Real-Time Extrapolation
as a
Function of Assessing Coherence

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This work is dedicated to engineers, manufacturers and the people who built, and continue to build, modernity.

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Real-Time Extrapolation Defined

Real-time extrapolation is nothing more than estimating aided by direct observation of something.

Most, if not all, estimation is reliant on calculating time, resources and other requirements, based on, i) drafted plans, ii) verbal proposals and, iii) data related to previous completed similar work.

Estimates based on direct observation are rooted in real-time and can be better supported through knowledge gained by firsthand experience.

Estimates based on direct observation can be more reliable for estimating via modeling, i.e., extrapolation.

Extrapolation models sourced from data arrived through direct observation can be referred to as real-time extrapolation.

Purpose & Intent

The purpose of this document is to demonstrate the capabilities of abstract inference measured against stated (given) timeframes to complete construction.

Stated timeframes like: *condominiums and office towers are built at a rate of one (1) floor every two (2) weeks*. This timeframe is based on the assertion of construction professionals ranging from developers, site supervisors and general contractors questioned directly by myself.

Such a statement lacks coherence when crane function and the work performed on condominium and office tower construction sites are both monitored closely with direct observation.

Any conclusion or deduction rooted in logic, or any supposition, should always be supported by proof.

Direct observation, with sound documentation and evidence, provides and constitutes proof.

Mathematics constitutes and provides proof.

Something stated, and which is held as a given, but which cannot be readily shown, lacks reliability.

Verifiable coherence is attainable in an age where all information can be reduced to storable data; binary code represented by bits and the bit of either zero (0) or one (1).

Collecting and recording sounds, language, images, moving images, color, shapes, all information/results known to the human species, and representing them in digital form in accordance with the structured order of the mathematical units of zero (0) or one (1), allows for all data to be measured, modeled, manipulated and graded for coherence.

On a long enough timeline, information can be cross referenced to determine:

- What is constant.
- What is consistent vs. what is inconsistent.
- What is efficient vs. inefficient.
- What lasts vs. what deteriorates and how and why.
- What is popular vs. unpopular.
- Degree of positive (+) attribute vs. negative (-) attribute.
- What combination of what makes the best or worst of something.
- What causes pain vs. what doesn't.

The above is achieved by testing proven data.

Software is capable of taking known information and extrapolating in an attempt to discover unknown, but possible, opportunities.

The problem with this method is that it doesn't account for real-time scenarios and variables like choice, happenstance, accidents, delays and the interaction of free will.

Basically, information that is arrived at without real-time testing cannot be considered proven and actual. It is, at best, a projection.

To complicate matters more, a considerable number of positive discoveries are achieved by accident; one (1) or more negative (-) resulting in something that produces a viable and objectively positive (+) discovery and outcome. Mathematics, and any extrapolation reliant on mathematics, has difficulty accounting for such phenomenon.

While coherency and objectivity are essential to verifying data and the soundness of any concept, it must be understood that existence is more than what can be broken down and interpreted in binary form.

The potential for individual interpretation is infinite. While mathematics can be used to

assess the coherency of any expressed interpretation, it cannot always arrive at the conclusion of true or false.

The human mind, aided by logic that forms coherence, must always be relied upon to assess what mathematics cannot assess, or has difficulty assessing: good vs. bad.

For the purpose of this document, good vs. bad relates to statements pertaining to given work timeframes essential to constructing modernity and maintaining its preservation.

Direct observation is the primal tool of logic.

Mathematics can prove meaning. Meaning, however, requires interpretation and something with awareness and orientation to interpret the worth of such meaning.

An example of *a good thing that mathematics could assess to be bad* is farming. Modern farming requires approximately ten (10) calories to produce one (1) calorie. Prior to the advent of machines, farming would have continuously struggled to reliably produce more calories than the calories expended to produce food from farming. With the gift of machines, farming can only produce viable (consistent/unspoiled) calories on account of hydrocarbons and a scale of production that requires toxic processes; processes which compound the toxicity in the environment and food chain. Left to mathematical analysis, typical farming might be ceased and replaced with more efficient calorie production and consumption, resulting in culture, pleasure and tradition giving food production and consumption being reduced to a perfunctory obligation requiring a complex staple apportioned at timed intervals.

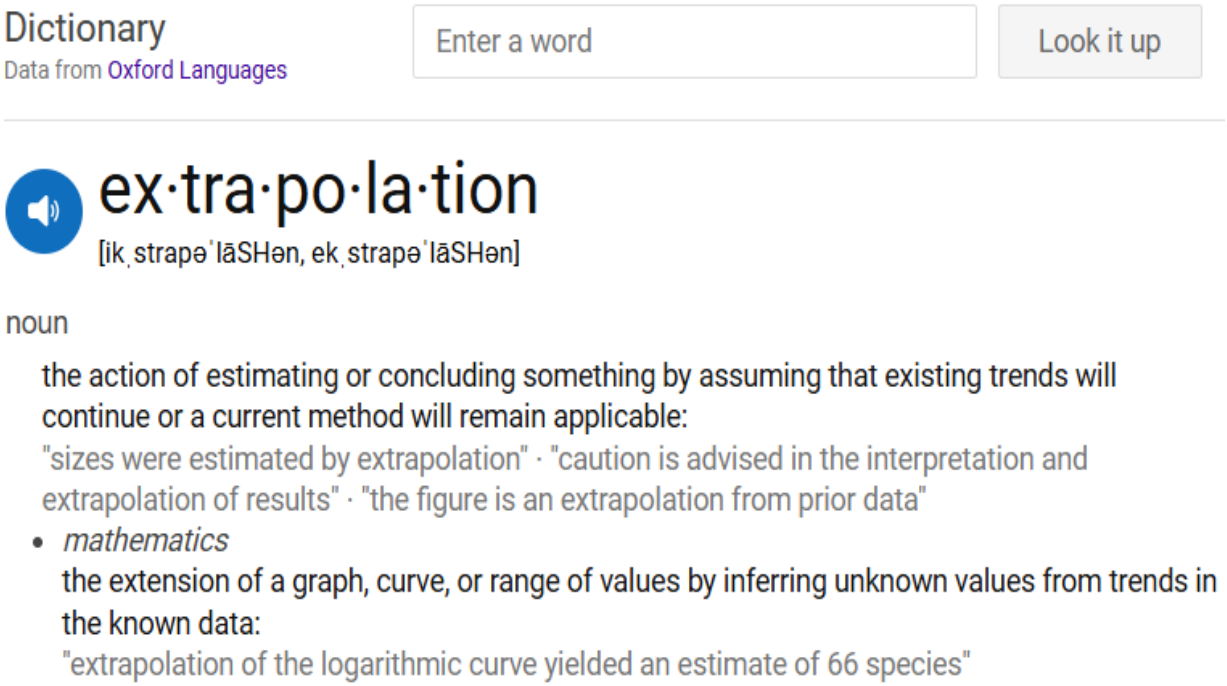
However, real-time observations confirm that farming creates its own supply chain that provides tremendous economically beneficial work (that greatly offsets the energy imbalance of farming) and supports external supply chains, learning, innovation, community, stability, pleasure, appreciation and a connection to environment - which all give existence meaning for people.

Real-time extrapolation can support such positive (+) logic which mathematics might refute, using both real-time observations and mathematics, while finding undiscovered efficiencies beneficial to people, land, livestock and a modern supply chain, i.e., a modernly integrated economy.

This document is intended to show how extrapolation in real-time scenarios can be used to support, or call into question, logic and timeframes given to the planning and pace of construction for foundational structures in the real-world which are generally agreed upon, though never given much consideration or scrutiny.

Confirming such timeframes would lead to a better understanding of the environment, i.e., to further the purpose of science.

Extrapolation Defined



Extrapolation is a great way to analyze what is known about something in order to predict where what is known can go or what it can do in the future.

I like using abstract extrapolation to learn more about life and what makes it tick. I watch videos of things and compare them to what I can observe of similar things in the real world to come up with estimations of what work goes into making, or doing, something and what the time, risks and cost of it would be.

People in science, technology, engineering and mathematics use hard data to extrapolate with. I take loose data and extrapolate with it very conservatively to account for the variables (looseness) of my data; hence, its abstract. However, because I extrapolate with observable things in real-time (directly), my form of extrapolation is more entertaining than conventional data analysis. It serves as a reliable guide with solid visual frames of reference which literally gives people a "better picture" of what is being estimated and/or explained. My goal is to find deeper understanding and meaning in things.

When I observe the world around me where I've lived, be it Toronto, Austin, New York or the places I've traveled to like:

Berlin, Boston, Buffalo, Burlington, Calgary, Chicago, Cleveland, Dauphin Island, Denver, Des Moines, Dresden, Detroit, Dominican Republic, El Paso, Ferguson, Fredericton, Fredericksburg, Halifax, Honolulu, Houston, Jamaica, Kitchener, London, Los Angeles, Miami, Montgomery, Montreal, Napa, New Orleans, Ottawa, Paris, Philadelphia, Playa del Carmen, Prague, Prince Edward Island, Quebec City, Saint John, Saint Lucia, Salem, Salt Lake City, San Francisco, Sarnia, Saskatoon, Savanah, Selma, Sydney, Tampa Bay, Tokyo, Vancouver, Victoria, Vienna, Washington, Windsor and Winnipeg …

I observe the ways in which everything is built, the structural integrity of what has been built and the wear and/or repair of what has been built. And I pay a lot of attention to hazards and what can go wrong – despite precautions.

Hazards like electrical wires and natural gas pipes placed above ground and below ground, throughout modernity. When infrastructure like this sustains damage from tampering/failure/accidents, it can trigger mass shorts, chain reaction explosions and additional fires which can render urban environments uninhabitable beyond a manageable period of time.

Cities used to be made mostly of wood and burned down frequently, but today they have energy and accelerants fed into the walls of literally every structure built.

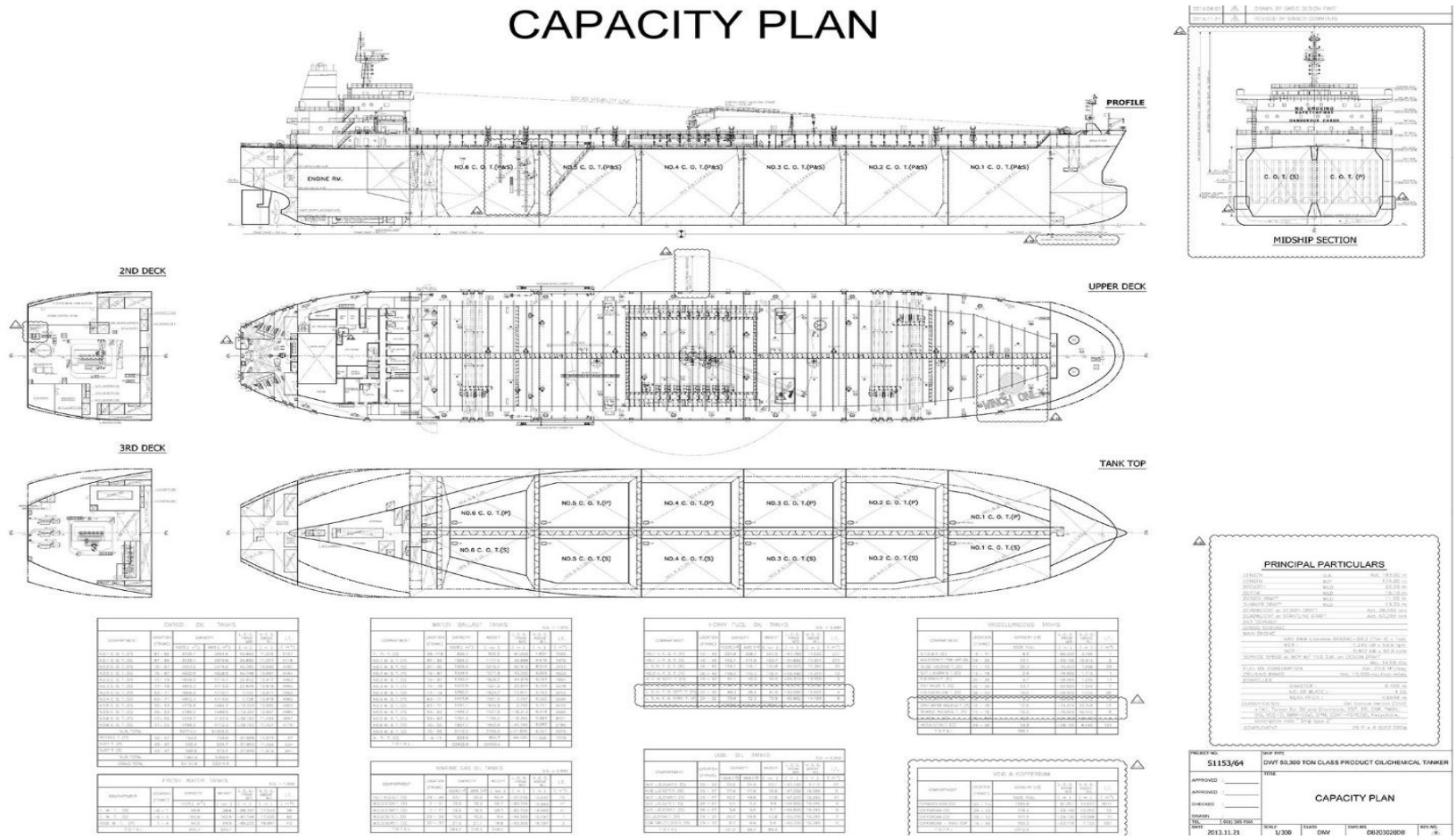
The potential for disaster related to the structural composition of modern structures improbably never occurs to scale.

The recent 2024 fire in Los Angeles was a product of potential arson combined with willfully negligent forest, water and municipal management, and was not a result of modern design/energy transmission. Not much information is known about the fire in its aftermath, let alone as to how a municipality that couldn't keep a water reservoir full was capable of managing the logistics of ensuring electricity and natural gas was strategically shut off to prevent mass surges, chain reaction explosions and additional fires.

To give an example of less calamitous risks, the Northeast blackout of 2003 was ultimately attributed to transmission lines coming into contact with foliage; a tree branch. The probability of events like this occurring frequently is staggeringly high given the number and length of transmission lines in operation around the world. Factor in how these transmission lines are often inadequately maintained and continuously overloaded, the probability of frequent major disruptions further increases.

LNG Catalunya Spirit Arriving At Boston LNG TML

When I observe the ship pictured above pulling up to dock, I think about how one small pipe being misaligned, or how one critical component failing and causing a static shock/accident/spark, could destroy the city and perhaps shut down multiple regions ability to function – until every gas pipe (or many of them) was rebuilt and/or replaced, in addition to all other infrastructure damaged and/or destroyed.



Additionally, I observe and think about how people can design and make just a single Liquid Natural Gas transporting ship. There could be easily over 1,000,000 individual parts that need to be separately made and then assembled. The organization and understanding of what parts are needed, who can supply them or make them if they don't exist, where the parts need to go and taking the time to place them on a draft board or computer screen to form a plan, is perplexing. As more people help organize a plan like this, the likelihood of confusion and errors can increase.

When I observe the intricacy of everything that is built and how many individual parts and components of finished manufactured products go into building and assembling singular products and structures, I casually sense that there isn't enough time to conceive, invent, design, patent, engineer, manufacture, test, approve, plan and construct everything we see and use in the modern world. Sense in this instance, of course, means nothing without proof.

This casual sense of doubt, however, is reinforced by the fact that modernity being built with table-sized hand drawn building and engineering plans, i.e., blueprints, prior to the advent of sophisticated software and computers, is in no way conducive to the rapid pace of modern development between 1924-2024. IBM introduced the first practical computer in 1981. Such hand draw plans, i.e., blueprints, were relied upon until the mass adoption of software generated schematics in, approximately, the late 1980's, and the adoption of sophisticated laser printers required to manifest their designs, i.e., lines.

Life Before the Invention of AutoCAD: Photos from 1950 to 1980 - Rare Historical Photos

Real-time extrapolation is a good way to probe if my sense about there not being enough time to construct things as quickly as they are claimed to be, is incoherent, because my sense is that the real world is a lot different than the drawing board.

Variance in Conventional Perception & Perspective While Maintaining Objectivity

I don't observe time like most people.

Most people are of the perception and perspective that a year is a long time and a lot of time to get things done.

I perceive time in the way that people actually use it to get things done. My perspective is that a year is not a lot of time to perform complex work and work that requires a lot of logistics. Let me elaborate:

A workday is 8 hours long and there are 5 of them in a week.

That's 8 x 5 = 40 hours of work in a week.

As most people work 50 weeks a year, 50 weeks x 40 hours = 2,000 work hours a year.

2,000 work hours ÷ 24 hours in a day = 83.33 days.

83.33 days expressed as a percentage of 365 days in a year = 83.33 ÷ 365 = 0.2283

0.2283 x 100 = 22.83%

∴ Only 22.83% of the time in a year is spent working. People need to get to work, sleep and live with the rest of the time available. This does not factor in the time people need to learn, update skills, and make corrections in life in order to complete work.

While a lot of jobs are done at night, as far as construction is concerned, most work is a 7AM-3PM proposition. Even when construction sites run until 6PM, not much gets done with extra time as it's been proven that longer shifts actually slow work and cause more

errors. Night work is good for construction tasks like road paving and concrete pouring, due to less traffic and cooler temperatures, but such work only became efficient with the advent of portable lighting.

To be conservative and to use a pragmatic figure, I stick with the sound observation that only 25% of the time in a year can be used for consistent work – and this figure does not include slowing negative (-) variables like economic downturns, supply chain issues, bad weather, illness, labor shortages/disputes, lazy workers, incorrect work that has to be corrected and accidents.

That is how I perceive time in relation to anything built in the physical world. It is a different perspective than most people, but it is objective and can be very revealing.

Seeing 10-15 men with modern tools and rented equipment take two (2) years to build a custom 8,000 square foot house makes me intrigued when I see 100-150 men take two (2) years to build a forty (40) floor office tower with a 30,000-60,000 square foot floorplate on every floor. Constantly observing no more than twelve (12) men excavating a 30,000-60,000 square foot floorplate seems odd to me as well. Many people incorrectly believe high-rise construction is performed by several hundreds or thousands of men.

House

8,000 square feet ÷ 15 men = 533.33 square feet per man

Tower

40 floors x 30,000 square feet = 1,200,000 square feet

1,200,000 ÷ 150 men = 8,000 square feet per man.

Fifteen (15) times more work being performed in the same amount of time is an interesting disparity given the fact that while many hands make for lighter work, many hands make for more confusion and errors in the process of work. Increased chance for errors is a major concern when building concrete hundreds of feet off the ground, or the foundational apparatus below ground to support such an endeavor. Small errors propagate into larger ones as every stage in construction progresses. So that is how my perspective and perception is different than most people, while maintaining objectivity.

Real-Time Extrapolation Used to Confirm Time to Perform Construction Work

Reliable perception forms a reliable perspective. Reliable perspective can bias perception, or what is perceived. New reliable perception and perspective can expand upon existing reliable perception and perspective.

I'll now show you a real-time example of how extrapolation can be used to assess logic and mathematical coherence.

In simpler terms, we're going to see how extrapolated calculations based on real-time observations can confirm what is known and what works, while simultaneously offering more illustrative and qualitative meaning.

When valid, yet different, perception and perspective can be agreed upon, avenues for new exploration can result.

The subject being examined herein is something most people notice, but may not give much thought to.

People are unaware of the complexity of their environment and the complexity with which it is comprised of very small parts that are too many in number to give thought to. The human brain can only process 30-50 bits of data per second, when in any given space some 11,000,000 bits of data are present. People can only perceive, think, decide and act so fast! Giving thought to things that aren't useful is, hence, distracting and normally avoided.

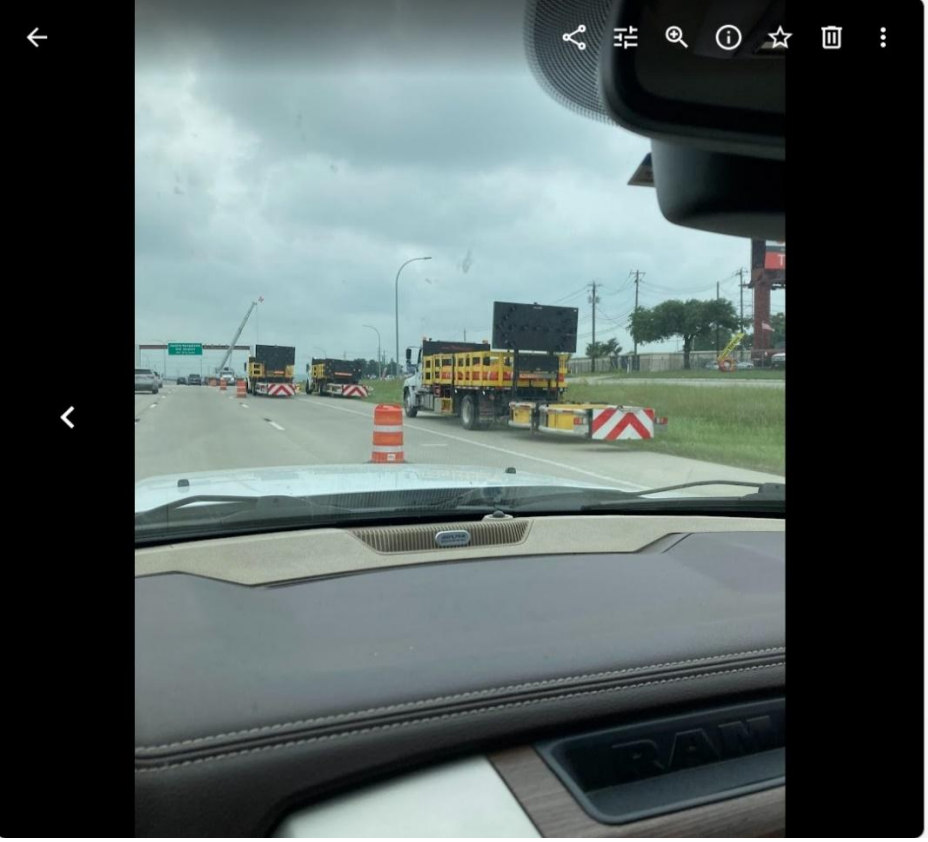
The subject relates to the oldest form of communication in the history of the human species: signs. The first form of agreeable language was pointing, looking and moving in a manner to indicate direction.

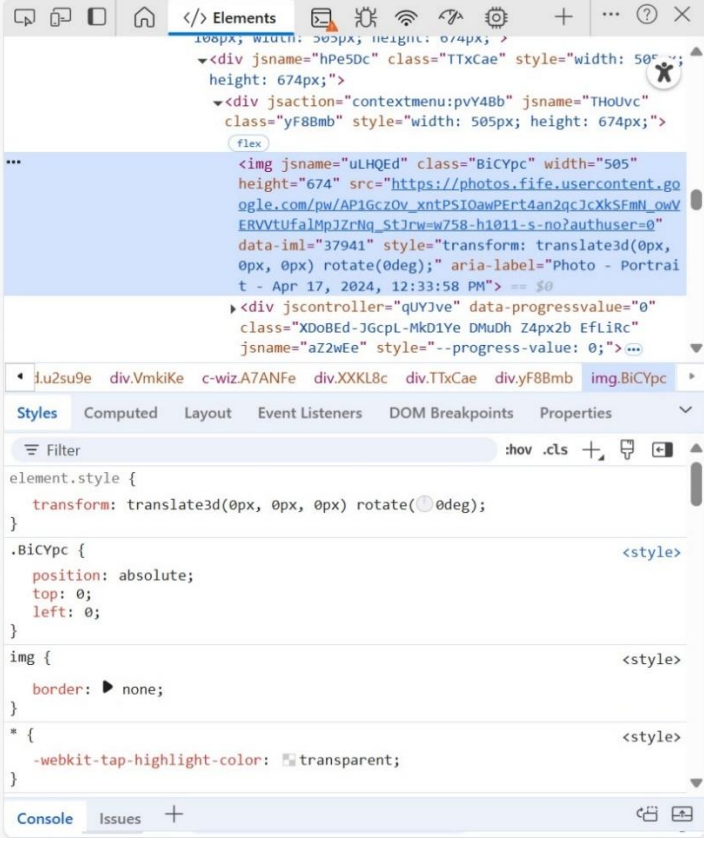
The signs ↑ ↓ ← → are the first concepts people understood and expressed with certainty. With that, let's commence some real-time extrapolation.

Real-Time Extrapolation Example 1: Sign Installation

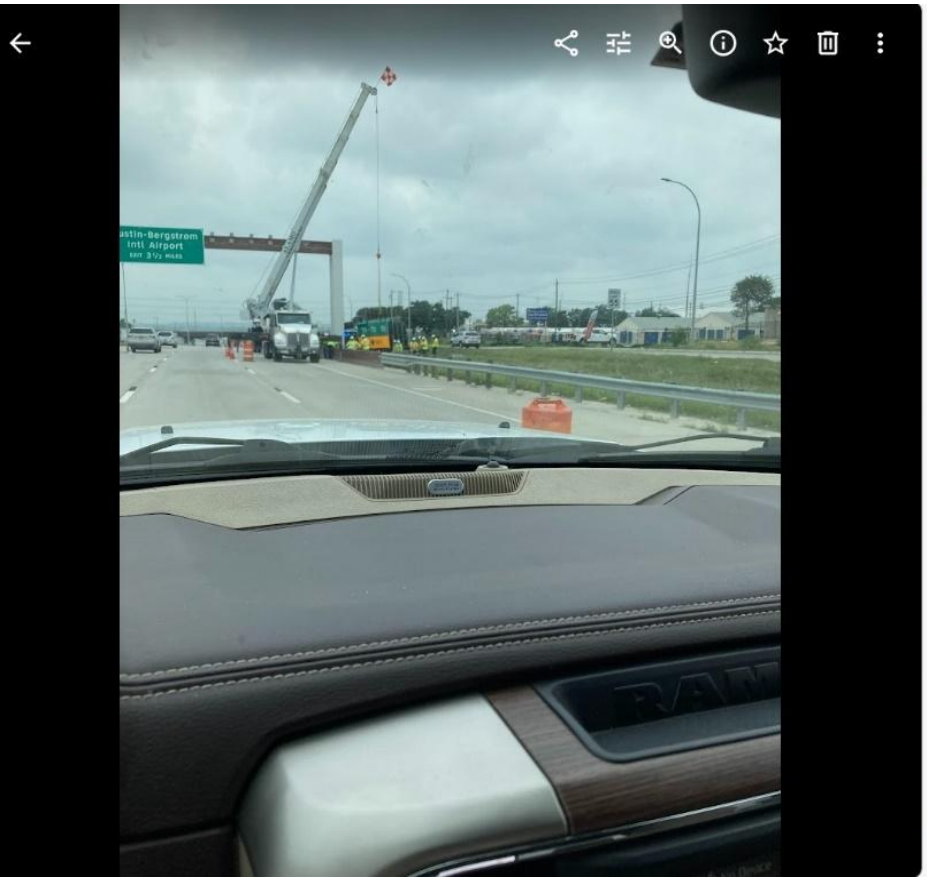
Driving down the South toll portion of 183 for work, on April 17, 2024, I noticed a crew installing four (4) panel signs.

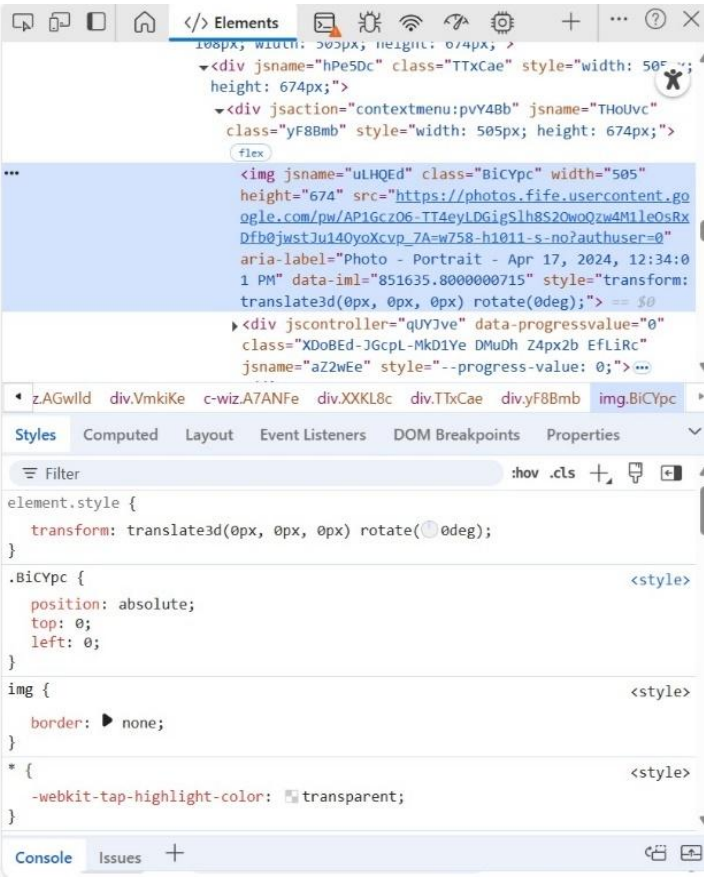
Ten (10) men and six (6) different kinds of trucks were needed.



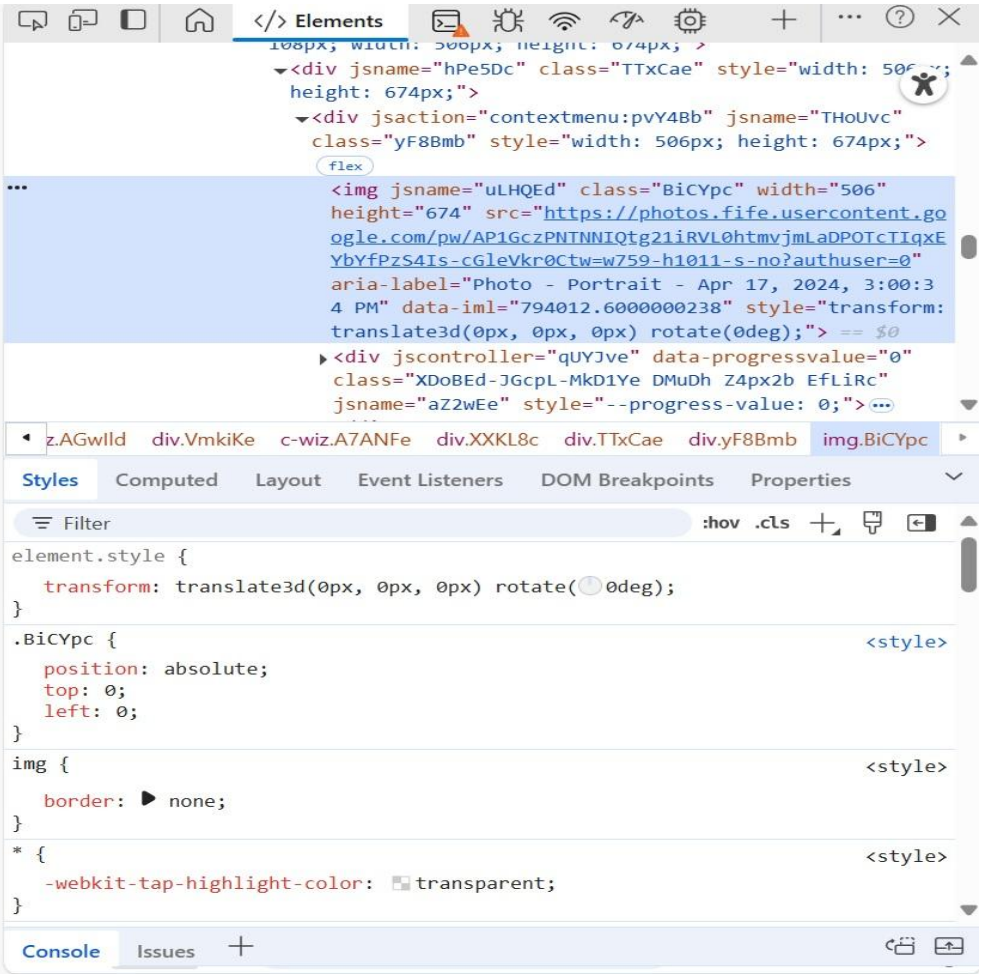


I snapped the first photograph @ 12:33:58PM and the second @ 12:34:01PM.

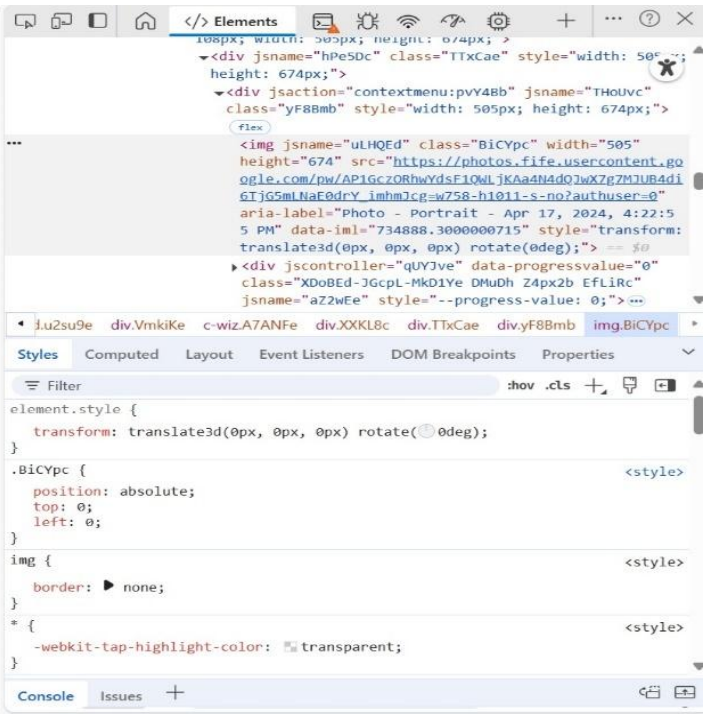




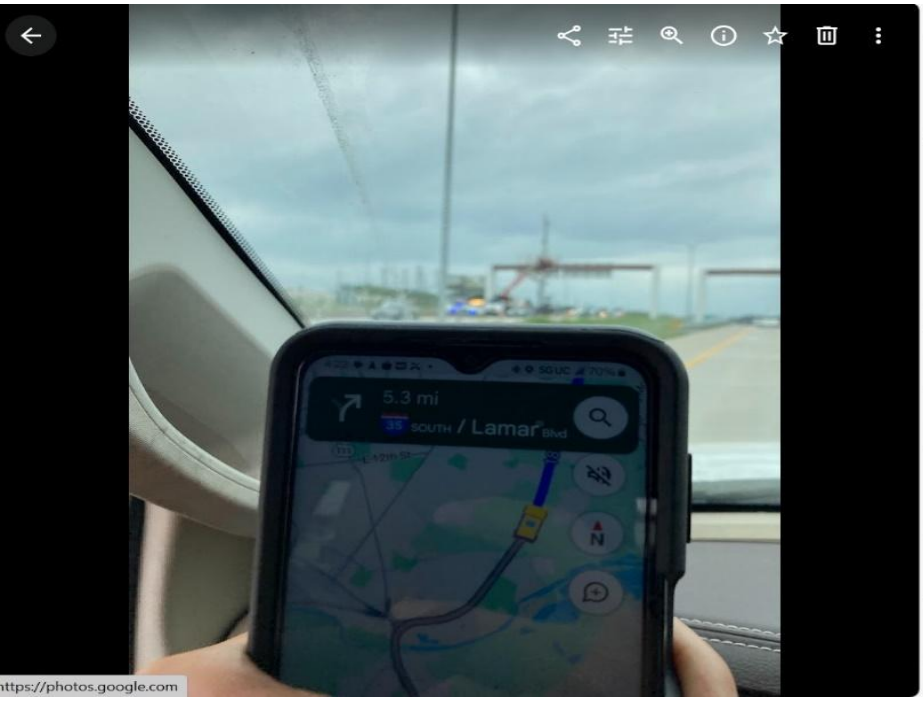
@ 3:00:34PM, I purchased an exceptionally delicious chocolate milkshake from Wendy's.



Heading North on the toll portion of the 183 @ 4:22:55PM, I notice the men are still hanging up signs.



@ 4:22:58PM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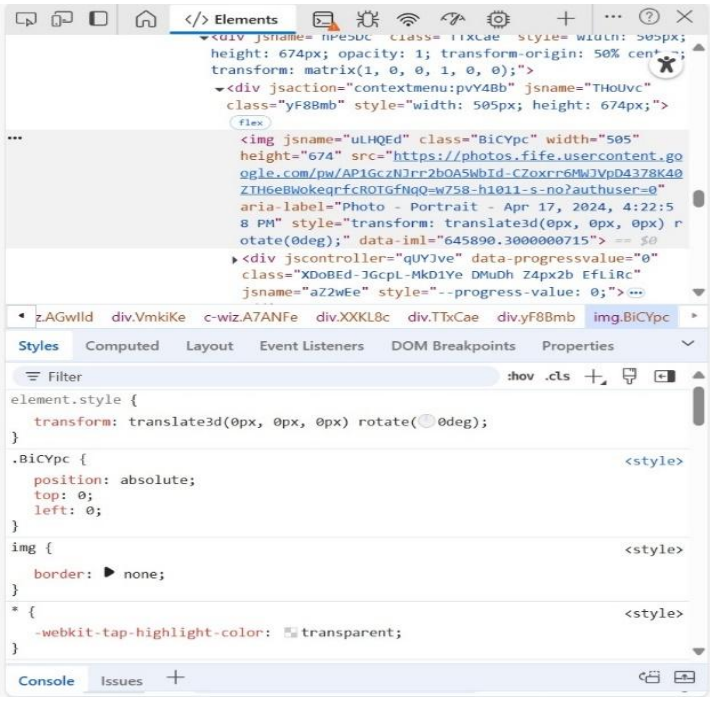
Elements
Styles
Computed
Layout
Event Listeners
DOM Breakpoints
Properties
Filter
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}
.BiCYpc {
position: absolute;
top: 0;
left: 0;
}
img {
border: none;
}
* {
-webkit-tap-highlight-color: transparent;
}
Console
Issues

ELLIOT JORGENSEN LCO
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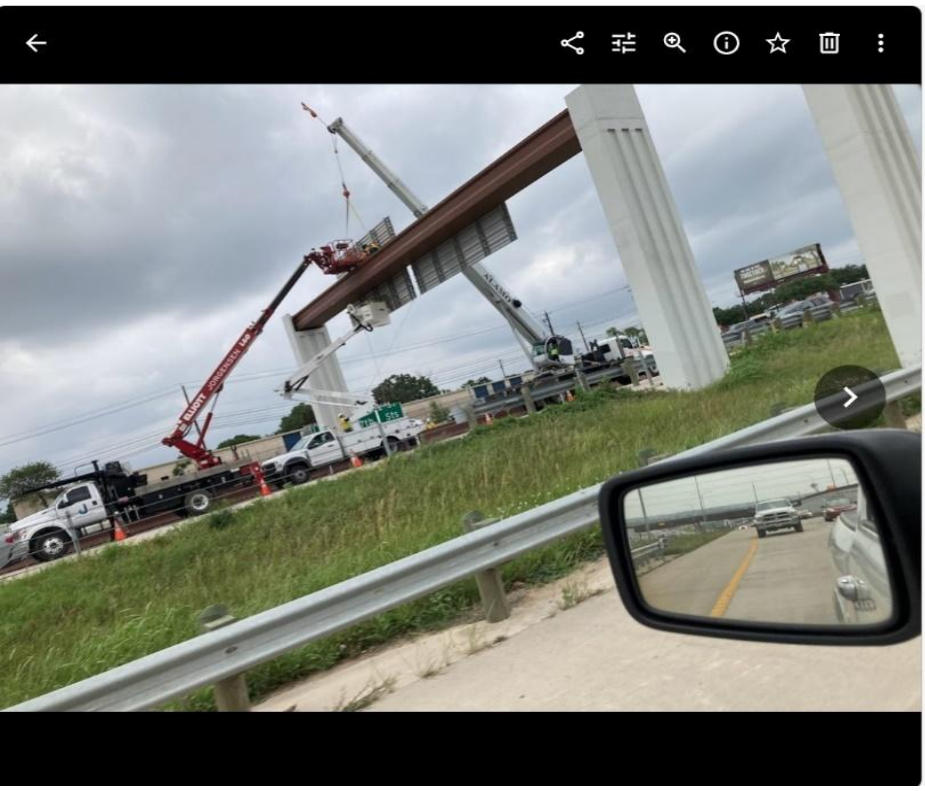
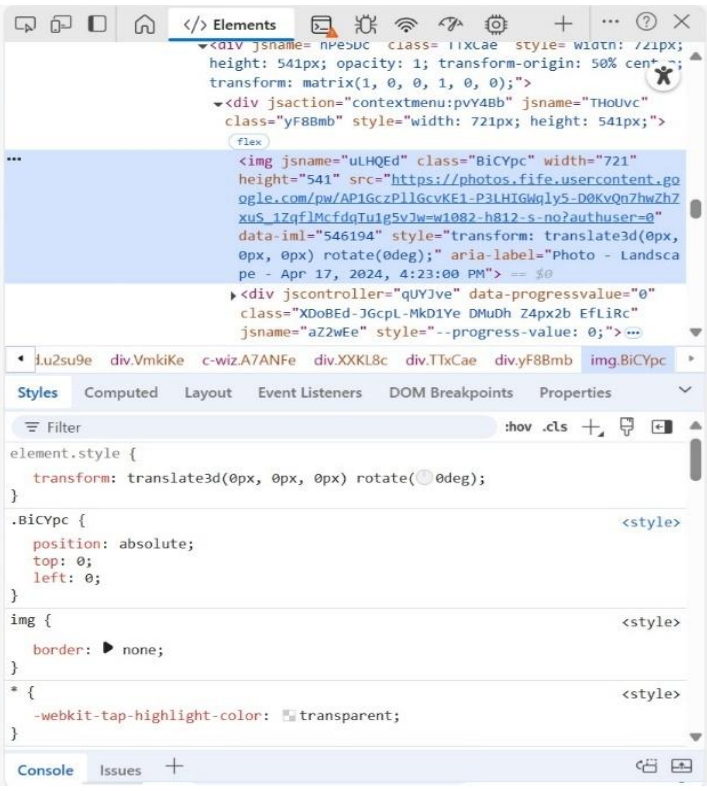
@ 4:23:00PM




Elements

flex
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c-wiz.A7ANFe
div.XXKL8c
div.TTxCae
div.yF8Bmb
img.BiCYpc
Styles
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top: 0;
left: 0;
}
img {
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}
* {
<style>
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}
Console
Issues

Same location confirmed by the blue garage doors and GPS @ 4:23:00PM as observed at @ 12:24:01PM when heading Southbound.

It's reasonable to presume that the men installing the signs dedicated their day to putting up the signs in this one (1) location.

Coordinating a crew consisting of two (2) mobile skyjacks, one (1) mobile crane and traffic calming vehicles for a 6-lane highway is not screwing in a light bulb. It's an awkward job with a lot of weight that has to be done very well to ensure the signs never fall off and kill people driving 75-90mph and to ensure any of the people driving during the installation of the signs don't kill the men doing the work.

The men on this job have to meet in the morning, ensure everybody can be on time if different trucks are starting from different points, ensure all materials and tools are stocked, ensure the location and signage correlate to specifications, and then head out to the job. While I'm quoting eight (8) hours of work here, this job may have run these men into overtime.

- ∴ It takes ten (10) men and technologically advanced equipment with hydraulic mechanics a day's work (8 hours) to install four (4) panels of highway signage.

- ∴ In one (1) year (50 weeks x 5 days = 250 days) ten (10) men can install 1,000 major highway signs (250 x 4 = 1,000). On newly built roads with quieter surroundings, it would only take 6 men to install signs as less would be needed to manage traffic and safety.

- ∴ In one hundred (100) years, a crew of ten (10) men can install, repair and change out 100,000 major highway signs (100 x 250 = 25,000 x 4 = 100,000).

- ∴ One hundred (100) men can install, repair and change out 100,000 major highway signs in ten (10) years.

While the numbers here are clean and coherent, this doesn't provide the bigger picture of the logistics entailed in determining the need and placement of signs, the copy (words) for the signs, devising the specifications for the manufacturing of the signs, the ordering of the signs, or the manufacturing/delivery of the signs.

Logistics requires a lot of time, particularly before the advent of software, and are prone to disruption and technical problems even when supported by software.

The deduction that one hundred (100) men can install, repair and change out 100,000 major highway signs in ten (10) years, isn't practical.

As will be shown in the next section: (Poor) Extrapolation Used to Estimate Time to Perform Construction Work, on page 29., what can complicate real-time extrapolation, or any other form of estimation, is the bias of presumption.

A rational person may regard the task of affixing traffic signs on a highway road as a binary task, not considering many other time-consuming variables that are only obvious after close analysis and which drastically alter the task at hand, i.e., affixing a traffic sign.

The variables in this instance are:

1. Constructing the column to hold the sign.
2. Installing the mounting bracket.

A column in the middle of the highway used to affix signs to, and with, is a major piece of construction in that it requires:

- Steel rebar being assembled and held in place by forms.
- The use of a crane to place the rebar and forms in place.
- Concrete being poured into the forms.
- Once the concrete has dried a crane is needed to remove the forms.
- The process is repeated again to complete the custom angled shape on the top of the column that a mounting bracket is attached to.

Steps 1-8 on pages 27. and 28. show the process.

1.

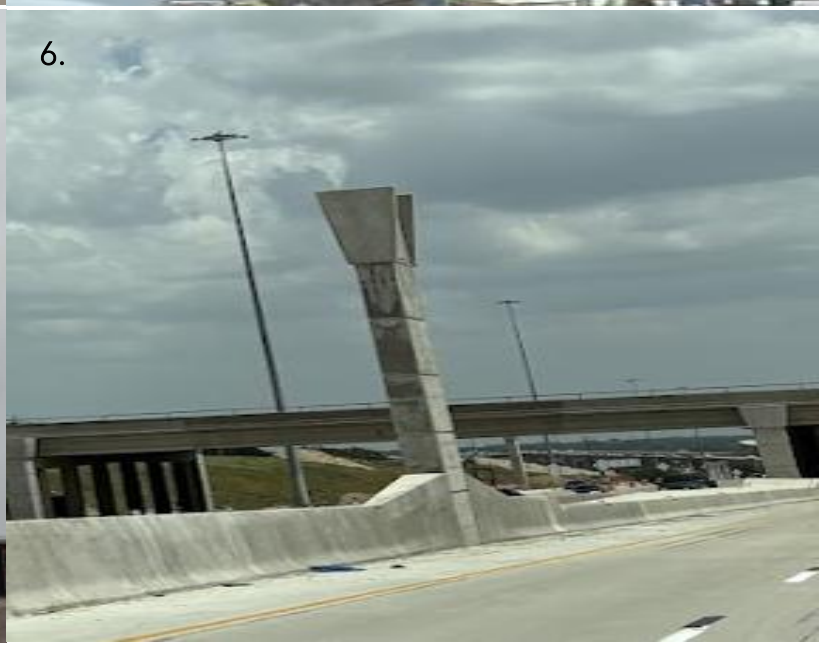
2.

3.

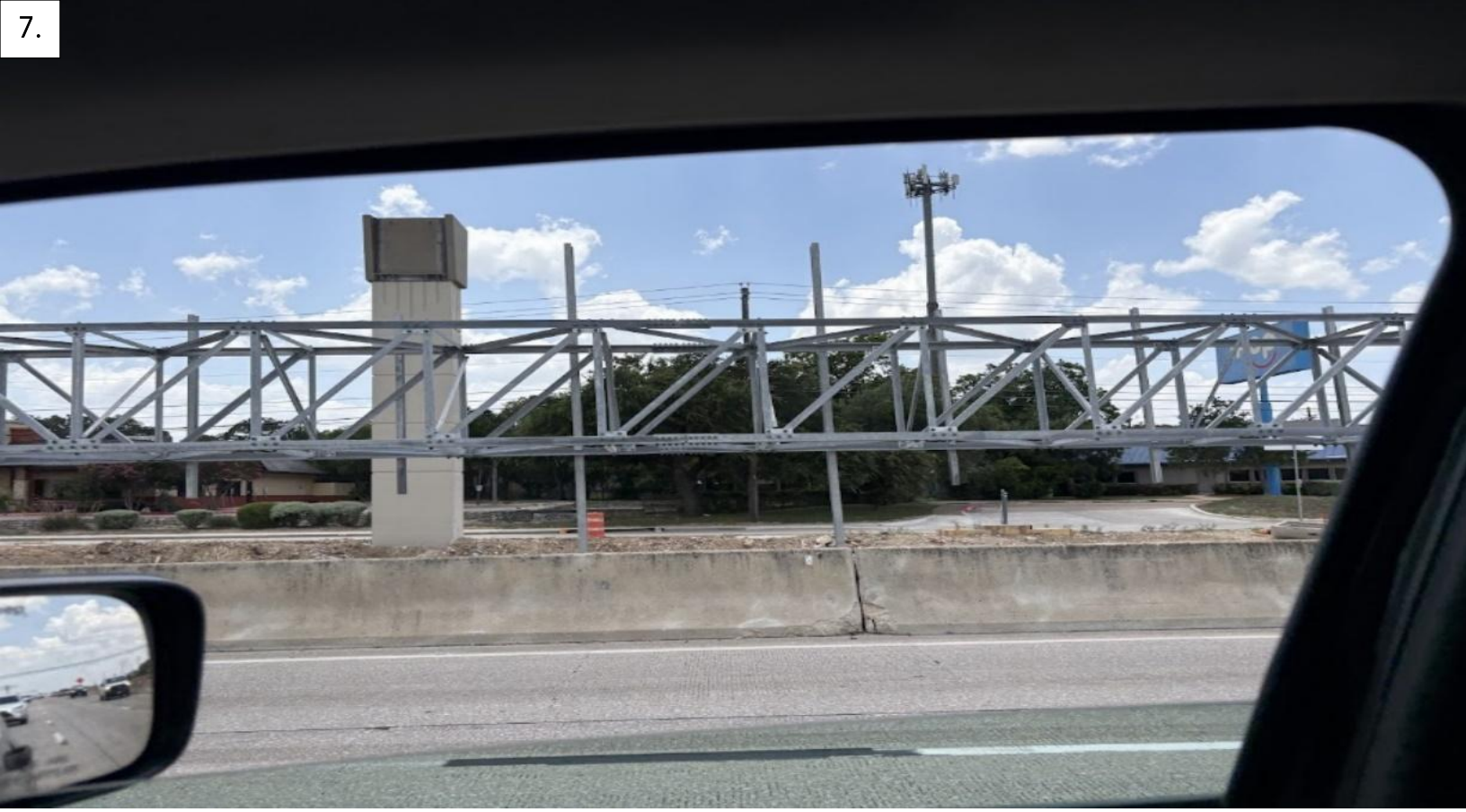
4.

5.

6.



7.



Photographed above, we see a mounting bracket waiting to be affied to a column. Affixing the mounting bracket to a column, as shown below, may require more time than affixing a sign to the mounting bracket. What this process shows is that there is much more logistics and time that goes into affixing a highway sign than a person might think by using conventional methods of estimation.

8.

(Poor) Extrapolation Used to Estimate Time to Perform Construction Work

Now let's expand to look at how many signs may exist in the U.S.A. to estimate how much work would go into putting up signs everywhere. The U.S.A. has over 4,000,000 miles of roads with nearly 3,000,000 of them paved.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Table 1-4: Public Road and Street Mileage in the United States by Type of Surface[a] (thousands of miles)												
2		1960	1965	1970	1975	1980	1985	1990	1991	1992	1993	1994	1995
3	TOTAL paved and unpaved	3,546	3,690	3,730	3,838	3,860	3,864	3,867	3,884	3,901	3,905	3,907	3,912
4	Paved[b], total	1,230	1,455	1,658	1,855	2,073	2,114	2,255	2,280	2,303	2,278	2,342	2,378
5	Low and intermediate type[c]	672	758	897	967	1,041	1,015	1,025	1,030	1,026	1,010	1,043	1,062
6	High-type[c]	558	696	762	888	1,032	1,099	1,230	1,250	1,277	1,268	1,299	1,316
7	Unpaved[d], total	2,315	2,235	2,072	1,983	1,787	1,750	1,612	1,604	1,598	1,628	1,564	1,534

In 1960, the U.S.A. had 3,546,000 miles of road – with only 1,230,000 of them paved.

	A	AK	AL
1	Table 1-4: Public Road a		
2		2019	2020
3	TOTAL paved and unpaved	4,125	4,161
4	Paved[b], total	2,906	2,844
5	Low and intermediate type[c]	N	N
6	High-type[c]	N	N
7	Unpaved[d], total	1,219	1,317

As of four (4) years ago there are well over 4,000,000 miles of road in the U.S.A. – with 2,844,000 of them paved. As the modern U.S.A. was, more or less, constructed by 1980, let's stick with the U.S.A. having 2,000,000 miles of paved roads for this next extrapolation.

	A	B	C	D	E	F
1	Table 1-4: Public Road and Street Mileage in the United State					
2		1960	1965	1970	1975	1980
3	TOTAL paved and unpaved	3,546	3,690	3,730	3,838	3,860
4	Paved[b], total	1,230	1,455	1,658	1,855	2,073

Let's presume that for every mile of paved road in the U.S.A. there are **100 signs per 1 mile** of paved road, **within 200 yards of the paved road**, to facilitate navigation and instruction in the U.S.A. What constitutes a sign? Anything that requires a man, or two (2), to get out of a truck, dig/drill a hole in the ground, put a pole in the hole or screws to affix the pole to, then fill the hole(s) with cement and affix a sign to the pole. Any sign like these:

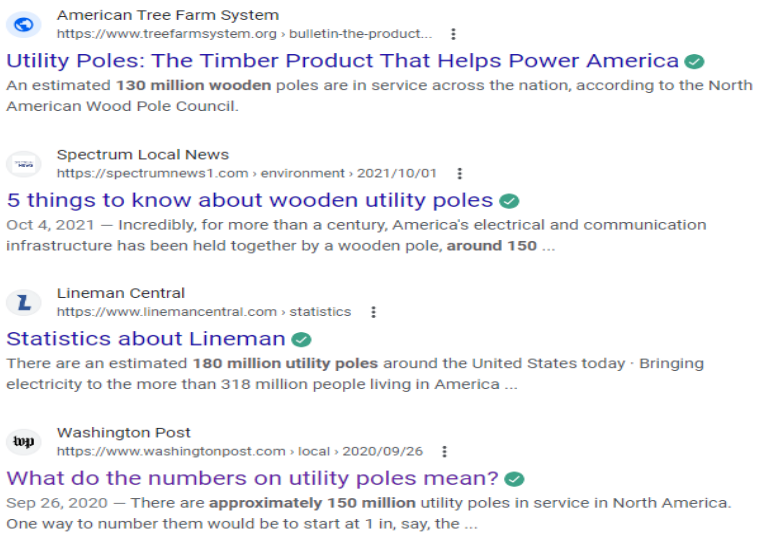
Not included is signage affixed to buildings which takes skyjacks and a lot of time to install, especially if electric hookups are required, or any pole used to mount power lines or street/road lights. However, many signs require heavy post/column foundations and will be included in the 100 signs per 1 paved mile formula.

When you understand that things like a stop sign or handicap parking spot sign require drilling and concrete and that anything that stands upright in modernity requires the foundational support that concrete provides, you can come to understand that 100 signs for every mile of paved road in the U.S.A. is a conservative estimate.

Formula and Answer

2,000,000 paved miles of road x 100 signs = 200,000,000 signs in the U.S.A.

200,000,000 signs in the U.S.A. is a very safe estimate as there are an estimated 130,000,000-180,000,000 hydro poles in the U.S.A.



Where there are hydro poles there are people around with all sorts of signs. Signs are frequently placed near hydro poles. 200,000,000 signs it is.

To be ultra conservative, let's calculate that to install one (1) sign requires just one (1) man and just one (1) hour of labor. This time and manpower will account for travel, bathroom breaks, breathers and smoke breaks, lunch and bad weather.

200,000,000 x 1 hour = 200,000,000 hours.

200,000,000 hours ÷ 1 man = 200,000,000 manhours

200,000,000 hours ÷ 8-hour workdays = 25,000,0000 workdays

25,000,000 workdays ÷ 250 workdays in a year = 100,000 years of work that can be performed by 100,000 men in 1 year or 20,000 men in 5 years.

Conclusion

That is an example of how numbers can arrive at logical estimations and explanations, i.e., stated timeframes for construction with seeming coherence. However, the problem with calculations and estimations is that they frequently fail to factor in logistics and the innumerable variables that can disrupt expected outcomes.

What this method of extrapolation here can't account for is:

- How many people work in the sign installing industry?
- How many companies manufacture signs?
- How many sign installing companies are there?
- How many people in government and the private sector actually plan and install signs?
- The time it takes for someone to decide on if and where a sign is needed.
- The time it takes to design the sign.
- The time it takes to pay for and accept payment for the manufacturing and installation of the sign.
- The time it takes to manufacture the sign, screws, bolts and concrete.
- The time it takes to get a permit.
- The time it takes to organize the installation, perform the installation and have it approved.
- The fact that many signs require much more than an hour to install and that installing eight (8) signs in a day within eight (8) hours is not necessarily realistic.

In many ways, perceiving the world through an abstract extrapolative perspective can lead to the formation of faulty perception and perspective. Being aware of as much, and always scrutinizing projections without bias, can prevent such errors.

Conversely, an abstract extrapolative perspective can reveal unforeseen problems and opportunities. Abstract extrapolation can provide useful insights in the fields of economics, logistics, sociology and educational methodology.

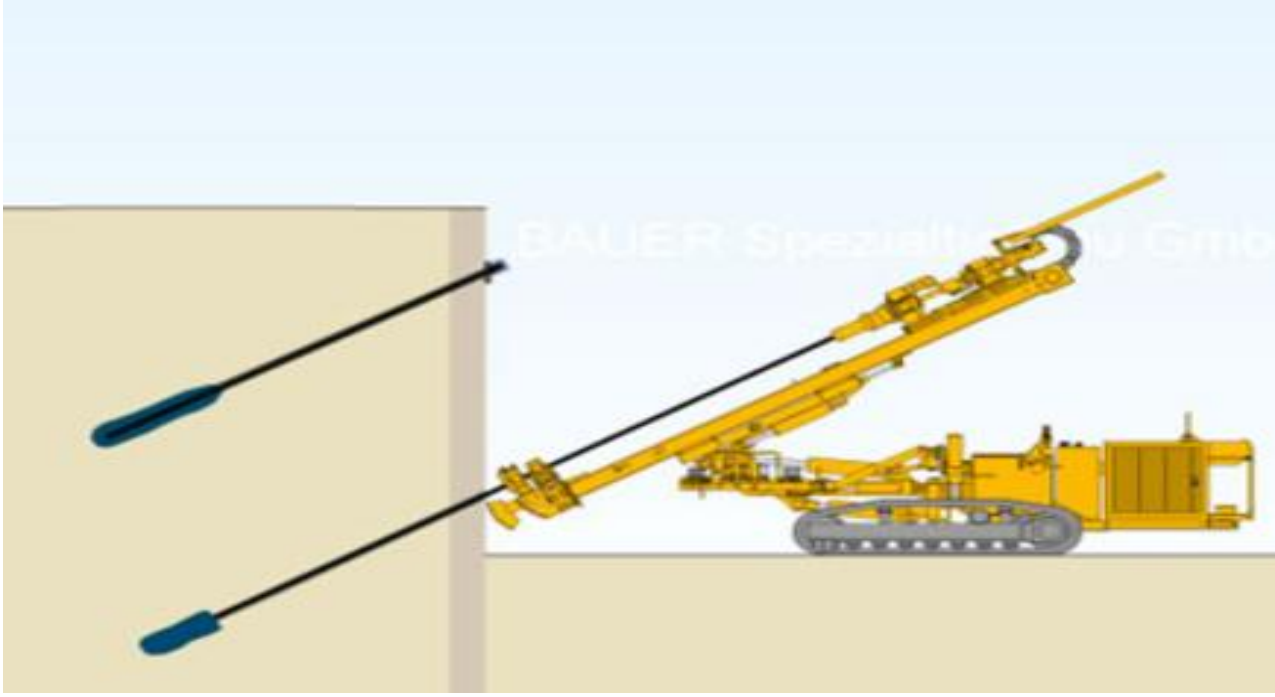
This is why the best data needs to be sourced in real-time experience, i.e., direct observation.

(Good) Extrapolation Used to Estimate Time to Perform Construction Work

Large signs require drilling machines commonly referred to as shoring drills or spikes, to dig through hard material. Most commercial grade structures require shoring drills, pictured above, to establish the foundational load bearing support a column provides. Once assembled, a shoring drill bores a hole as required by engineering and survey specifications.

In condominium and office tower construction, the drill bores holes around the perimeter of the proposed building and then inserts steel beams into the hole where it rests on bedrock. The function of a column in heavy structures is to transfer the weight of a building through support columns down to bedrock. With the beams in place, excavators can commence the process of removing earth and aggregate to reach bedrock.

As excavation proceeds, the shore wall gets additional support with ground anchors.



Source:

Securing of an excavation pit with temporary ground anchors - 3 min - YouTube

Illustration and actual image of modern ground anchor drill, above.

Sun movement in this video which screenshots were taken from for this document, indicates a single anchor can take hours of work. Above is the start of the film where crews and machines are in place, organized and have commenced drilling. Sunlight is approximately twenty (20) feet from the shore wall.

Below, the sun is approximately five (5) feet from the shore wall and the anchor tendons have just begun to be inserted into the drilled hole. The tendons need to be filled with concrete and cut down to provide retaining support, i.e., prevent collapse and cave-in.

- As the sun moves at approximately one (1) foot per 10-15 minutes before peaking on the horizon, approximately one hundred and fifty (150) minutes (2.5 hours) elapsed after drilling on this anchor commenced up to the point of inserting anchor tendons (pictured below) into the bored hole (15 feet of sun movement x 10 minutes per foot = 150 minutes ÷ 60 minutes = 2.5 hours).

- After the sun moved to within five (5) feet of the shore wall, the process of securing the anchor tendons begins and includes pumping concrete around them and waiting until it dries. Upon drying, the process of capping off the tendons can be completed.

The process of capping off anchor tendons requires intricate piecing and welding that can't be rushed.

Installing ground anchors into shore walls, depending on the floorplate of a condominium or office tower, needs to be done hundreds (100's) to over one thousand (1,000) times and is a primary factor in determining the progress of an excavation.

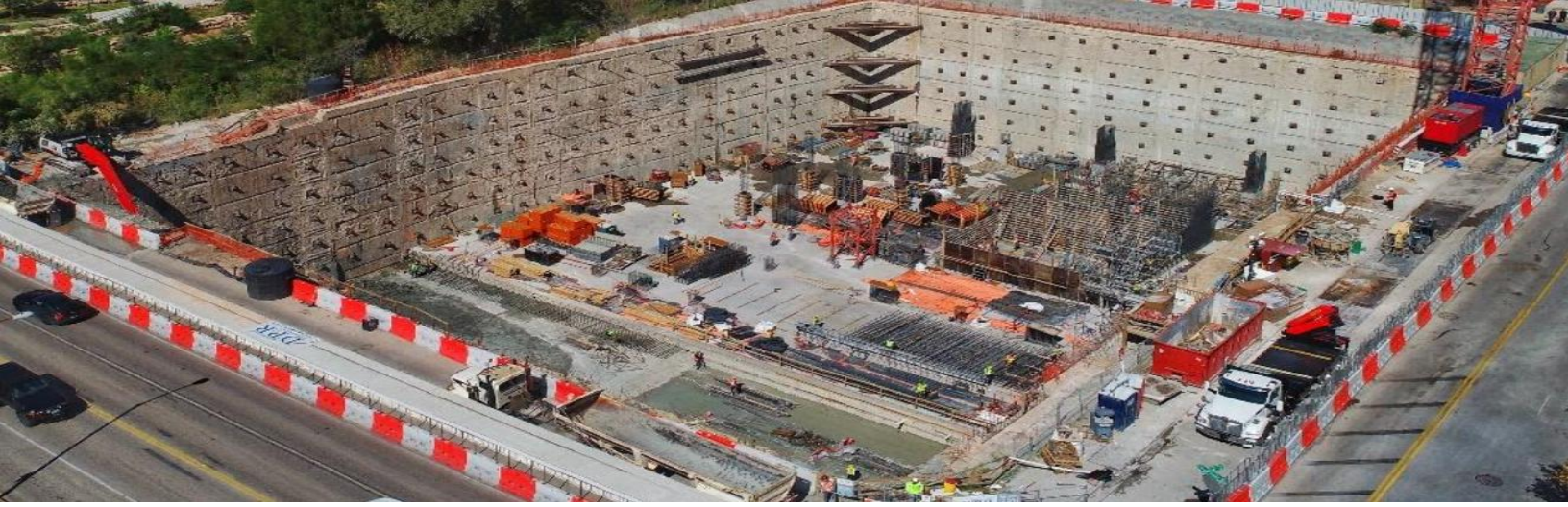
The men who perform this work can be considered to be champions.

Based on an example of a ground anchor drill installing one (1) ground anchor in optimal conditions, in a YouTube video, it is sound that a conservative estimate of approximately 2.5 hours is needed for a drill to be positioned and complete the task of creating the hole required to position and secure tendons with. It is a conservative estimate that an additional one (1) hour is needed to finish capping off the ground anchor, and this includes cement drying.

- ∴ 2.5 hours + 1 hour = 3.5 hours to complete one (1) ground anchor.

Four (4) or five (5) hours wouldn't be out of the question, but we're being conservative here and calculating on the premise that crews are experienced, machines are properly serviced, and the site is well supplied.

A crew of two (2) ground anchor drills could complete two (2) ground anchors every 3.5 hours. Even if drilling was faster than 2.5 hours on account of softer ground conditions, 3.5 hours is the estimated time required to complete a fully formed ground anchor in condominium and office tower construction.



Above is a fifty thousand (50,000+) square foot site with no less than five hundred and forty (540) ground anchors in place; this estimate is based on the assumption that the wall faces not in view required ground anchors.

540 x 3.5 = 1,890 hours

1,890 hours ÷ 8-hour workdays = 236.25 days

236.25 workdays ÷ by six (6) workdays in a construction week = 39.38 weeks.

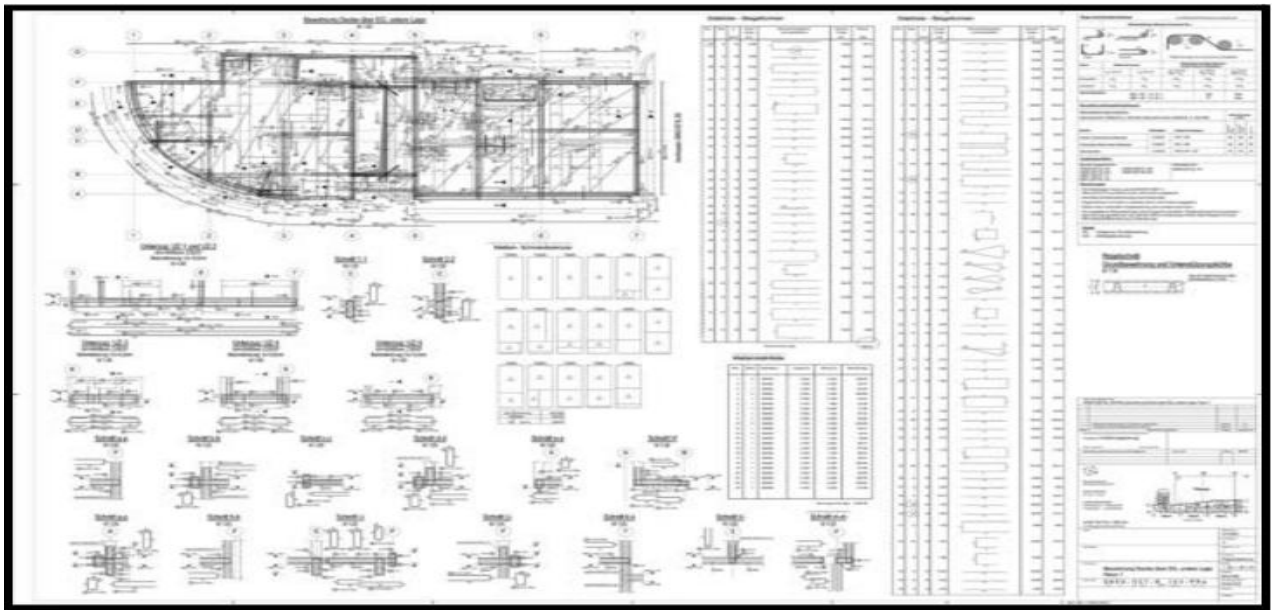
A two (2) machine crew could cut the time down 19.69 weeks, or call it, five (5) months. A four (4) machine crew could perform this work in 2.5 months. Given this site's proximity to Shoal Creek, it needed diaphragm walls which likely required more time to construct. Impressively, this site broke ground in early January of 2019 and the 35-floor tower, with 3-floors of below grade parking, was above grade by Spring of 2020 and capped off by the end of July of 2021.

What this calculation, and the task of constructing ground anchors, doesn't account for is all of the work needed to be performed prior to, and during, ground anchors being drilled. Beam hole drilling and insertion, digging, aggregate removal, plank installation, rebar forming, concrete pouring, angle and lateral support beam installation, and connection points for drainage/sewers/hydro and natural gas (if required by design) all require a lot of time and can encounter several delays causing setbacks. This work obviously slows the pace of ground anchor construction. If that weren't enough, heavy rainfall and/or snowfall can delay matters. Heavy machinery gets bogged down in moist earth and aggregate and can create unstable mud that needs to dry, i.e., cause delays. Direct observation, continually monitored and uninterrupted, is required to arrive at any definitive timeframes/calculations.

Real-Time Extrapolation Anomaly Detection in Highway Ramp & Skyscraper Construction

A good example of there not being enough time to construct modern structures in the generally stated and given timeframes, is by extrapolating the time it takes construction cranes to perform tasks. While we must accept that a floor of a condominium or office tower can be erected in two (2) six (6) day work weeks, or just twelve (12) working days, or just 96 hours of consistent work (8 hours x 12 days = 96 hours), it takes a crane 10-40 minutes to raise and return a porta-potty. This is in addition to performing tasks like lifting rebar, concrete, tools and everything a jobsite requires, while not destroying curtain walls or objects and life below.

Men with little-to-no education and/or poor language skills (though who frequently possess remarkable adaptive intelligence) working with plans like this:



… is anomalous, with all due respect. A plan like the one (1) above requires far more knowledge and skill than the craftsmanship required to tack up drywall, fences or a backyard deck. Executing a plan like the one (1) above entails extremely careful calculation, planning, preparation and highly coordinated crane maneuvering to accommodate moving a myriad of parts while frequently holding them in position to accommodate hand assembly. Simple oversights with plans like the one (1) above can lead to disastrous errors propagating throughout a building as floors rise in sequence.

These screenshots show a crane helping workers assemble rebar. An entire crane is dedicated to adjusting a piece of material, that amounts to a drop in the bucket, for over (10) minutes. The workers needed the crane for over twenty (20) minutes.

When I directly observed construction sites for long periods of time, several intervals in a day, virtually little progress takes place. To the best of my knowledge, it is potentially a real-time example of how the observer can affect the observed. A more practical example of the observer affecting the observed, unrelated to physics (physics being a field of expertise for which I have no comprehension of), is when a boss watches workers on the job; the workers perform differently (usually more diligently) under direct supervision.

Highway ramp construction is very similar to skyscraper (modern condominium and office tower) construction with respect to the process of column building.

Both highway and skyscraper construction:

1. Require shoring drills to establish foundations.

2. Require tying steel rebar together to make the skeletal structure of the column.

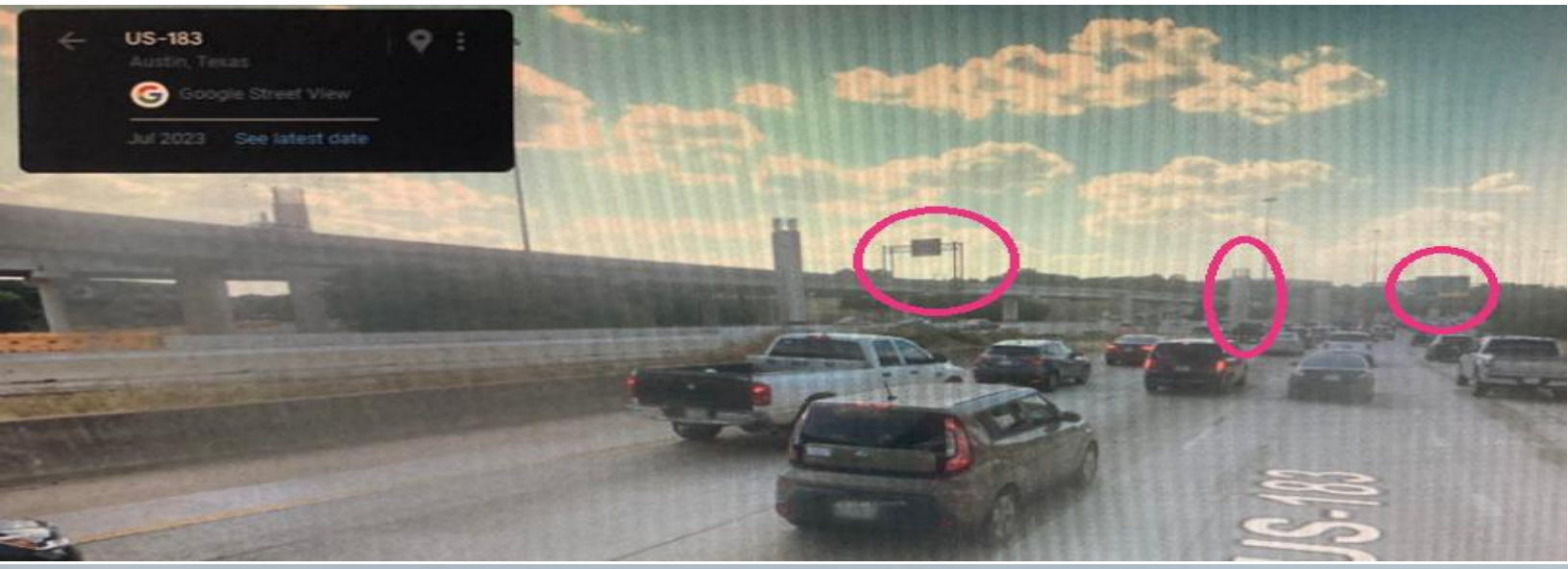
3. Require heavy forms (or molds) placed around the rebar to allow concrete to be poured around the rebar to form the column.

4. Require columns to transfer the weight of anything resting on the column, down to the foundational support of bedrock.

In the following section on page 48., we will observe what most people can observe directly every day, but don't because they need to direct and focus their senses on the more important task at hand, i.e., driving an automobile on a highway.

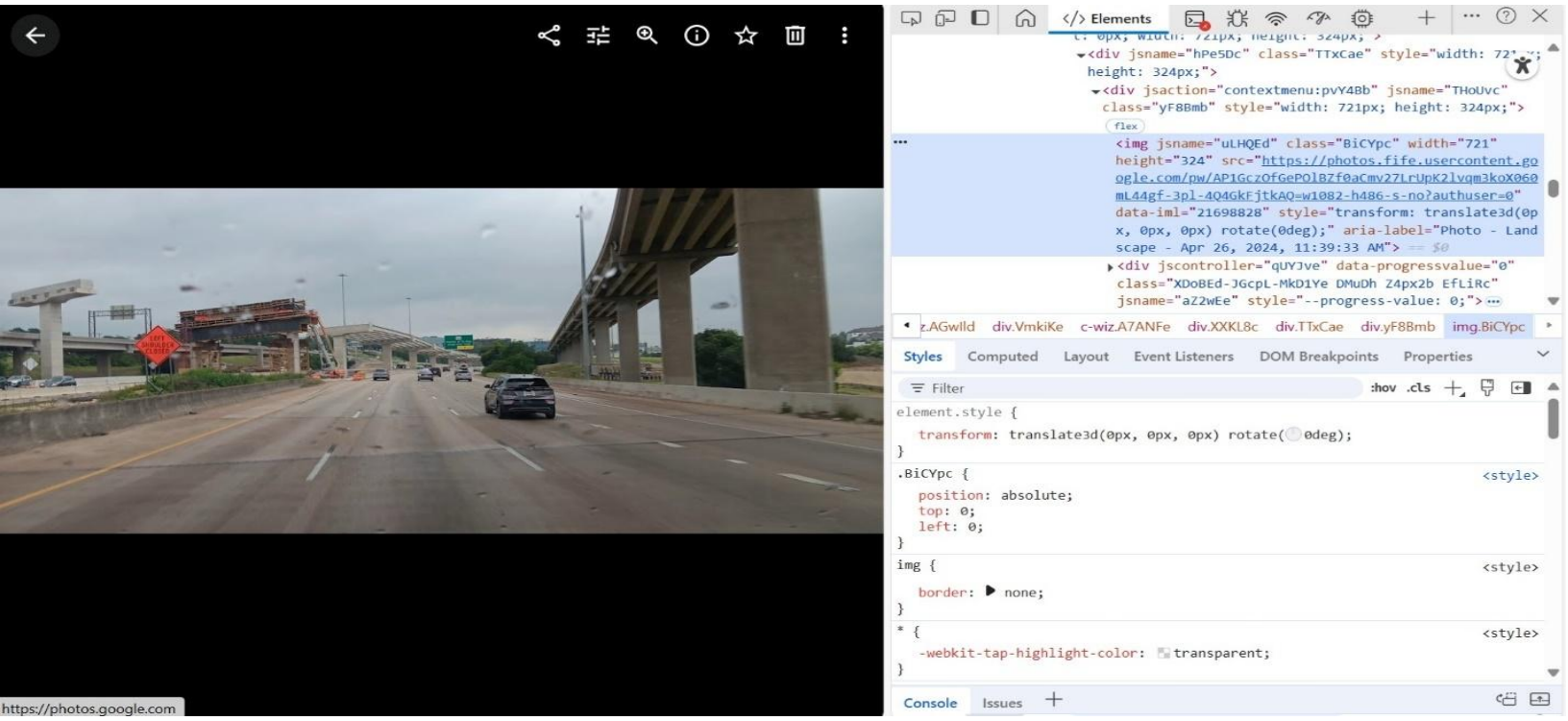
Highway Ramp Construction Anomalies

Below is an example of the years it takes to build a simple additional highway ramp here in Austin, Texas, connecting the 183 to the Mopac. The first image is a screenshot taken from Google Maps and the remainder in this document are from my personal phone.

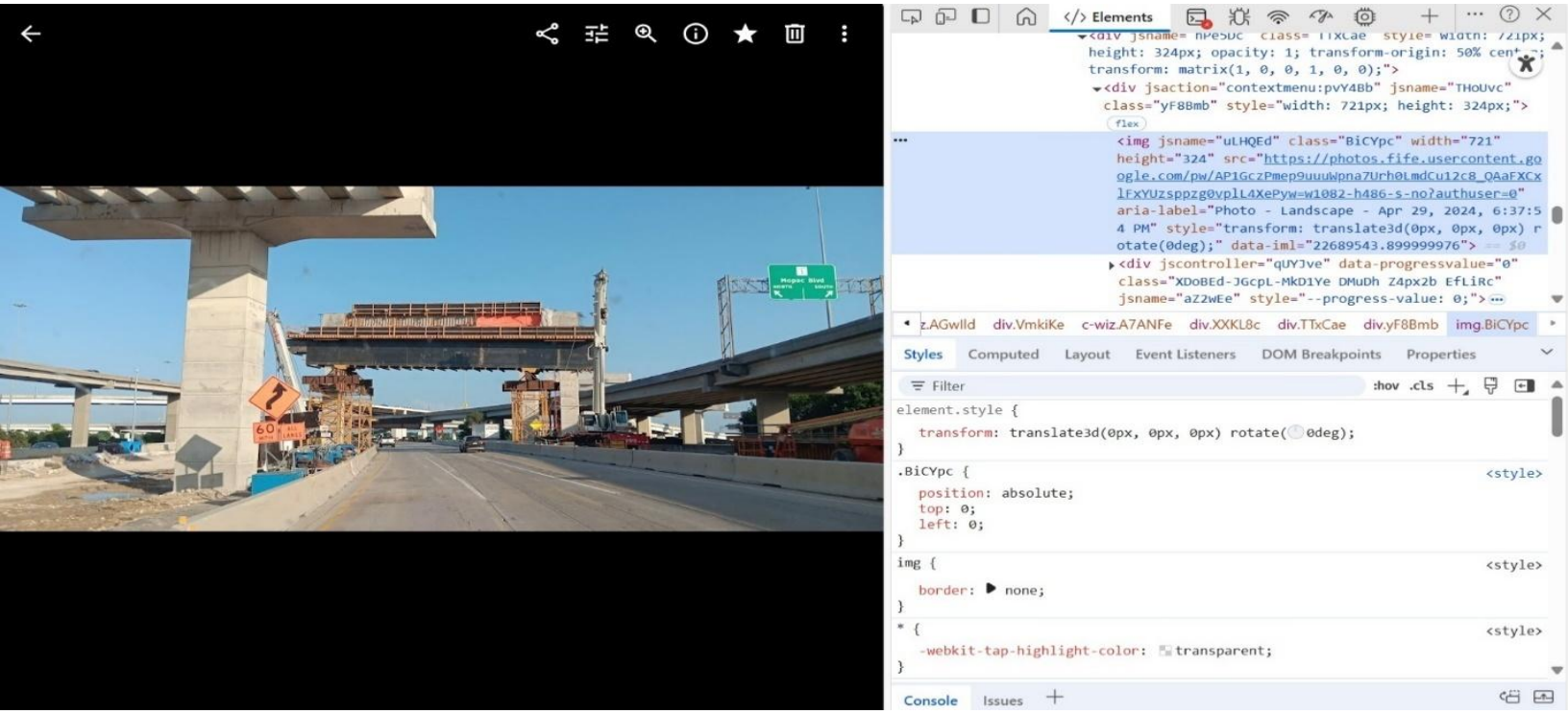


The photograph above, taken on April 26, 2024 @ 11:39:22AM, reveals the relatively small amount of progress performed on a highway ramp that was well underway by the start of July 2023. In approximately ten (10) months of work, the ramp has six (6) connected columns and isn't close to finished, much less capable of being paved.

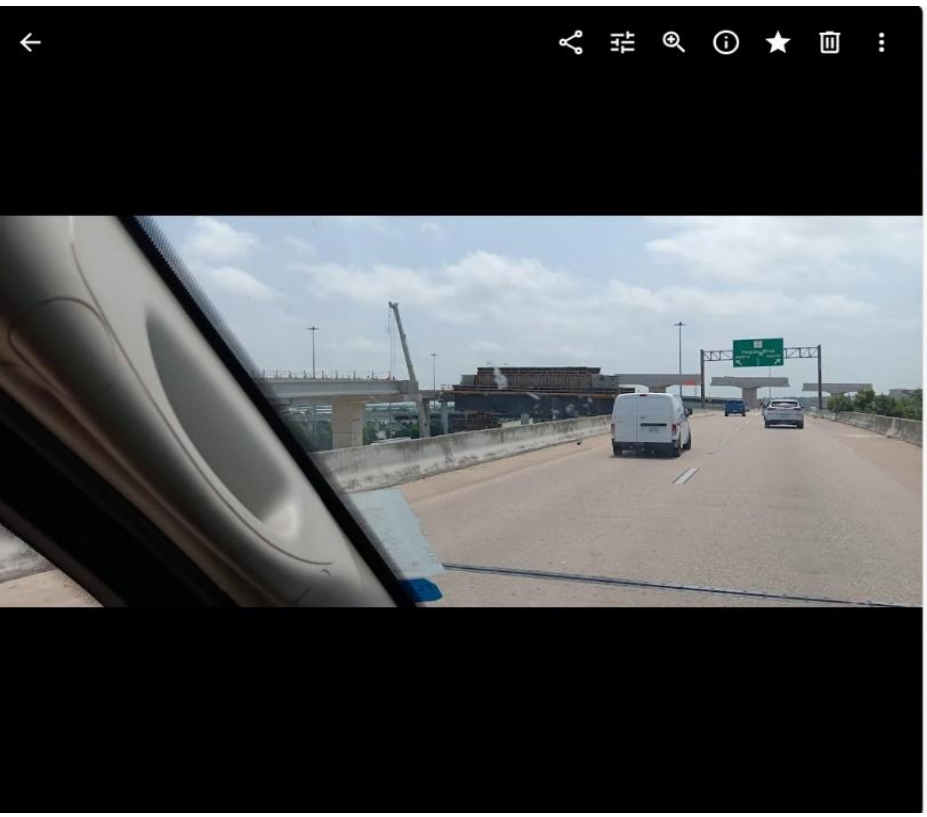
Pictured above again on April 26, 2024 @ 11:39:33AM, the new ramp being built on the 183 connecting to the Mopac **(travelling Northbound on 183).** It is important to note that the work currently being performed here is on a double-column needed to have the new ramp traverse a full 3-lanes of highway below it. The work being performed is for the cross section being added to the two (2) columns. This is very similar work to skyscraper construction. Page 53. shows how work is still being performed here twelve (12) days later on May 8, 2024; this could show inconsistencies with concrete drying times.

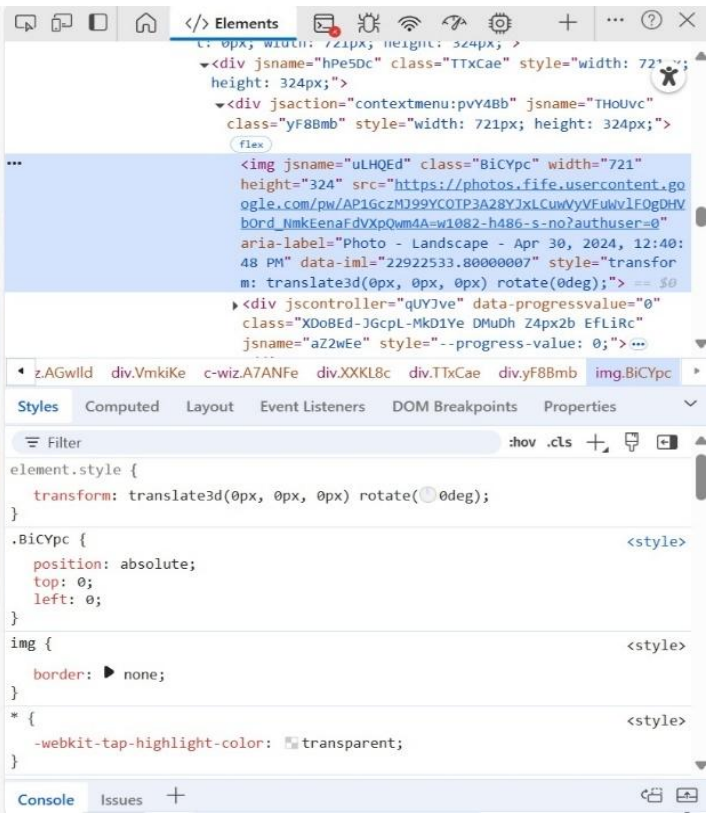


April 29, 2024 @ 6:37:54PM **(traveling Southbound on 183)**. Construction on roadways is always regarded as slow and constant, but it is incoherent that tall and intricate structures like a skyscraper, with varying floorplan designs, can be built at a rate of two (2) floors (or 50,000+ square footplates x 2) per month, while highway ramps require 2-4 years for construction. How an international highway system was formed from the 1950's onwards is anomalous in this light; there is demonstrable lack of time to perform work.

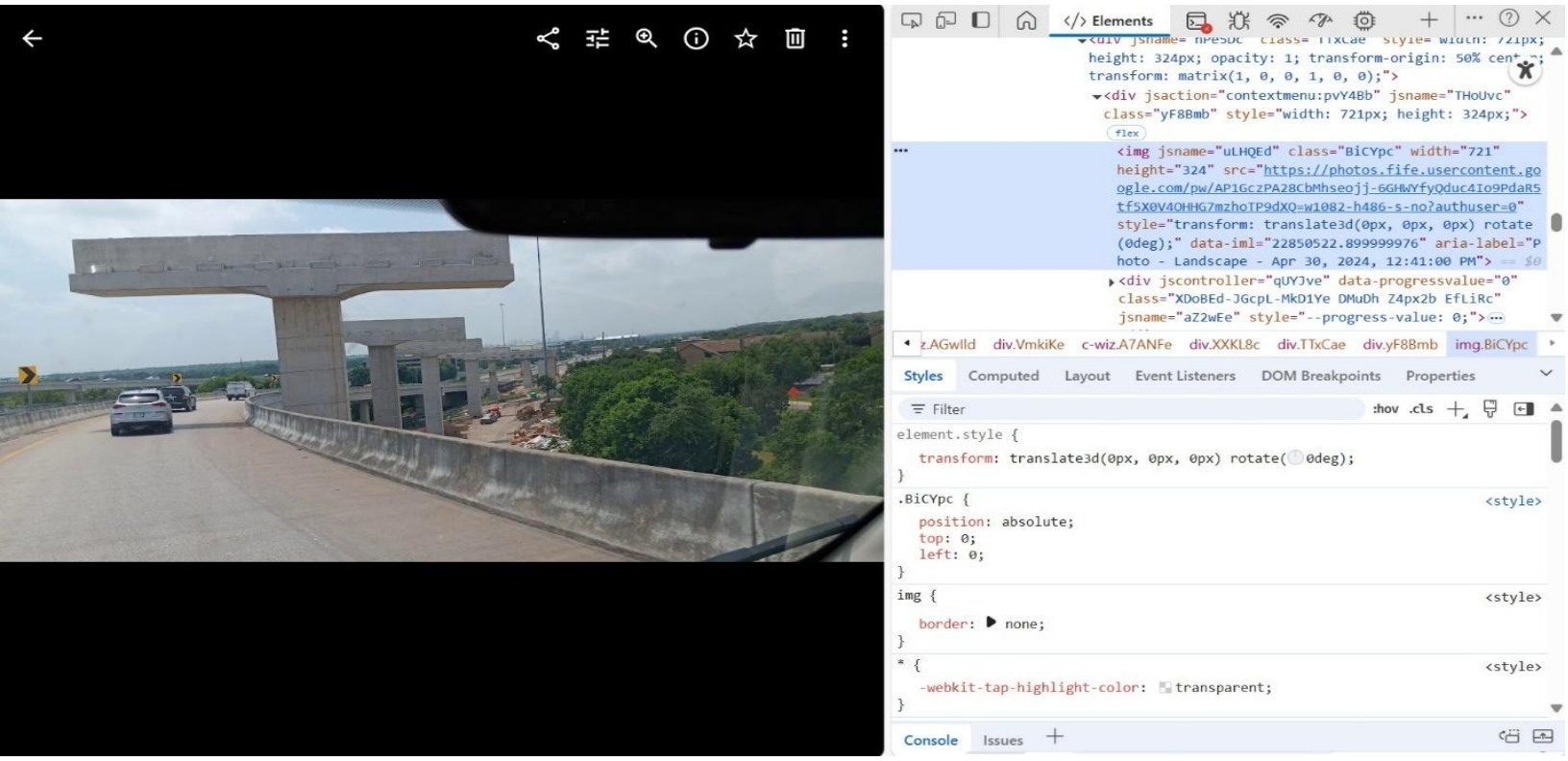


Aril 30, 2024 @ 12:40:48PM (traveling on current 183 offramp towards Mopac exits).

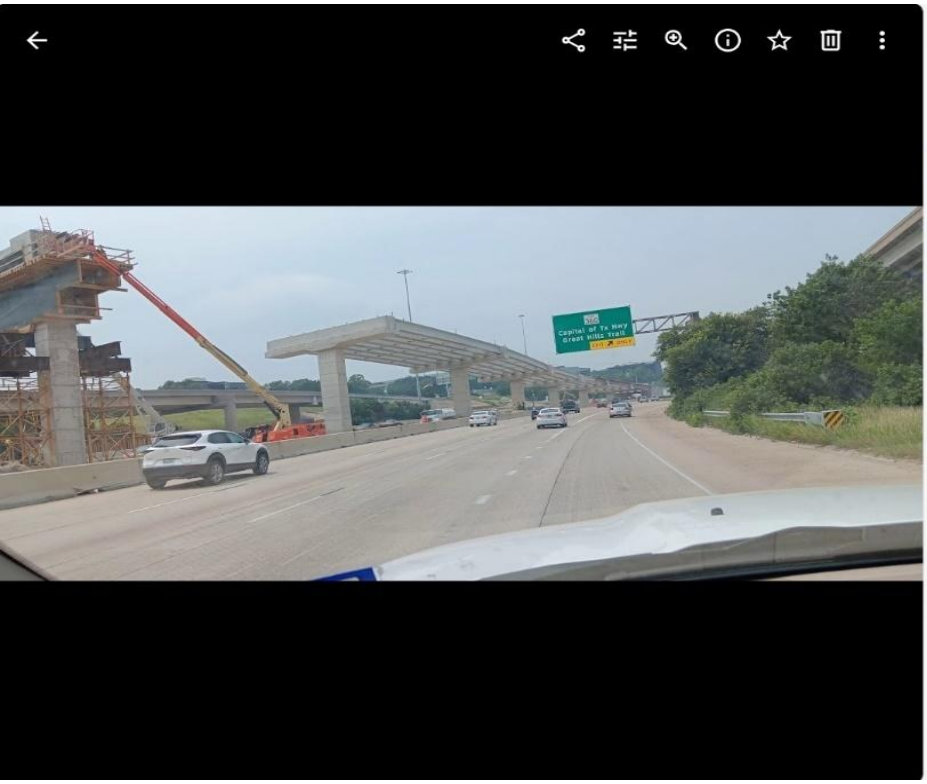


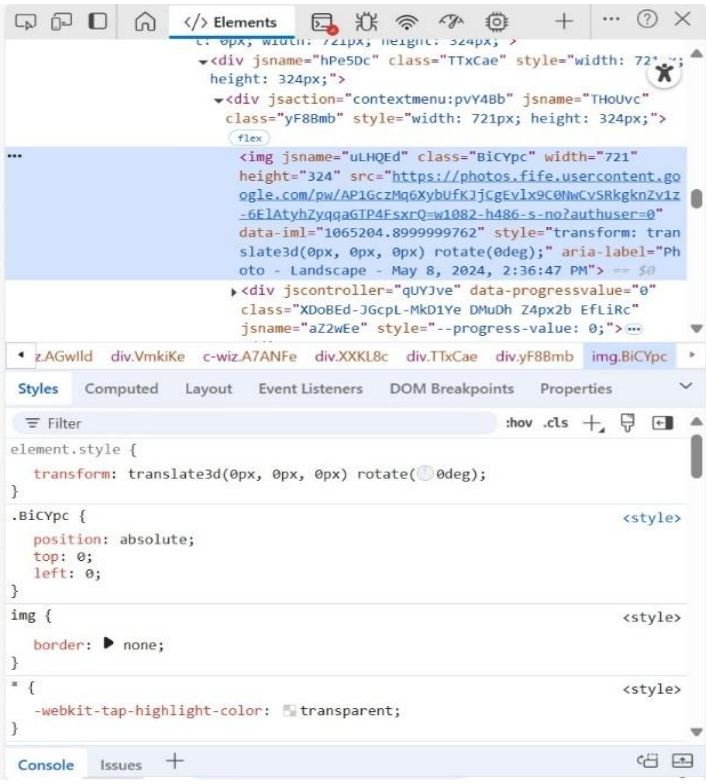


April 30, 2024 @ 12:41:00PM (merging south off of 183 onto Mopac S).

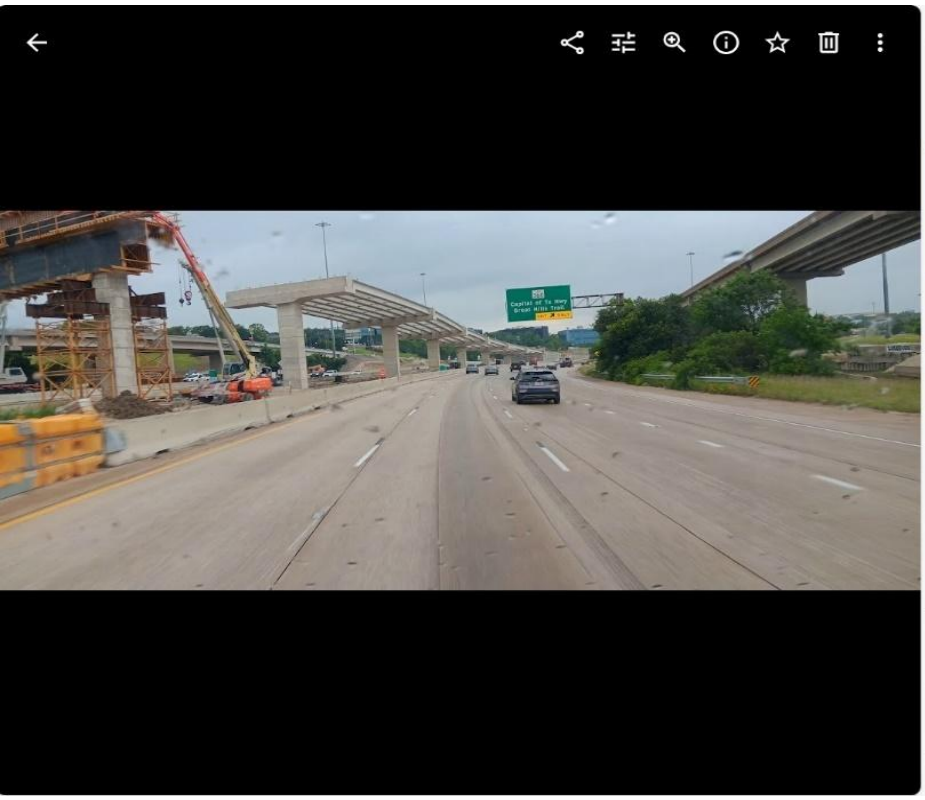


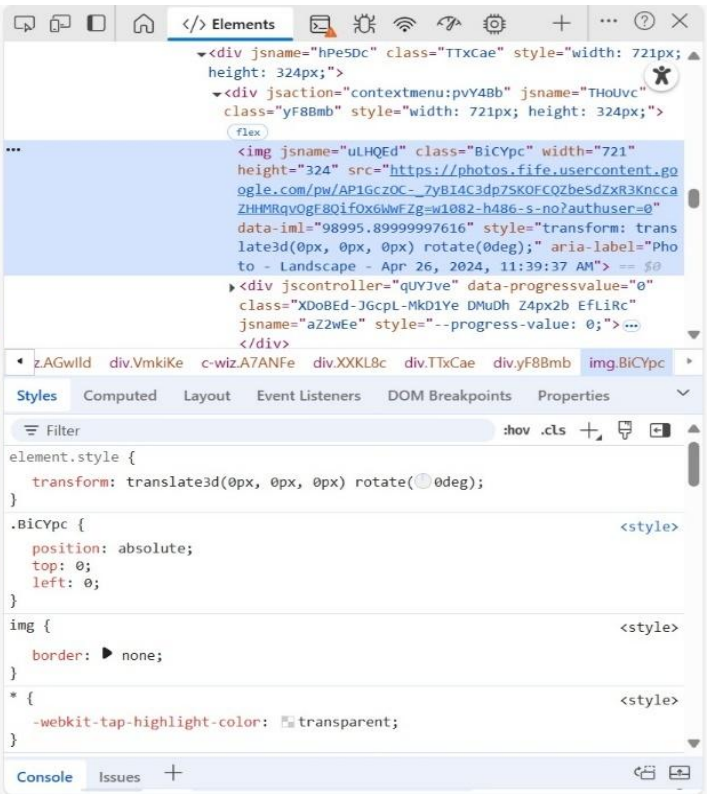
May 8, 2024 @ 2:36:47PM **(12 days after April 26, 2024 @ 11:39:33AM)**. It can be confirmed that this is the same column section being worked on because it is the only double-column in the area and because there are still only six (6) connected columns before. On pages 54.-55., we will confirm unchanged column counts.



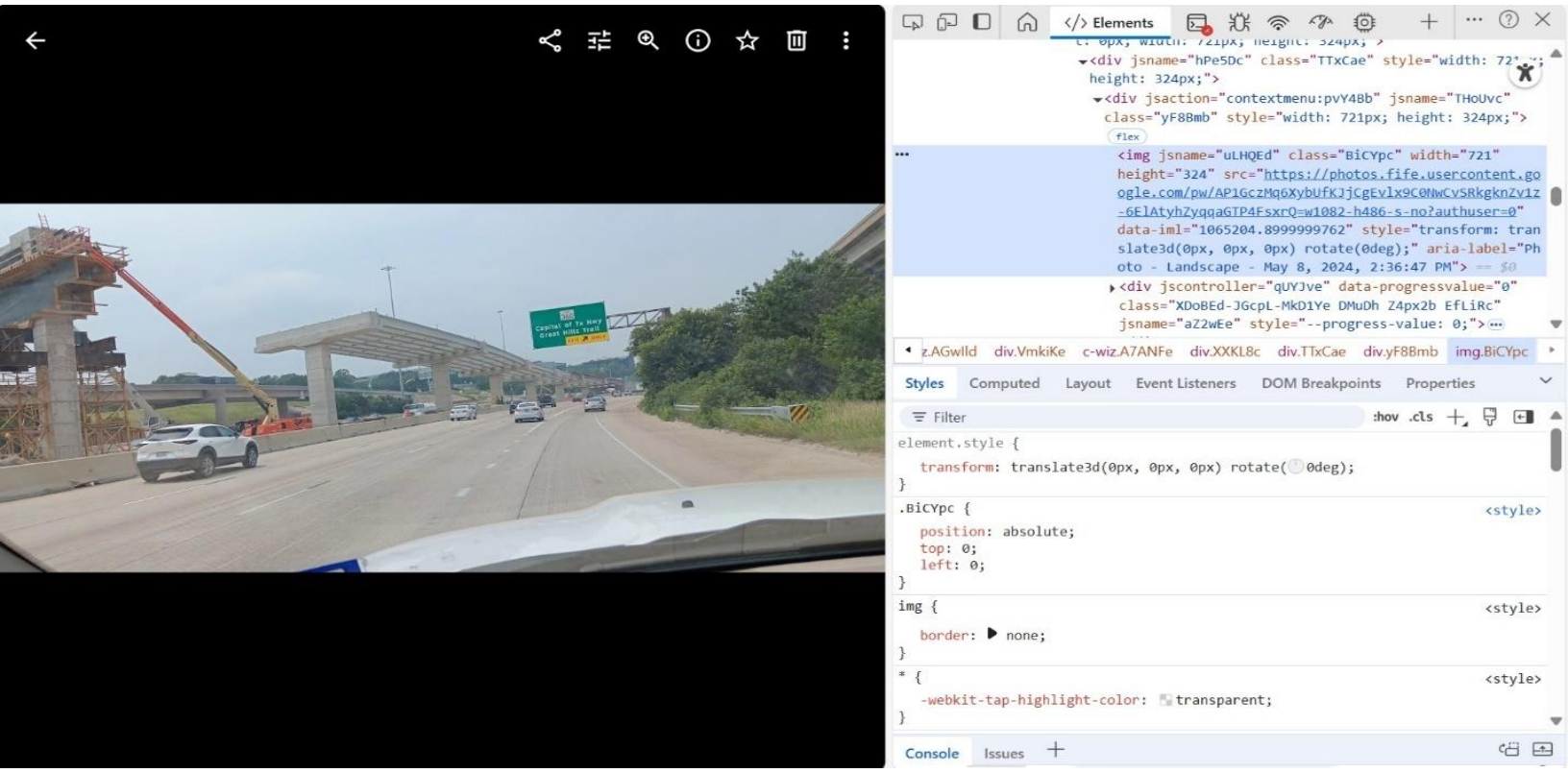


April 26, 2024 @ 11:39:37AM **(four (4) seconds after the initial photo taken at 11:39:33AM)**. This second photograph provides a better close up of the starting point of the ramp on April 26, 2024. We will now examine a better close up on May 8, 2024, on page 55., to provide confirmation of columns and to show the time intensive nature of this work.

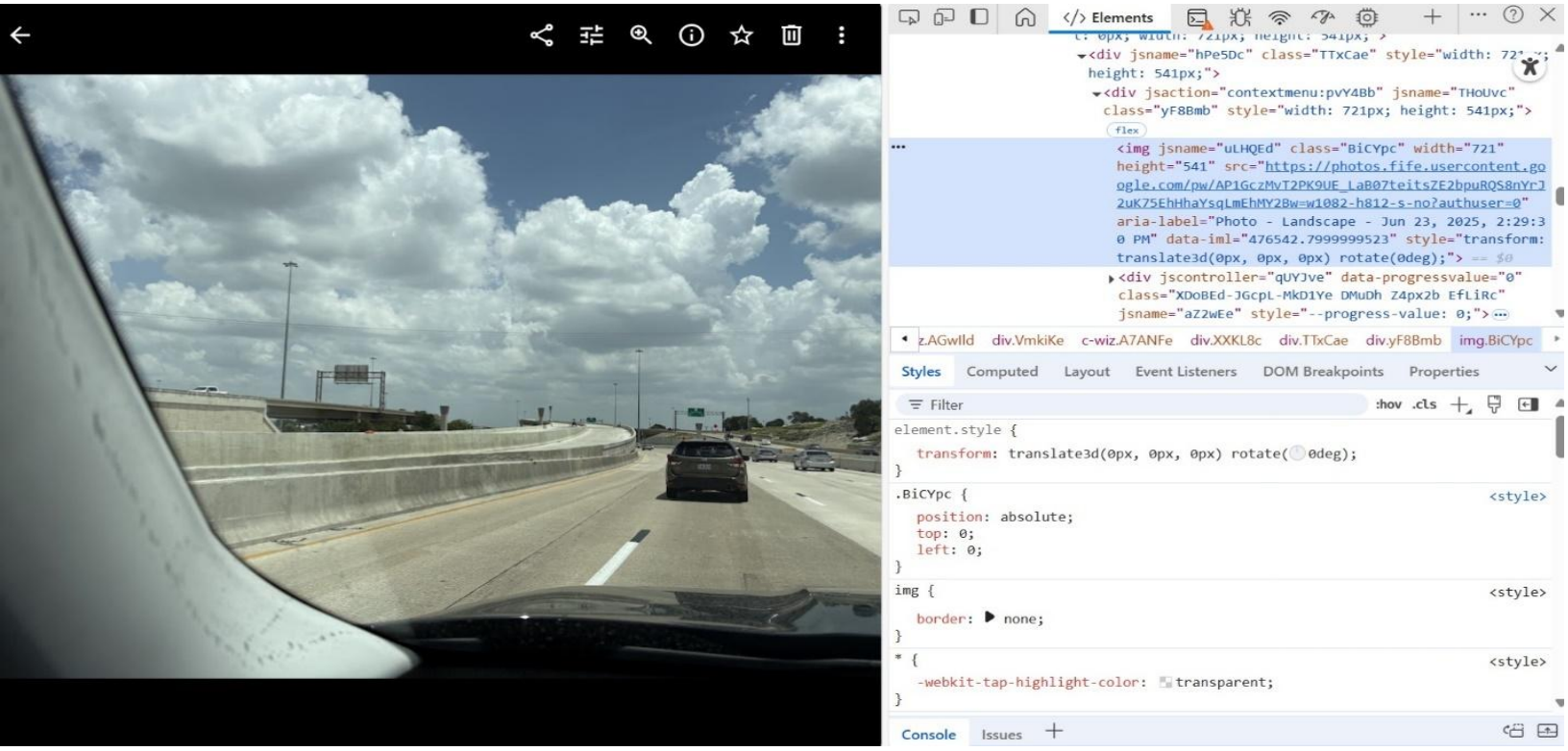




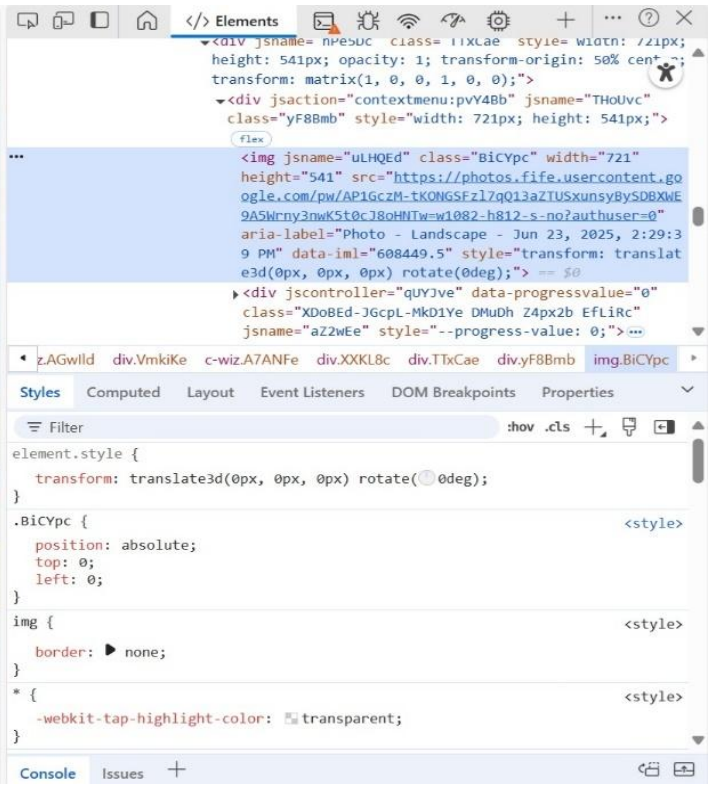
May 8, 2024 @ 2:36:47PM **(zoomed in to confirm column count)**. We will now track the progress of this ramp over thirteen (13) months later on June 23, 2025 on page 56.



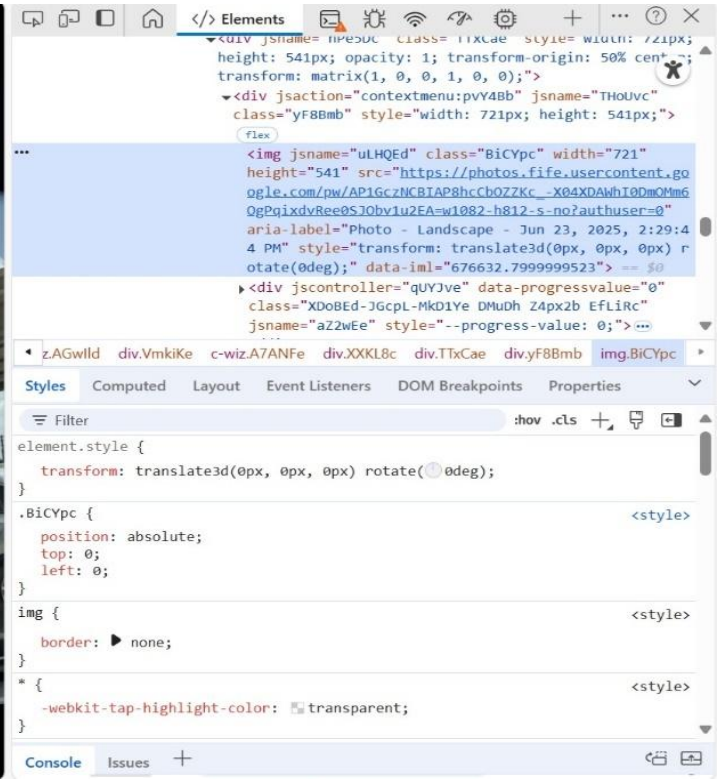
June 23, 2025 @ 2:29:30PM (heading South on 183 due South of Loop 360).



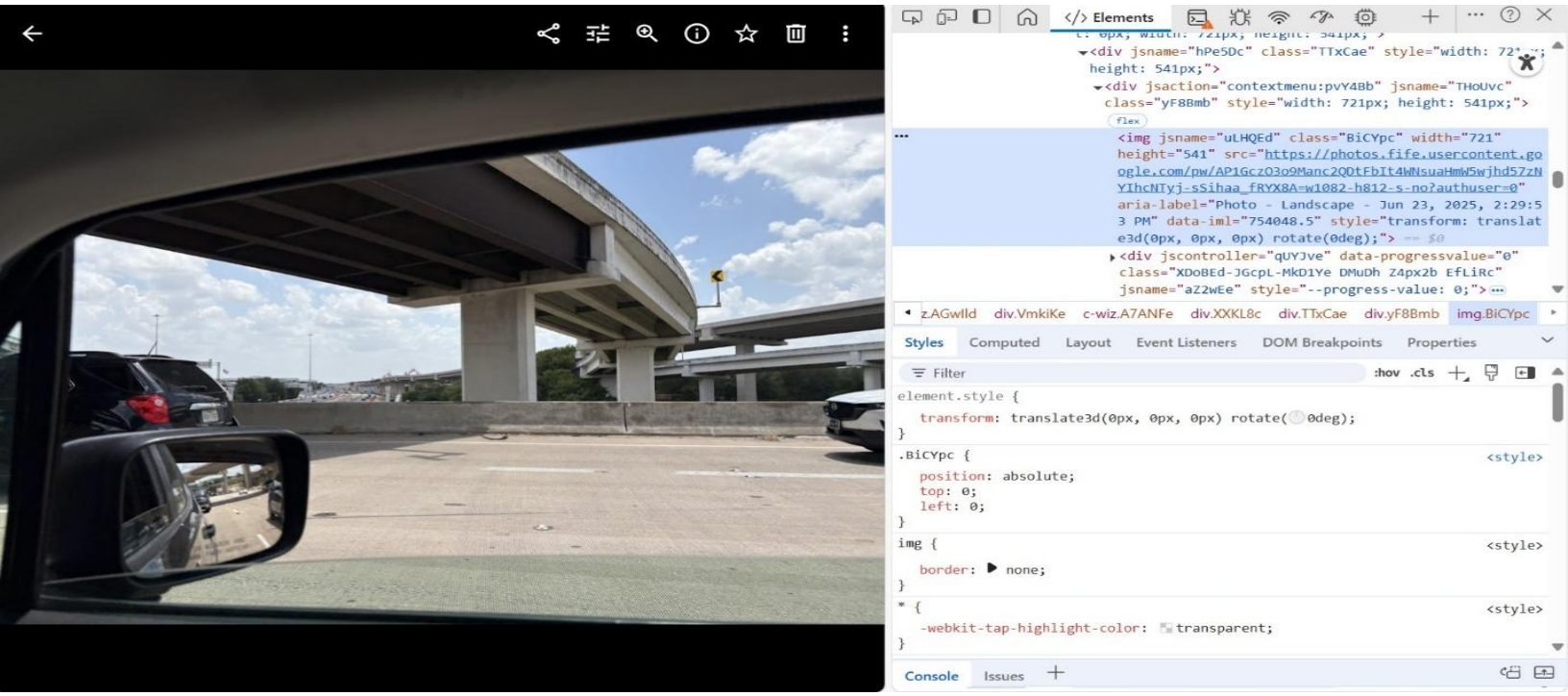
June 23, 2025 @ 2:29:39PM **(heading South on 183 approaching Double-Column)**.



June 23, 2025 @ 2:29:44PM **(heading South on 183 @ Double-Column)**.



June 23, 2025 @ 2:29:53PM **(banking East on 183 @ Mopac)**.



A closer inspection reveals construction on the ramp continuing as of June 23, 2025.

Casually driving under the ramp, South of the 183, on April 11, 2025, without a proper timestamping cellular phone, shows the general area highlighted in the photograph above. The area still has a long way to go until it connects to the ground. Law enforcement was detected while I broke the law conducting what you are reading.

Highway Ramp Construction Anomalies Conclusion

A simple two (2) lane highway ramp requiring a limited amount of drilling for support columns, which benefits from prefabricated rebar reinforced concrete beams that eliminate on site rebar tying/assembly time, has taken well over two (2) years to complete, not including proposals, surveying, drafting, engineering and logistics.

Over two (2) years to build a ramp, while it routinely takes twenty-four (24) months to perform the following work on a condominium or office tower:

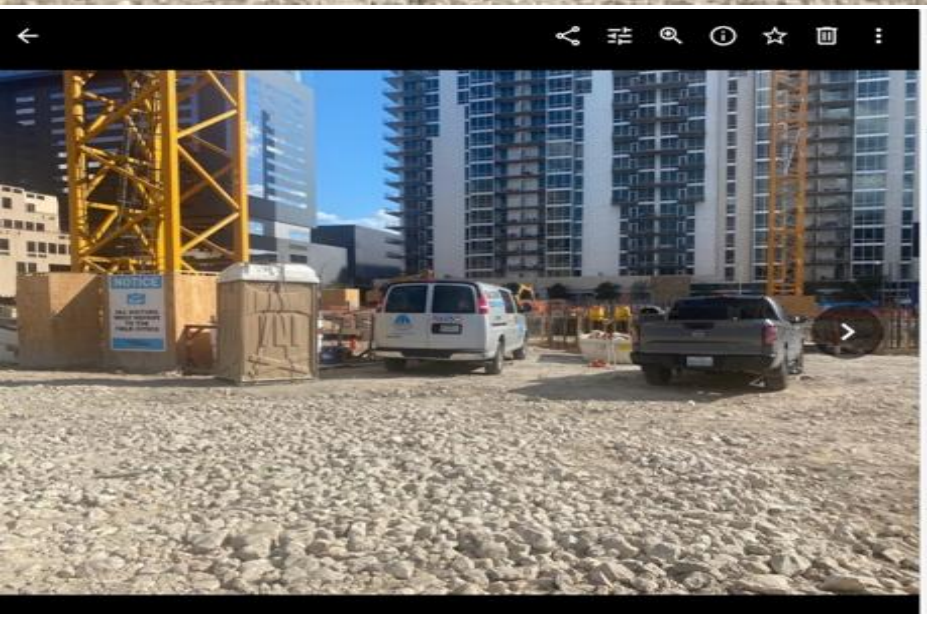
i) Excavate 3-5 levels below ground.
ii) Shore/brace walls to prevent cave-ins.
iii) Connect plumbing intake/drainage and hydro points.
iv) Form and/or lay rebar to pour the concrete needed to create 3-5 levels of extensive underground tunnels that are parking levels.
v) Have formed and poured up to the 20th floor or higher with all connection points for plumbing, hydro and HVAC in place – all in two (2) years. *Completing the interior on a 20-floor (or higher) project adds anywhere from 6-12 months to the timeframe*.

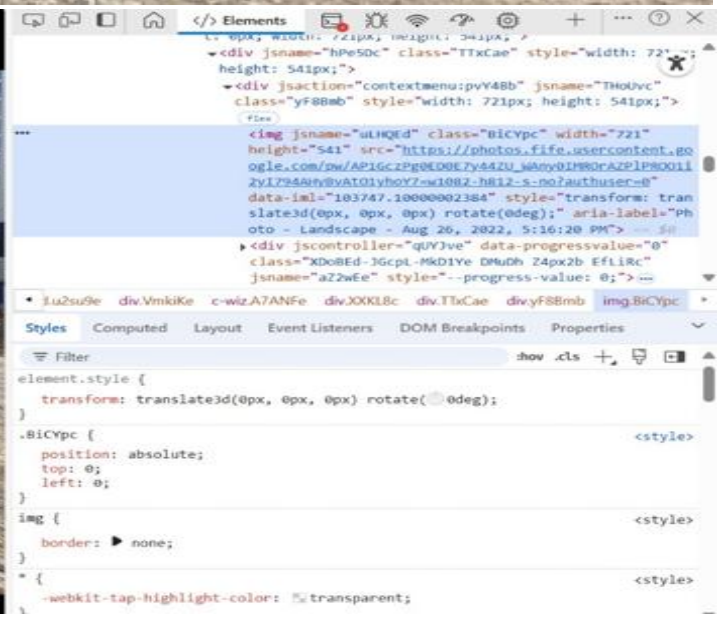
What is glaringly anomalous here is that the pace of highway ramp construction is much slower than the pace of condominium or office tower construction, despite the fact that highway ramp construction is mostly comprised of the exact same type of work performed up to dozens of times on every single floor of condominium or office tower construction site in a matter of twelve (12) working days – including drying time.

A casual observer might think that fast moving traffic slows the pace of work for highway ramp construction. Properly observed, highway ramp construction workers have well shielded work areas and less distractions as their work site involves one (1) designated task. How condominium and office tower construction complete up to dozens of formed/poured and dried columns – in addition to core/elevator shafts - frequently in less than ten (10) days to the point where they are dried and capable of supporting loads above them requiring, i) the weight of a new floor, and ii) the men/equipment and supplies being placed on them, is anomalous and requires continuously monitored and uninterrupted direct observation to be understood.

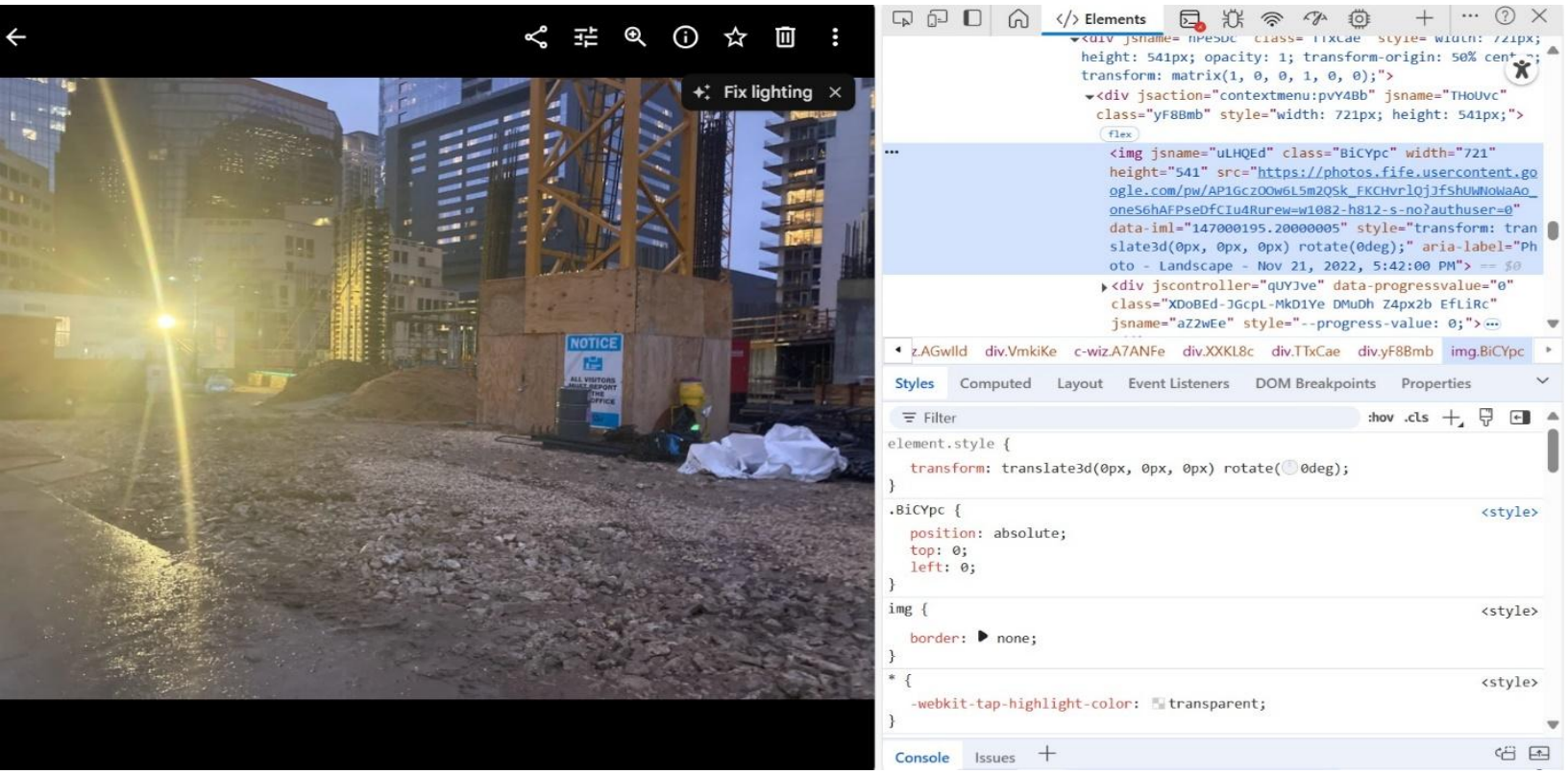
Real-Time Extrapolation Anomaly Detection in Skyscraper Construction

When I closely observed a random construction site not requiring major excavation and drilling, actual progress was found to be much slower. Under heavy observation, only six (6) floors were built in essentially one (1) year, on a site that required no major excavation. This lacks coherence. Below in Austin, Texas, The Republic on August 26, 2022 @ 5:16:20PM. Three (3) cranes had been set up at this point in time. Work started here in early June with the removal of asphalt.

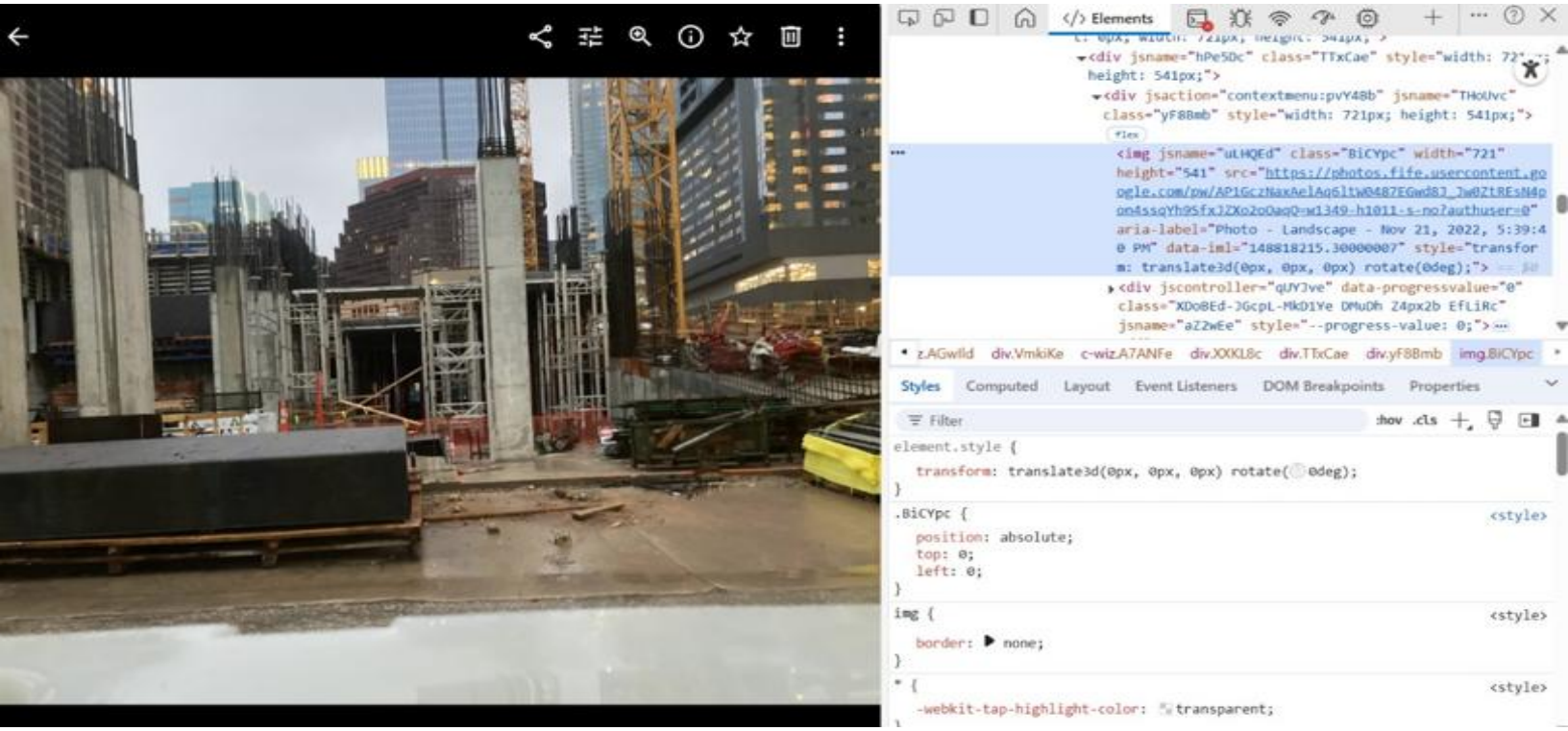




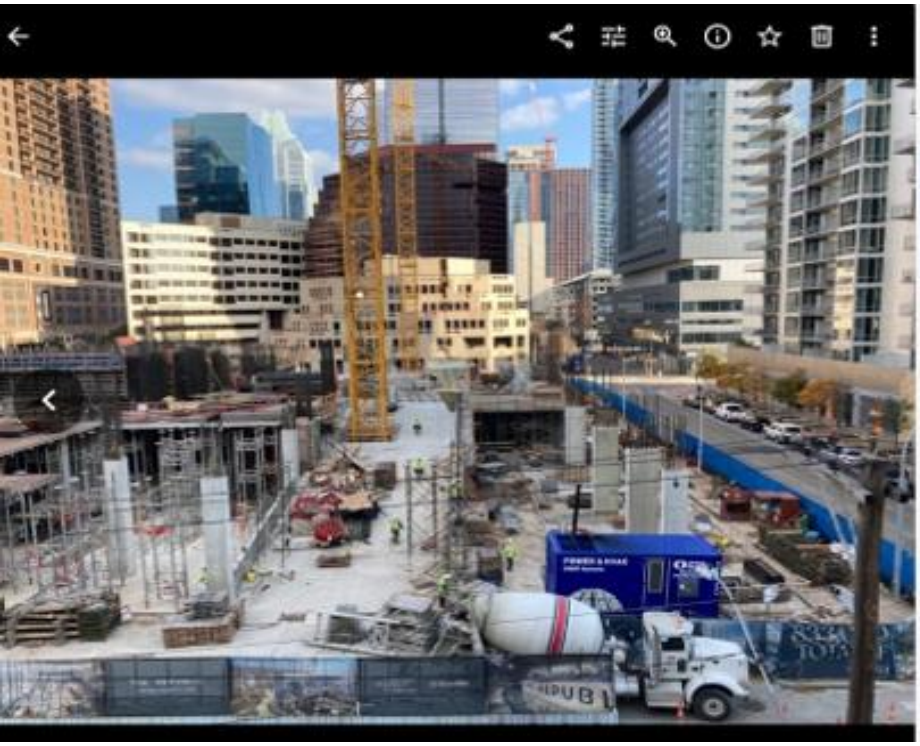
Almost three (3) months later on November 21, 2022 @ 5:42:00PM. The site is still constructing the ground pad and columns to erect the first above ground level, i.e., 1st floor.

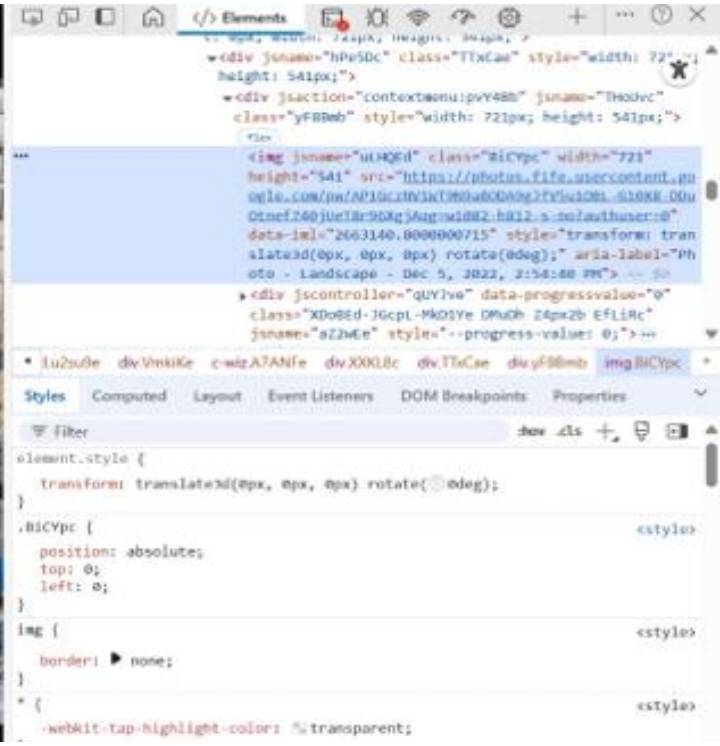


Below is The Republic with a view of the site facing East on November 21, 2022 @ 5:39:40PM.

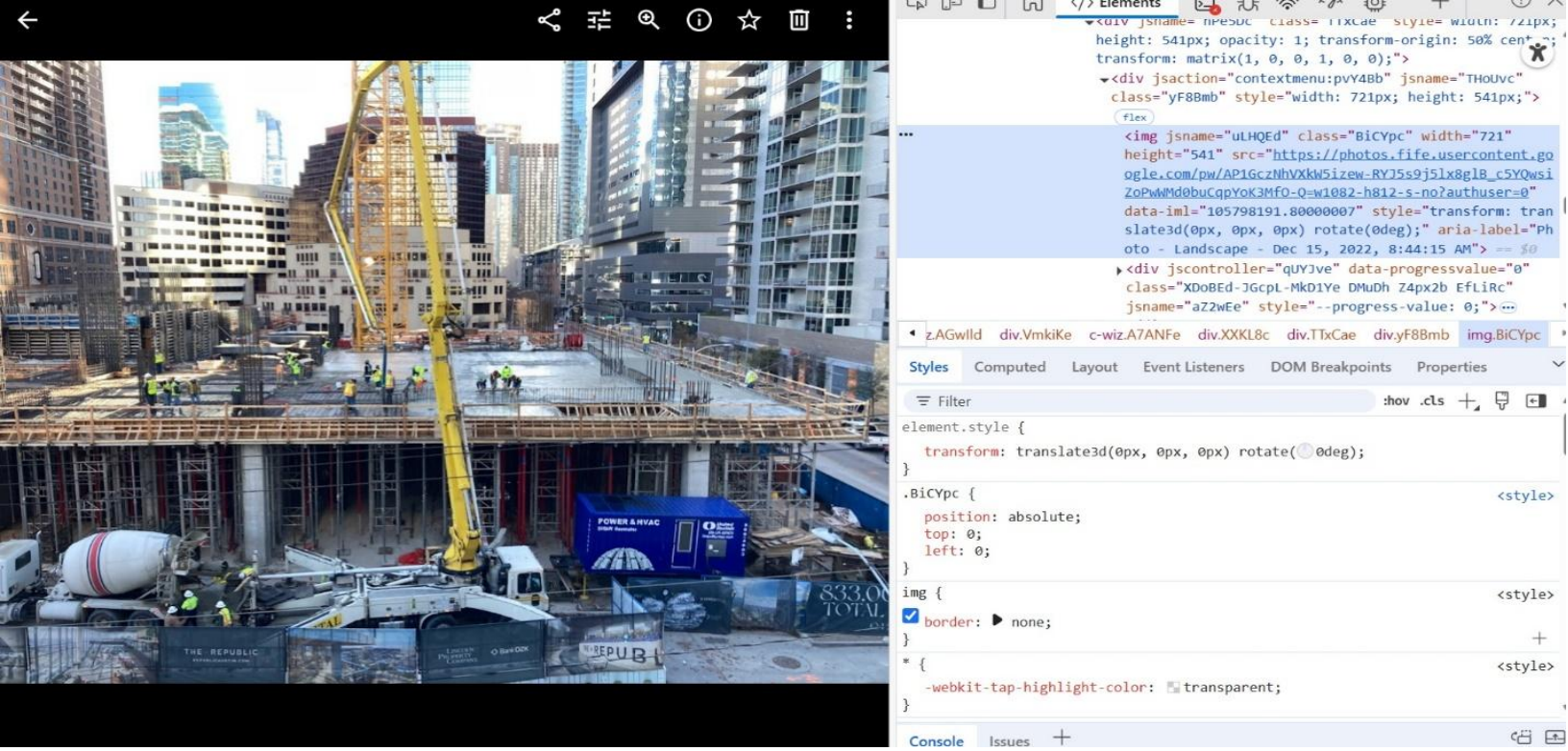


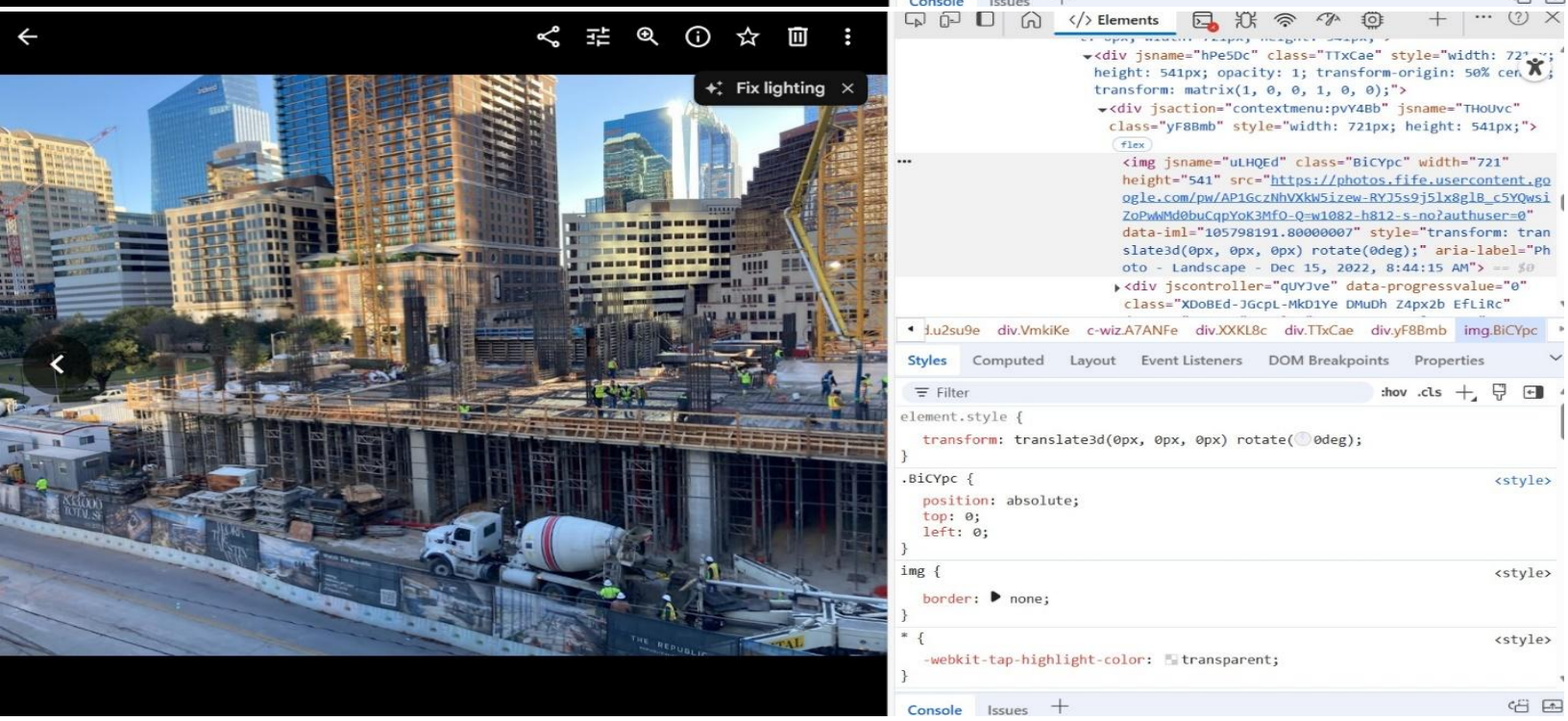
Above, The Republic on December 5, 2022 @ 2:54:40PM; not much has changed in two (2) weeks. Even not needing serious excavation due to the limestone foundation, and with access to open street loading and abundant ground level storage, building the ground floor couldn't be accomplished in even close to three (3) months. The more I observed this site in a day, the less progress that was made.





Ten (10) days after December 5, 2022, on December 15, 2022 @ 8:44:15AM, the forms to pour concrete for the 1st floor are in place and pouring has commenced.

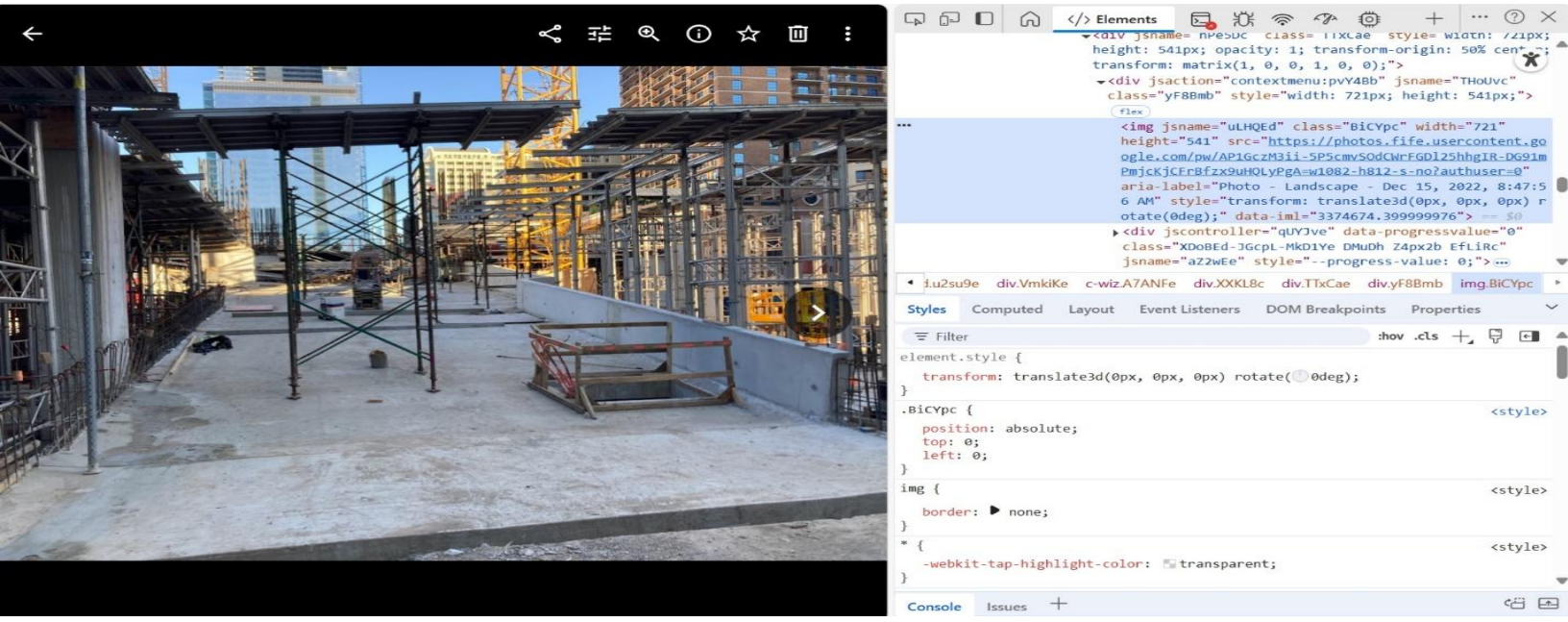




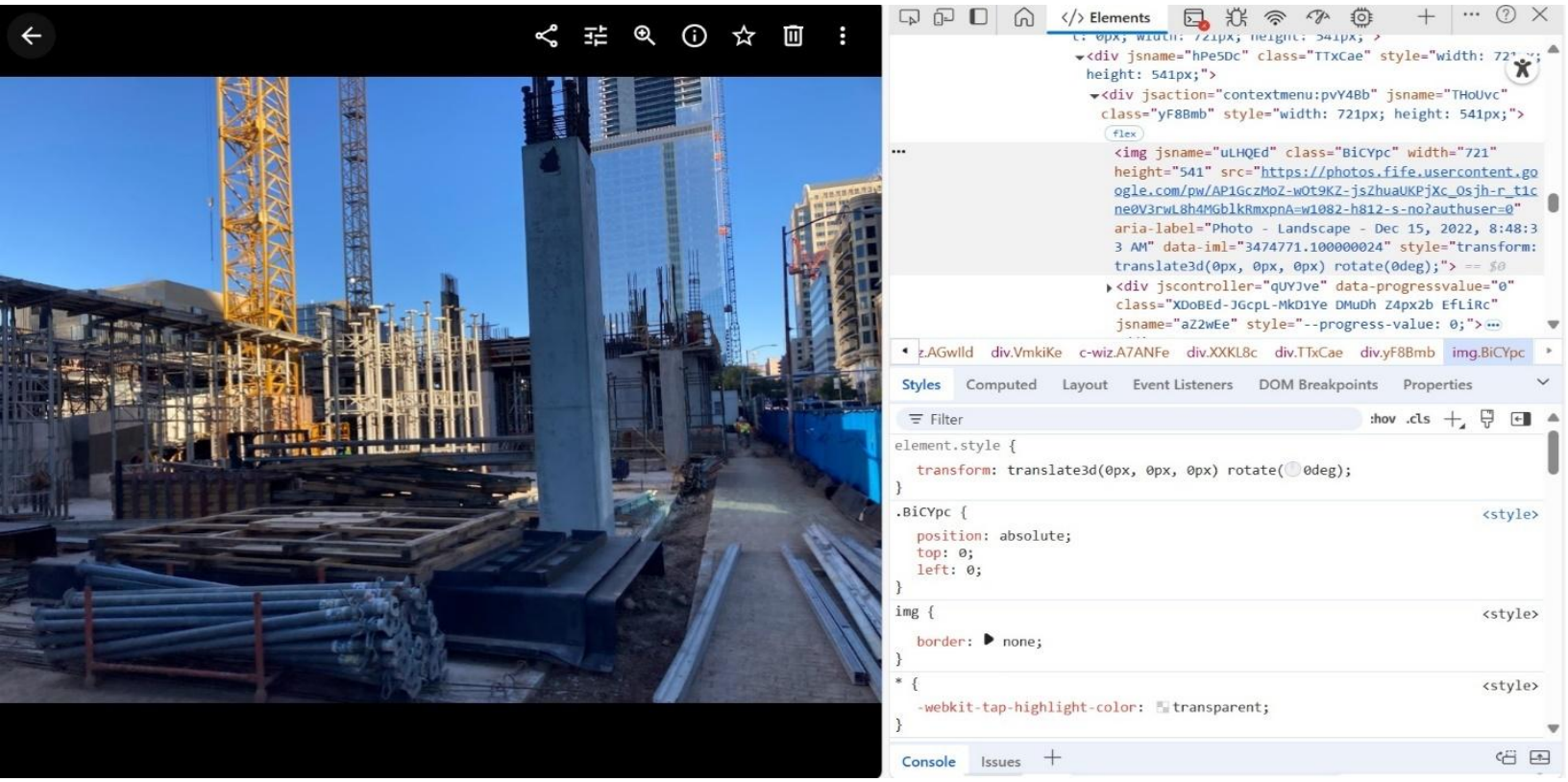
There is a problem, however. **The 1st floor of the East half of the Republic is nowhere close to being formed, i.e., constructed.**

Let's observe on pages 68-70.

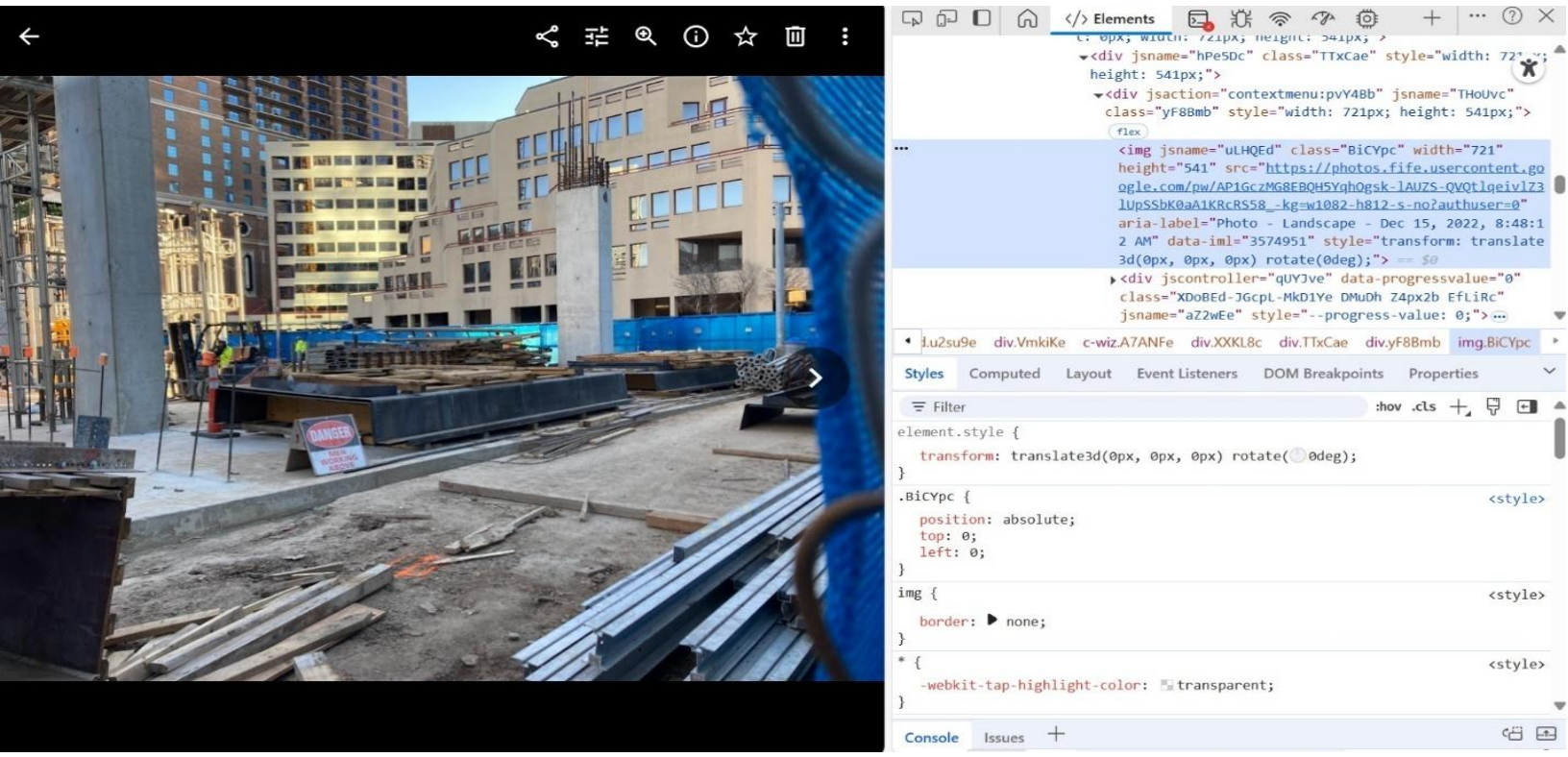
Above is a photograph of the middle section of The Republic, facing North, on December 15, 2022 @ 8:47:56AM. Scaffolding is only being assembled to have forms put in place. The pink box indicates the Austin skyscraper Sixth & Guadalupe. Lincoln Property Company, the same developer as The Republic, broke ground on the 66-floor tower in 2019 and it capped off in November of 2022. Another good source for skyscraper construction timeframes is Austin's 98 Red River. The 74-floor 98 Red River development broke ground in July of 2022 and will cap off in July of 2025.



December 15, 2022 @ 8:48:33AM.

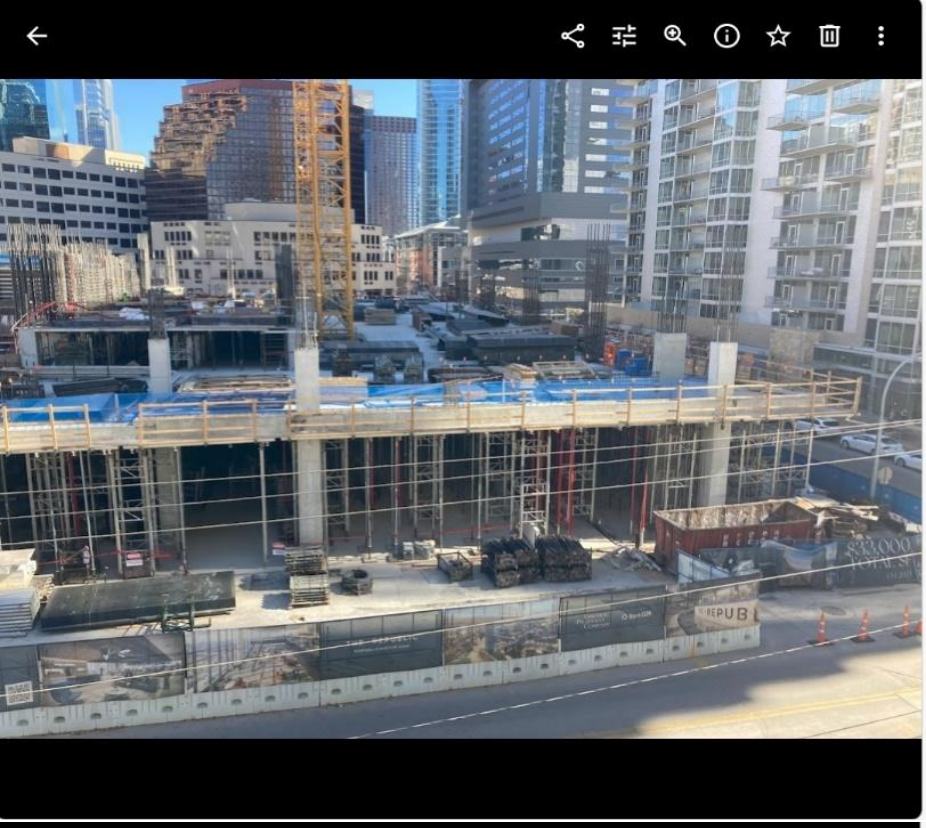


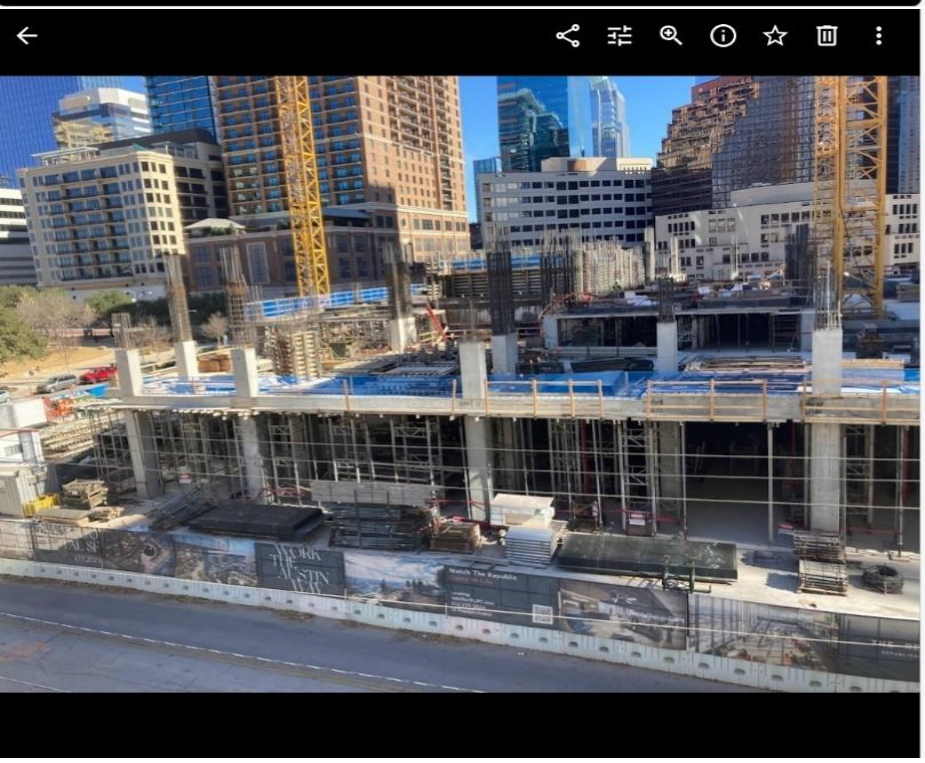
December 15, 2022 @ 8:48:12AM.



From June 2022 up to December 15, 2022 a parking lot has been removed and **not even half of one (1) above ground floor has been constructed**, despite everything needed to construct one (1) above ground floor being in place by no later than August 26, 2022. Forty-four (44) floors (reaching final height) were completed by November 20, 2024.

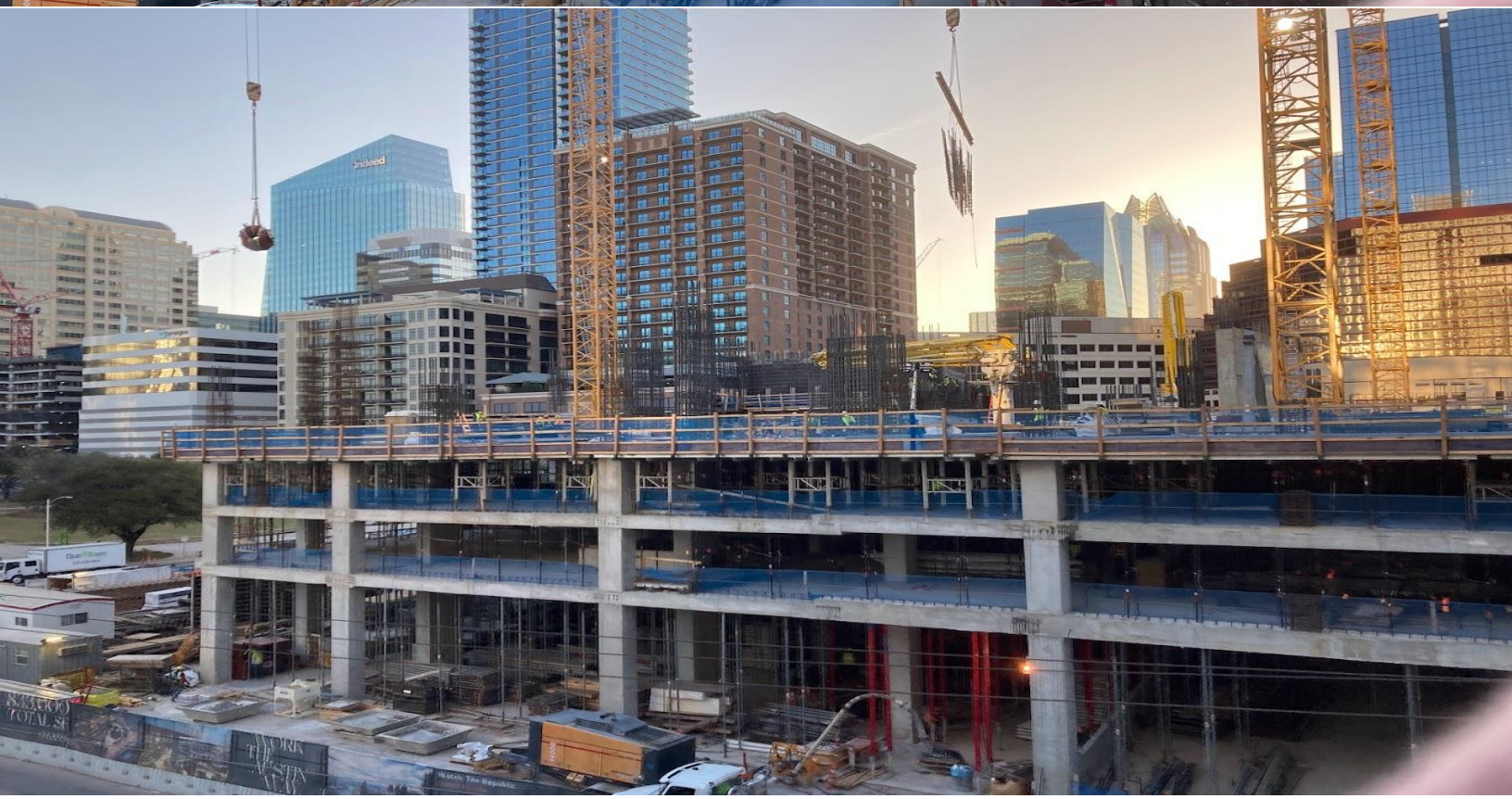
By January 12, 2023 @ 12:57:14PM and 12:57:18PM the 1st above ground level is mostly complete. Many columns on the right (South) side still need to be formed and poured before scaffolding and the forms required to establish the 2nd floor can begin to be put in place.



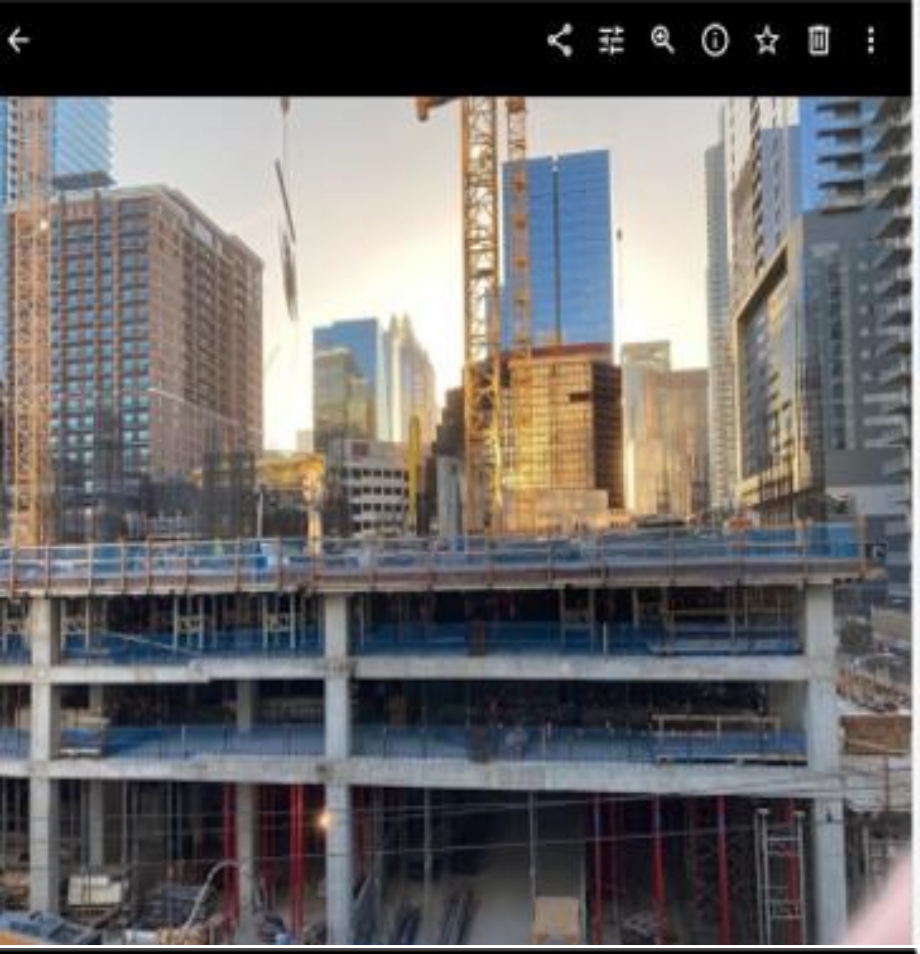


By February 28, 2023 we will see that only the 2nd floor above ground has been completed with the scaffolding and forms in place to construct the 3rd floor. It's not even a rate of one (1) floor per month.

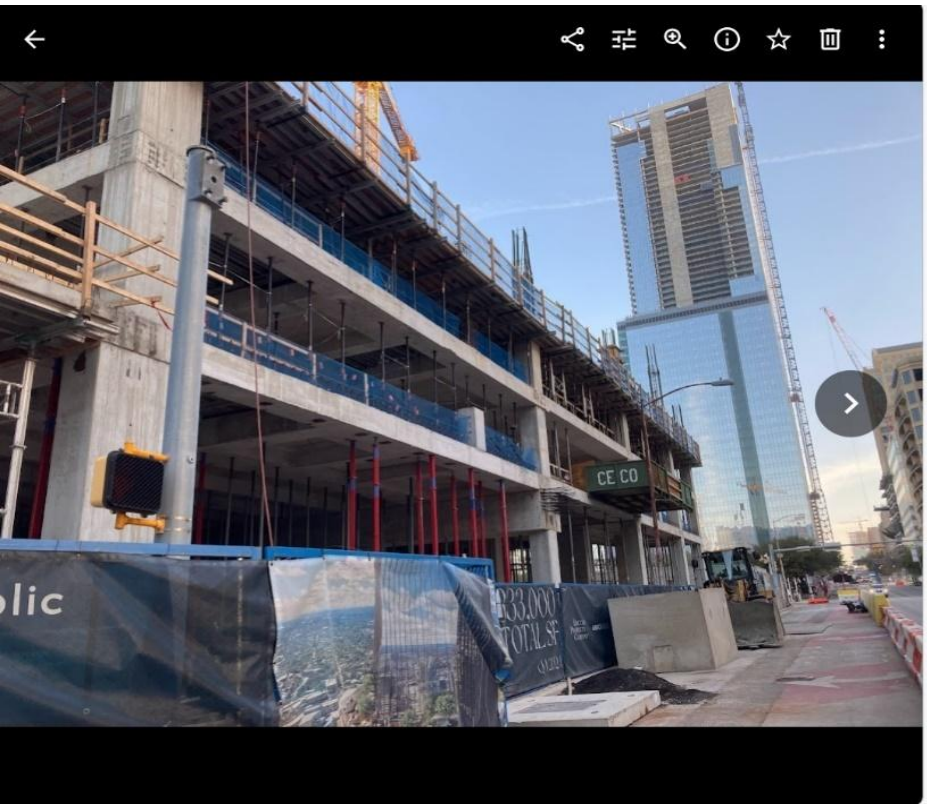
Let's observe on pages 74-76.

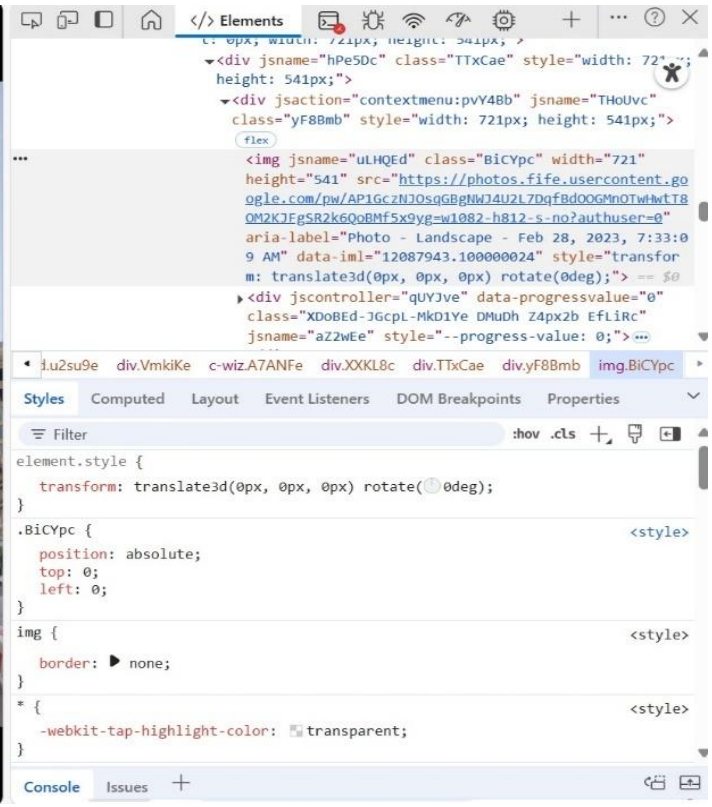


On February 28, 2023 @ 7:28:00AM and 7:28:02AM, the 2nd floor above ground is complete and the 3rd floor is having rebar put in place with columns yet to be formed and poured.



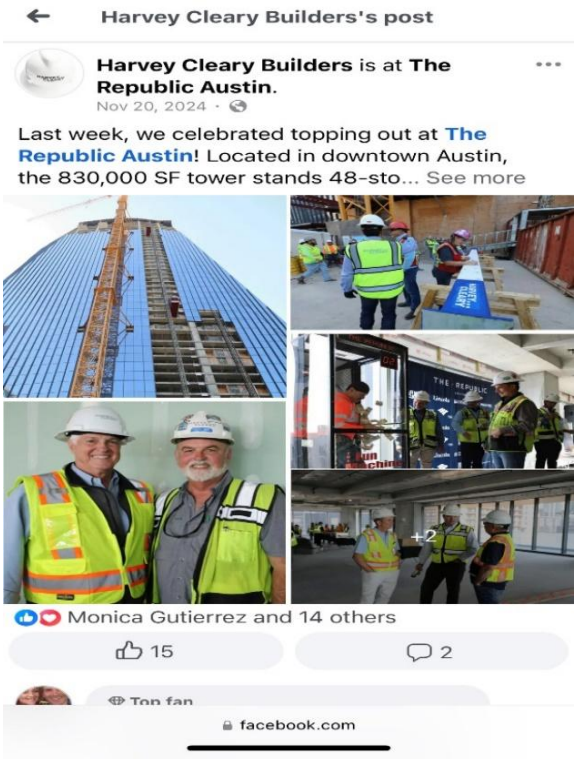
February 28, 2023 @ 7:33:09AM, the Southeast corner of The Republic facing North to the Sixth & Guadalupe skyscraper. Forms for the 3rd floor are in place.





Real-Time Extrapolation Anomaly Detection in Skyscraper Construction Conclusion

When I stopped observing the site at precise points on a daily basis, the pace of construction including curtain walls conformed to the common pace of one (1) floor built every two (2) weeks. People who would assume that parking levels require more time to build fail to understand that above ground parking levels, which The Republic features, are cheaper and faster to build, especially when the parking levels are connected by elevator, not ramp. Parking levels are a more straightforward design, whereas residential and office floors feature more customization. More customization = more time and the increased likelihood of errors. Additionally, work becomes slower and more dangerous for cranes as a building rises in height. Higher floors technically slow the rate of progress as all high-rise construction only runs as efficiently as its crane(s) can. The variable of wind, alone, is a constant concern and delay for higher floor construction/progression.



By November 20, 2024, the tower capped off at 44 floors (it is marketed as 48 by not including the number 13 in the floorplan and representing the 1st floor above ground as P4).

48 floors – 13th floor = 47

47 floors – P1, P2, P3 = 44

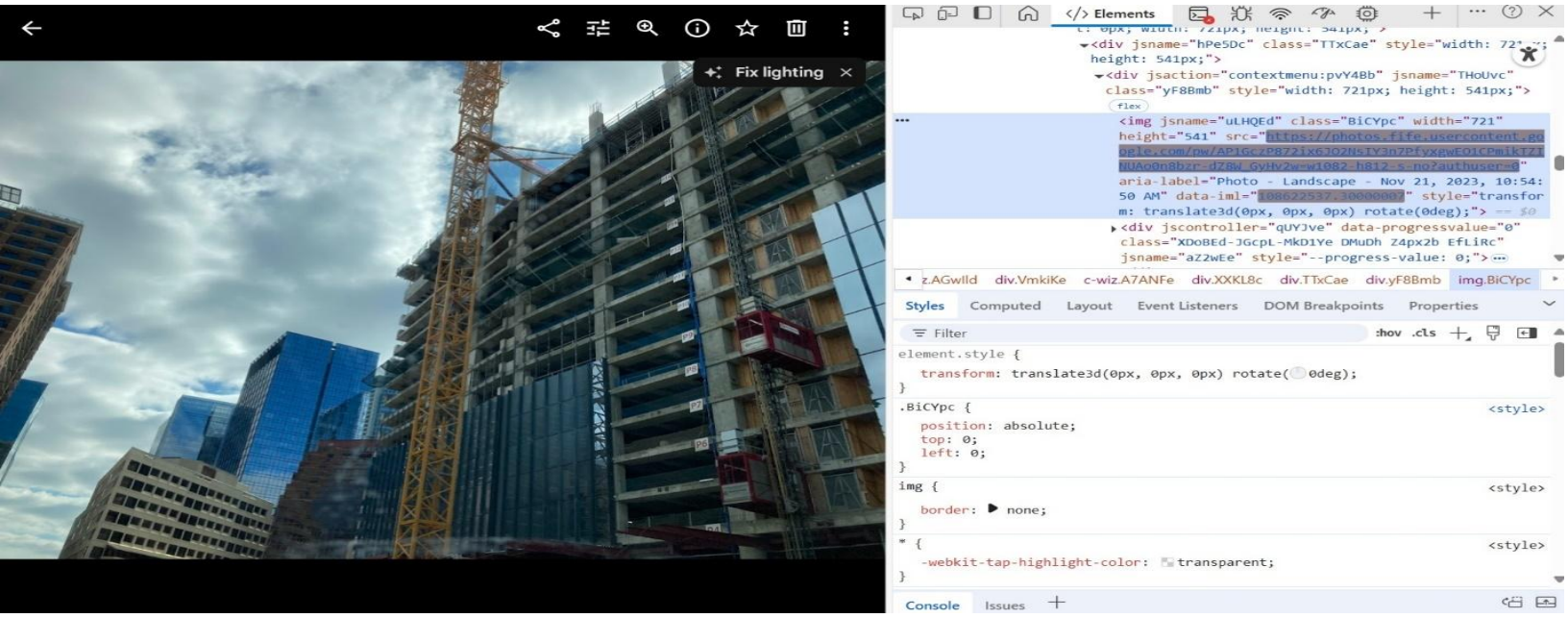
In approximately twenty-one (21) months (less eight (8) days) from February 28, 2022 to November 20, 2024, 42 floors were constructed for a pace of two (2) floors built per month.

42 floors ÷ 21 months = 2 floors per month.

42 floors ÷ 21 months = 2 floors per month is not, however, accurate.

One of the last photographs I took of The Republic was on November 21, 2023 @ 10:54:50AM and, interestingly, The Republic stood at only 15 floors.

On November 21, 2023 @ 10:54:50AM the 15th floor is built. Level P4, just above beams protruding out over the sidewalk, is actually the 1st floor and the 13th floor is skipped and becomes P14.



44 floors completed by November 20, 2024 – 15 floors completed by November 21, 2023 = 44 – 15 = 29 floors.

As such, 12 months after November 21, 2023, an impressive twenty-nine (29) floors were constructed.

29 floors ÷ 12 months = 2.416 floors per month.

24 construction workdays in a month x 12 months = 288 workdays.

8 hours per workday x 288 workdays = 2,304 hours.

288 workdays ÷ 29 floors = 9.93 workdays per floor.

9.93 workdays x 8 hours = 79.44 hours of work performed per floor.

Some people might think approximately eighty (80) hours to build a skyscraper floor is feasible. What they would fail to take into consideration is the logistics of material delivery and the fact that a crane's work gets slower and more dangerous with added height. A simple task like raising a few yards of concrete to the thirtieth (30th) floor to complete a needed pour and then returning the bucket can take 30-45 minutes.

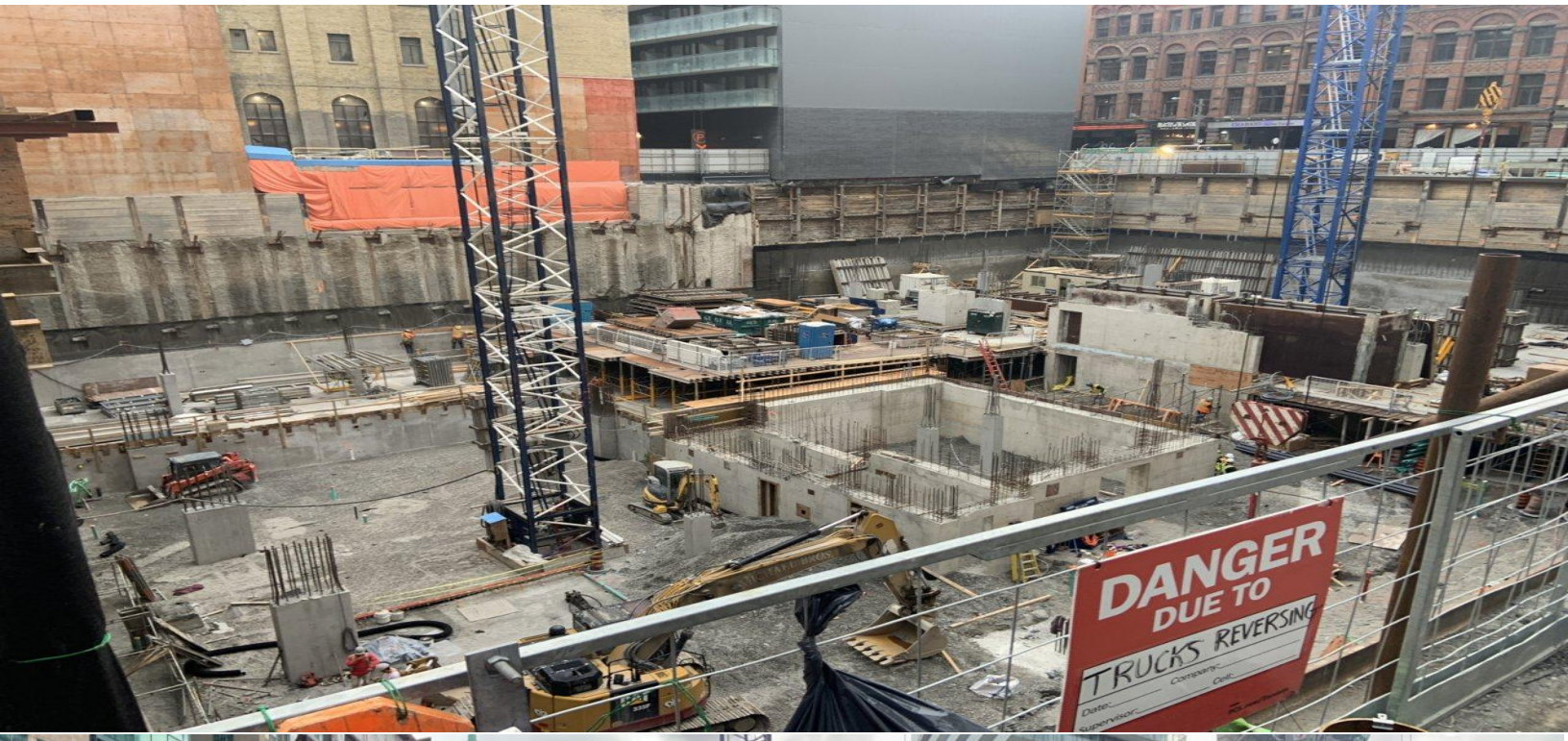
Two (2) very time-consuming tasks for a crane, which compound with floor height, are:

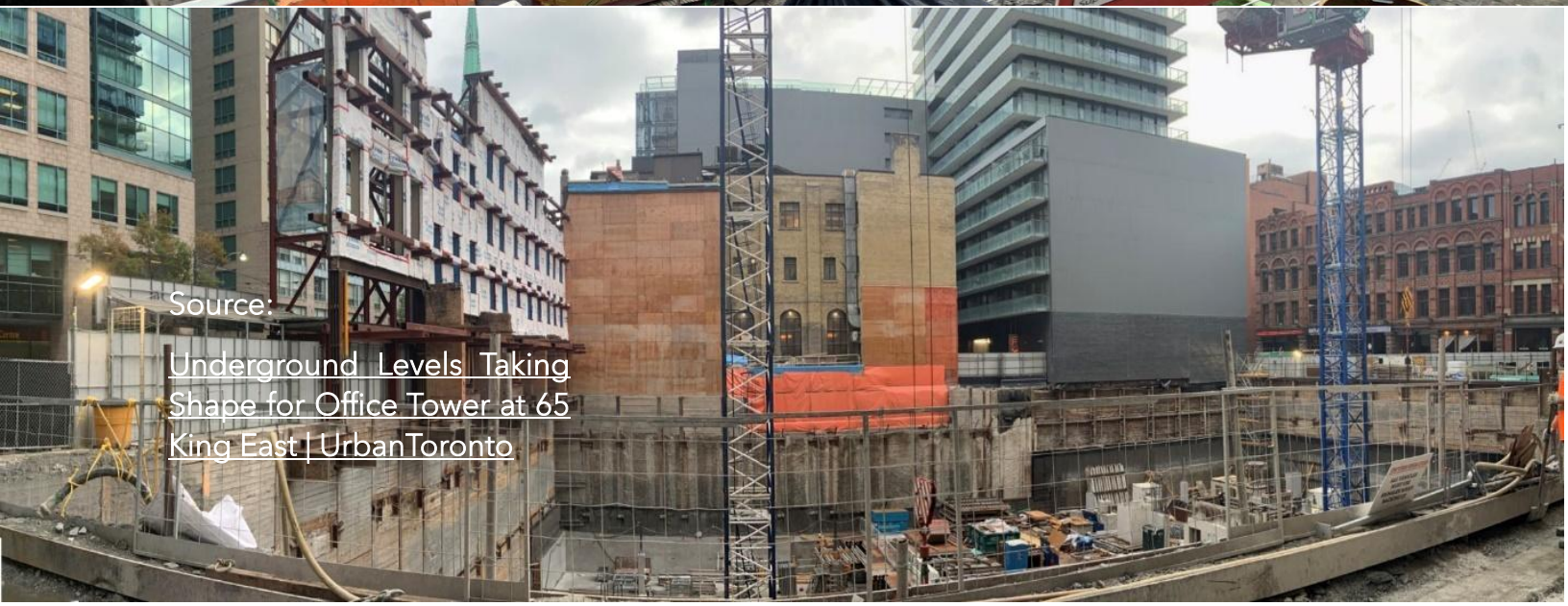
1. The task of putting up the curtainwall (glass exterior) is extremely slow, methodical and dangerous.
2. The task of removing forms from dried and completed lower floors, and then raise them to the highest level needing to be completed, is a slow and dangerous process.

I have not been able to capture these tasks being performed in real-time.

Where is Everyone?

Perhaps the reader hasn't noticed that there is a lack of workers in the photography in this document. Pictured below, in photographs not taken by myself, are less than ten (10) men working on a site beside existing structures.





Source:

Underground Levels Taking Shape for Office Tower at 65 King East | UrbanToronto

The photographs on page 80, zoomed in on here and page 82., reveal the number of workers on site.

A total of nine (9) construction workers are present.

There is only one (1) toilet on this site. In Toronto, Canada one (1) toilet is required by law for every 1-15 workers. That is a clear indication of not many men being present here, despite the enormity of tasks required.

The righthand zoom in shows where and how workers enter the dig. On site toilets are essential, especially in warmer weather when the need for hydration increases.

Every single item on a site needs to be strapped and secured at ground level to a crane, raised, delivered in place and then unloaded.

This process that seems unremarkable becomes remarkable when minutes are added up and start becoming many days of dedicated work for the most important machine on a construction site, i.e., the crane.

A simple potty for big boys, and the only one (1) on this site which requires access by ladder, can take 10 minutes to deliver and 30 minutes to exchange; the figures are higher when floor heights are higher and/or winds are high.

The point of this section is to show that the given and stated timeframes, which lead people to believe that major construction like building a condominium or office tower is relatively fast work, does not add up and lacks coherence upon close inspection, i.e., direct observation, that real-time extrapolation facilitates.