

MY WEIRD PROMPTS

Podcast Transcript

EPISODE #407

The Vertical Revolution: Why Your Old Elevator Won't Fall

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EPISODE SYNOPSIS

In this episode, Herman and Corn take a deep dive into the world of vertical transportation, sparked by a listener's question about the contrast between Jerusalem's mid-century lifts and modern high-tech towers. They explore the visceral anxiety of manual accordion gates versus the actual mechanical safety systems that prevent a free-fall. You'll learn about the "triple-v-f" drives that have replaced energy-wasting motors and the fascinating world of regenerative braking—where elevators actually pump electricity back into the building's grid. The duo also breaks down the history of Elisha Otis's safety governor and why an elevator can look like a wreck while remaining structurally sound. From the "ride-sharing" logic of Destination Dispatch to the battery backups of Automatic Rescue Devices, this episode reveals the invisible engineering that keeps our cities moving upward. Whether you're a fan of industrial history or modern smart-city tech, you'll never look at a "Tazkir Bdika" inspection certificate the same way again.

DANIEL'S PROMPT

Daniel

Are modern elevators more power-efficient and safe than older models? In many older buildings in Israel, elevators can feel quite unsafe and dilapidated, yet they still hold inspection certificates. How do these older elevators manage to pass safety checks, and are they actually safer than they appear?

TRANSCRIPT

Corn

You know Herman, there is a specific kind of adrenaline rush that you only get in certain parts of Jerusalem. It is not from the traffic or the hills, but from stepping into an elevator in a building built in the nineteen fifties or sixties. You open that heavy manual door, then you pull back the metal accordion gate, and you just pray that the floor is actually there.

Herman

Ah, the classic Israeli elevator experience. It is a mix of mid-century industrial charm and pure, unadulterated anxiety. Herman Poppleberry here, and I know exactly what you are talking about. Our housemate Daniel actually sent us a prompt about this very thing. He has been living in various spots around the city and he is struck by the contrast between these older, let us say, character-filled elevators and the high-tech versions you see in the new towers over in Tel Aviv or the newer parts of Jerusalem.

Corn

It is a great question because it touches on something we all interact with every day but rarely think about until we are suspended in a metal box by a few steel cables. Daniel was asking if these modern elevators are actually safer and more energy-efficient than the older ones. And specifically, how on earth do those rickety, creaking boxes in older buildings manage to pass their safety inspections?

Herman

It is a fascinating look into engineering versus perception. Because, as Daniel pointed out, you see those inspection certificates, the Tazkir Bdika, taped to the wall, and they are usually up to date. In Israel, by law, a certified external inspector has to come out every six months to sign off on it. So, there is a formal system saying this machine is safe, even if your lizard brain is screaming that you are about to plummet into the basement.

Corn

Right, and I want to really dig into that gap between feeling safe and being safe. But before we get into the mechanics of safety, let us talk about the other part of Daniel's question, the power efficiency. Because that is where the hidden revolution in elevator technology has really happened over the last couple of decades.

Herman

Oh, absolutely. If you look at an elevator from the nineteen seventies, you are looking at a system that is incredibly wasteful. Most of those older elevators use either a simple alternating current motor or, in some taller buildings, a direct current motor with a huge generator set. The problem with those older systems is that they are basically either on or off. When the motor starts, it draws a massive amount of current to get the car moving, and then it uses a lot of energy to hold it at the right speed.

Corn

And they use friction brakes to stop, right? So all that kinetic energy just gets turned into heat.

Herman

Exactly. It is just wasted. But modern elevators use something called Variable Voltage Variable Frequency drives, or triple-v-f. This allows the motor to start slowly and ramp up, which uses much less power than that initial jolt of energy in an old system. But the real magic, Corn, is regenerative braking.

Corn

This is the part that always blows my mind. It is like a hybrid car, right?

Herman

Precisely. Think about the physics here. An elevator is a counterweighted system. There is the car, and then there is a heavy weight on the other side of the pulley. Usually, that counterweight is sized to be equal to the weight of the empty car plus about forty or fifty percent of its maximum capacity.

Corn

So if the car is empty and it is going up, the counterweight is actually doing the work of pulling it up?

Herman

Yes! In that scenario, the motor is actually acting as a brake to keep the car from flying up too fast. In a modern system with a regenerative drive, instead of just burning off that energy as heat, the motor acts as a generator. It takes that mechanical energy from the falling counterweight and turns it back into electricity, which it then pumps back into the building's power grid.

Corn

That is incredible. So the elevator is actually powering the hallway lights or the neighbors' refrigerator while it is moving?

Herman

In a well-optimized building, yes. You can see energy savings of thirty to forty percent just from that one feature. When you combine that with more efficient permanent magnet motors, which are much smaller and more powerful than the old induction motors, the difference in power consumption between an old elevator in a four-story building in Jerusalem and a modern one is staggering.

Corn

It makes you realize that the old ones are basically just giant space heaters that occasionally move people between floors. But let us get back to the safety aspect, because that is what really bothers people. When Daniel says he feels skeptical about the inspection regime, I think a lot of people relate to that. You see a light flickering, the floor is not quite level with the landing, and the whole thing shakes. How can an inspector look at that and say, yes, this is fine?

Herman

Well, we have to distinguish between aesthetic maintenance and structural safety. An elevator inspector in Israel is looking at very specific, heavy-duty safety systems that are designed to be fail-safe. The most important one, and the reason why elevators are actually one of the safest forms of travel, is the governor and the safety gear.

Corn

This goes back to Elisha Otis, right? The famous demonstration in eighteen fifty-four where he cut the rope?

Herman

Exactly. That is the foundational moment of the modern city. Without that safety, we would not have skyscrapers. The way it works is actually quite elegant and entirely mechanical. There is a separate cable called the governor rope that moves with the elevator. If the elevator starts moving too fast, even by a small percentage over its rated speed, centrifugal force causes a set of weighted fly-balls in the governor to swing out and trip a mechanical switch.

Corn

And that happens even if the power is out?

Herman

Yes, it is purely mechanical. Once that switch is tripped, it grabs the governor rope. Since the rope is now stuck and the elevator is still moving, the rope pulls a lever on the car itself. That lever engages the safety gears, which are basically heavy-duty steel wedges or rollers that bite into the guide rails. They literally clamp the car to the steel tracks that it runs on. It is an incredibly violent stop, but the car is not going anywhere.

Corn

So when Daniel is in one of those old elevators and he is worried about the cable snapping, the reality is that even if the main hoisting cables failed, which is extremely rare because they are over-engineered by a factor of about twelve, these mechanical safeties would still catch the car.

Herman

Right. And those are the things the inspector is testing. They check the tension on the cables, they check the wear on the grooves of the drive sheave, and they often perform a test where they actually trip the safeties to make sure they bite. An elevator can look like a total wreck, the buttons can be missing, and the interior can be scratched up, but if those mechanical clamps work and the cables are sound, it passes the safety check.

Corn

That makes sense, but what about the doors? In those older buildings, you have that manual outer door and then the inner gate. I have seen cases where you can actually open the outer door even if the elevator is not there. That feels like a massive safety hole.

Herman

That is actually one of the most common causes of elevator accidents, and it is something inspectors are supposed to be very strict about. It is called the door interlock system. There is a mechanical and electrical lock on every floor. The elevator car has a little cam or a ramp that pushes a lever on the door lock when it arrives at the floor. If that interlock is bypassed or broken, it is a major violation.

Corn

I wonder if some of the skepticism Daniel feels comes from the fact that in older buildings, maintenance is often reactive rather than proactive. If the building committee is trying to save money, they might only fix things when they actually break.

Herman

That is definitely part of it. And there is also the issue of leveling. You know how sometimes you step out and the elevator is two inches higher or lower than the floor? That is a huge trip hazard. Modern elevators use sophisticated sensors and software to ensure the car stops exactly level every time. Older ones rely on mechanical switches and brakes that can go out of adjustment as they wear down or as the temperature changes.

Corn

So, while the old elevator might not fall down the shaft, it might still trip you or trap you. Daniel mentioned being in situations where the power went out and the doors would not open. That is a terrifying experience, even if you are technically safe.

Herman

It is. And that is another area where modern technology has made huge strides. Most modern elevators are equipped with an Automatic Rescue Device, or A-R-D. It is basically a battery backup system. If the power goes out, the A-R-D kicks in, moves the elevator to the nearest floor, and opens the doors. It is not meant to keep the elevator running for hours, just to make sure no one gets trapped.

Corn

That seems like it should be mandatory everywhere. Is it common in older buildings in Israel to retrofit those?

Herman

It is becoming more common, and for new installations in Israel, it has been mandatory for years under Israeli Standard twenty-four. A lot of the older buildings in Jerusalem are managed by small housing committees, the Vaad Bayit, and they often struggle to fund major upgrades. But you are seeing more regulations coming in that require certain safety updates over time.

Corn

Let us talk about the brain of the elevator for a second. Daniel mentioned those smart systems where you press the floor number on a screen outside the elevator instead of inside. That is called Destination Dispatch, right?

Herman

Yes, and it is a fascinating piece of optimization. In a traditional system, you press a button to go up, an elevator arrives, you get in, and then you press your floor. The elevator just reacts to whoever pressed the button first. It is very inefficient because you might have five people going to five different floors, and the elevator is stopping at every single one.

Corn

And meanwhile, another elevator is doing the exact same thing right next to it.

Herman

Exactly. With Destination Dispatch, the system knows exactly where everyone wants to go before they even step into a car. It uses an algorithm to group people going to the same floors into the same elevator. This reduces the number of stops, which saves a massive amount of energy and also reduces wait times. It turns the elevator bank into a coordinated fleet rather than a bunch of individual cars.

Corn

It is like ride-sharing for vertical transport. But it can be confusing for people the first time they use it. You get into the elevator and there are no buttons. You just have to trust that the machine remembered where you wanted to go.

Herman

It is a big shift in user experience! But from an efficiency standpoint, it is a game changer. For a high-rise building, it can increase the handling capacity by thirty percent or more without adding any more elevators.

Corn

I want to go back to the Israeli context that Daniel brought up. He mentioned the difference in housing stock, from the older buildings put up quickly after the state was founded to the luxury towers today. There is a real sense of a two-tier system in terms of infrastructure maintenance.

Herman

There really is. And it is not just about the elevators themselves, but the whole building's electrical system. A lot of those older buildings have outdated wiring that was never designed for the load of modern appliances, let alone a high-efficiency elevator drive. Sometimes the shabbiness that Daniel feels is a symptom of the building's overall age and the difficulty of keeping up with modern standards.

Corn

It is interesting because Israel actually has some of the strictest elevator codes in the world, partly because of the high density of apartment living. The Standards Institution of Israel, or Machon HaTkanim, has very specific requirements for everything from the strength of the cables to the fire rating of the doors.

Herman

That is a great point. Even if an elevator looks like it belongs in a black-and-white movie, it still has to meet those baseline standards to get that certificate. The inspector is a third party, usually from a certified private firm authorized by the Ministry of Labor, so they do not have a vested interest in passing a dangerous elevator. If they sign off on it, the core safety systems are almost certainly functional.

Corn

So, to answer Daniel's question directly, yes, modern elevators are significantly more power-efficient. They are smarter in how they move people. And while they are safer in terms of things like leveling and door sensors, the older elevators are actually much safer than they look because the fundamental mechanical safeties have not changed that much in a hundred years.

Herman

Right. The physics of catching a falling box are pretty much solved. The improvements have been in the soft safety areas, things like light curtains that detect your hand in the door before it hits you, or sensors that can tell if a cable is starting to fray before it actually becomes a problem.

Corn

I think there is also a psychological element here. An old elevator is loud. You hear the relays clicking, you hear the motor humming, you feel the vibration of the guide rails. A modern elevator is nearly silent. We tend to associate noise and vibration with danger, even if the machine is perfectly healthy.

Herman

That is so true. It is like an old car versus a new electric car. The old car feels like it is working harder because you can hear the explosions in the engine. But the electric car is actually more powerful and more reliable. In an elevator, that silence is the result of precision engineering, better lubrication, and digital control systems that smooth out every movement.

Corn

You mentioned the Shabbat elevator earlier when we were talking before the show. That is a uniquely Israeli thing that has a huge impact on energy efficiency and wear and tear, right?

Herman

Oh, definitely. For those who do not know, a Shabbat elevator is programmed to stop at every floor automatically so that observant Jews do not have to perform the work of pressing a button on the Sabbath. From an engineering perspective, it is the worst possible way to run an elevator.

Corn

It is the opposite of Destination Dispatch.

Herman

Literally the opposite! It is stopping and starting constantly, which is when the motor uses the most power and the brakes get the most wear. Modern Shabbat elevators are much better at this because they use those regenerative drives we talked about. They can recapture some of that energy as they decelerate at every floor. But it still puts a lot of cycles on the equipment.

Corn

I wonder if that is why some of those older elevators in Jerusalem feel so worn out. If they have been running in Shabbat mode every weekend for forty years, that is a lot of extra mileage on the motor and the door operators.

Herman

That is a very astute observation, Corn. The door operator is usually the first thing to fail on an elevator because it has the most moving parts and it gets cycled more than anything else. In Shabbat mode, those doors are opening and closing on every floor, whether someone is there or not. It is a lot of mechanical stress.

Corn

So, if you are Daniel and you are looking at that inspection certificate, you can take some comfort in the fact that the falling down the shaft scenario is extremely unlikely. But you should probably still keep your phone handy in case the door operator decides to give up the ghost between floors.

Herman

Exactly. And maybe check the leveling before you step out! But really, the transition from the old traction elevators to modern M-R-L systems, that is Machine Room-Less elevators, is what is changing the landscape.

Corn

Wait, Machine Room-Less? Where does the motor go?

Herman

It is tucked right into the top of the hoistway. Because the modern permanent magnet motors are so small and efficient, you do not need that big concrete room on the roof anymore. It saves space, it is easier to maintain, and it is much quieter for the people living on the top floor.

Corn

That is a huge benefit for architects. I can see why Daniel's wife, being an architect, would be interested in this. It changes the whole profile of a building.

Herman

It really does. It allows for cleaner rooflines and more usable space. And when you combine that with the energy savings, it is easy to see why developers are moving away from the old styles. But for those of us living in the older parts of the city, those old traction elevators are going to be with us for a long time. They were built to last, and as long as they are maintained, they will keep chugging along.

Corn

It is a bit like the old Mercedes taxis you still see in some parts of the world. They might be noisy and the interior might be held together with duct tape, but the engine will probably outlast us all.

Herman

That is a perfect analogy. There is a certain ruggedness to those old mechanical systems. They do not have microprocessors that can be fried by a power surge. They just have heavy-duty copper coils and steel levers.

Corn

I think we have covered a lot of ground here, from the physics of the governor to the economics of regenerative braking. It is amazing how much technology is packed into such a small space.

Herman

It really is. And it is a great reminder that even the most mundane things in our lives, the things we take for granted every day, are often the result of incredible engineering and decades of safety evolution.

Corn

Well, before we wrap up, I want to remind everyone that if you have a question or a topic you want us to dive into, just like Daniel did, you can reach out to us. We love getting these prompts that make us look at our surroundings in a new way.

Herman

Absolutely. You can find the contact form on our website at myweirdprompts.com. We also have a searchable archive there if you want to check out our past discussions on everything from urban planning to the science of habit.

Corn

And if you are enjoying the show, we would really appreciate it if you could leave us a review on Spotify or whatever podcast app you use. It genuinely helps other curious people find the show.

Herman

It really does. A quick rating or a few words in a review makes a world of difference for an independent show like ours.

Corn

So, next time you are in an old elevator in Jerusalem, Daniel, just remember: the physics are on your side. Even if the gate is rusty, those steel wedges are ready to catch you.

Herman

Just maybe do not jump around too much in there.

Corn

Good advice, Herman. This has been My Weird Prompts. I am Corn.

Herman

And I am Herman Poppleberry. Thanks for listening.

Corn

We will see you next time as we continue to explore the fascinating, the technical, and the just plain weird things that make our world work.

Herman

Until then, keep asking those questions.

Corn

Alright, let us go see if the elevator in our building is actually working today or if we are taking the stairs.

Herman

I could use the exercise anyway. Those Jerusalem hills are no joke.

Corn

Fair point. Thanks for listening, everyone!

Herman

Goodbye!