years (if it started on January 1st 1991 and completed December 31st 1993). This isn't a big deal for longer-duration construction, as the error will be a smaller fraction of the total duration, and will hopefully be symmetrical. But for shorter durations, it can potentially introduce significant bias (a building that started in 1991 and ended in 1992 is more likely to be closer 2 years of construction time than 0 years). I've tried to correct this where I can by finding start/finish months, but this was only possible for a tiny number of buildings.

There's also selection bias at work, as there are more newer buildings than older buildings in the database. This isn't necessarily a problem by itself (I don't think "gets added to the database" correlates with construction speed), but there will also be more information on recent smaller, less important buildings than on historical ones. If smaller buildings are systematically different from larger buildings, this would also bias the numbers. I'll do my best to correct for this.

But no dataset is perfect, and these issues aren't showstoppers as long as we're aware of them.

[2] - Here's the average floor area and stories per year with 1-year buildings removed. Note that 1940 is based on a single building

[3] - Construction speed vs number of stories. R-squared of 0.15, which drops to 0.07 if you remove the Empire State Building

9 Comments



Write a comment...



David G Mar 16

This seems a little simplistic. To turn a piece of urban land into great apartments requires an investment in the land and hiring people to build the building. What actually has changed in 100 years? More expensive land? More demand for amenities that cost money? Regulatory headaches? Less efficient labor? If it's the last we've really made no progress in 100 years.

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Liberty Writes Liberty's Highlights 10 hr ago

Great post, loved the mission statement about speed in the intro. I featured it here and linked you:

<https://www.libertyrpf.com/i/109002880/why-build-fast-when-did-new-york-start-building-slowly>

Keep up the great work

LIKE REPLY ...

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