Episode Book

EPISODE #5545

Jet Engines on Bicycles: The Physics of Bad Ideas

PUBLISHED	25 September 2026 at 11:31 UTC
DURATION	22:00
LISTEN	myweirdprompts.com/episode/jet-engine-bicycle-physics/
HOSTS	Corn, Herman, Hilbert
SCRIPT MODEL	deepseek-flash
VOICES	chatterbox-regular (chatterbox-local)
PIPELINE	V5.2
BOOK GENERATED	19 October 2026 at 17:37 UTC

SYNOPSIS

What happens when you strap a jet engine to a bicycle? It turns out the physics is funnier and stranger than the video. We dig into why that bike almost certainly ran a valveless pulsejet rather than a turbojet, why the V-1 "buzz bomb" sound comes free with the engine class, and why standing behind it would get you both shoved and scalded. Along the way: the pulsejet that burns 55 gallons an hour and has no throttle, the go-kart builder who melted an aluminum mount off his own tailpipe, and why the military cancelled a pulsejet helicopter because it was simply too loud.

TRANSCRIPT



Corn

...and that's the thing about the sound, right, it's not the volume. It's the doppler. You hear a jet coming, you look up, you expect to see metal in the sky.



Herman

And instead there's a man on a bicycle.



Corn

There's a man on a bicycle. Which brings us to Daniel, because he sent us a video exactly like that and a list of questions about it.



Herman

Of course he did.



Corn

Here's what he wrote. Somebody on YouTube, riding a bicycle with a small jet engine strapped to it, going up a slight incline, traffic backed up behind him. And the sound was the exact signature of a jet aircraft approaching and passing by. Daniel's guess is that traffic police would have wanted a word if they'd caught him. Then he asks the real questions. How hard would that have been to build? If you were standing directly behind the bicycle, would you get blown over by jet blast, or scalded by the hot exhaust? Or does that only happen when the engine is huge? And then the part I like best. He wants the physics of attaching a jet engine where there's no good reason to go, plus the other absurd things people have grafted jet engines onto.



Herman

That's a full afternoon.



Corn

It's a full afternoon. Blast, heat, scale, absurdity, and a gallery of other grafts. Let's start with what that thing almost certainly was.



Herman

So the honest caveat first. I couldn't independently verify that specific clip. I believe it exists, and I believe it because the concept is documented. There's a pulsejet bike project that Wikipedia's own pulsejet article links to. But the engineering underneath is fully documented, and that's the part worth doing.



Corn

And the engineering says?



Herman

It says that bike almost certainly wasn't running a turbojet. It was running a pulsejet. That distinction is the whole episode.



Corn

Explain the difference like I'm a man who has never once looked inside an engine.



Herman

A valveless pulsejet is an empty metal tube. Spray nozzles at one end, a sparkplug, and that's roughly it. Few or no moving parts. You light it, it starts pulsing, and it keeps running on its own.



Corn

An empty tube.



Herman

An empty tube that screams.



Corn

And the scream is the part Daniel noticed. He said it sounded exactly like a jet aircraft. That isn't a coincidence, is it.



Herman

That's the whole reason the V-1 flying bomb got called the buzz bomb. Same engine class. A low-frequency pulsing drone, about forty-five pulses a second on the Argus engine they used. It sounds like something coming to kill you, because at one point it was.



Corn

So the video's comedy is baked into the physics. You get the aircraft-approach sound at bicycle scale, for free, because that's just what the engine does.



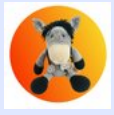
Herman

Right. Now, Daniel asked four things. Build difficulty, blast, heat, and whether any of that requires a big engine. Two of those answers are going to surprise him, and one of them is going to annoy him.



Corn

Which one annoys him?



Herman

The heat one. But build difficulty first, because that's the one where the answer is counterintuitive.



Corn

So if it's a pulsejet, the first question is: how hard is that to actually build?



Herman

Easier than you'd think. This is the cheat code of the whole genre. A valveless pulsejet needs steel tubing, a welder, and a large propane tank. That's the parts list. Someone who's actually built one described it as parts from a home improvement store over a long weekend.



Corn

A long weekend and a welder.



Herman

And the thrust figures make it real. Small commercial model pulsejets, the kind you can buy, make three to ten pounds of thrust. Homebuilt engines in the twenty to a hundred pound range. A hundred pounds of thrust is more than enough for what one practitioner described as, let's grab an old bicycle and do something really stupid.



Corn

That's the most honest engineering assessment I've ever heard.



Herman

It's also accurate. Compare that to building an actual turbojet from scratch, which is a different universe. Precision compressors, turbines, high-temp superalloys. Nobody's doing that in a garage over a weekend. So the answer to Daniel's first question is: if you're using a pulsejet, remarkably easy. If you meant a real turbojet, forget it.



Corn

What's the catch.



Herman

Fuel economy is atrocious. Bruce Simpson, who's the definitive amateur pulsejet resource, measured his engines at three to four pounds of fuel per pound of thrust per hour. A modern turbofan is around zero point three to zero point four. So the pulsejet is over ten times worse.



Corn

Give me that in gallons, because pounds per pound per hour means nothing to a human being.



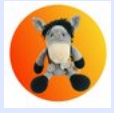
Herman

A hundred-pound-thrust pulsejet burns about three hundred pounds of fuel an hour. Call it fifty-five gallons. An hour.



Corn

Fifty-five gallons an hour to move one man on a bicycle.



Herman

Simpson's own go-kart burned about ten pounds of LPG in three to four minutes. He put it at two to three dollars a minute in fuel. His summary of the whole situation was, and I'm quoting, fuel economy? What's that?



Corn

A man who has made peace with his choices.



Herman

Completely at peace.



Corn

I want to sit on that for a second, because it's absurd. Fifty-five gallons an hour. My car doesn't burn that. A bus doesn't burn that. A small aircraft doesn't burn that. And this thing is moving one guy who could have just pedaled.



Herman

And here's the detail that makes it worse. The pulsejet doesn't idle. There's no throttle in the way you're imagining. It's either running at full scream or it's off. So you're burning fifty-five gallons an hour whether you're moving or sitting at a red light.



Corn

You're burning fifty-five gallons an hour at a red light.



Herman

At a red light, waiting for the crosswalk, deafening everyone within a block, and getting zero miles per gallon because you're not moving.



Corn

That's a beautiful image. The most expensive way to sit still ever devised.



Herman

Simpson actually talked about this. He said the engine has essentially one power setting. You control your speed with the brakes, not the throttle. Which means you're fighting your own engine the entire time.



Corn

Fighting your own engine with the brakes.



Herman

That's the design.



Corn

So build difficulty, answered. Now the blast question, because that's the one Daniel framed as a physical experience. Standing directly behind it. Would you get blown over.



Herman

Thrust is thrust. A hundred-pound-thrust pulsejet pushes a hundred pounds of force backward into whatever's behind it. For a standing adult, that's a substantial shove. Enough to stagger you, enough to put you on the ground if you weren't braced and didn't see it coming.



Corn

And Simpson's own warning about his hundred-pound engine?



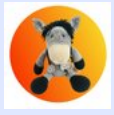
Herman

He described it as a seriously powerful source of thrust, capable of lifting a small kart right off the ground if it isn't properly controlled. If it can lift a kart, it can put a person down.



Corn

But there's a distance question, isn't there. Daniel's imagining standing behind the bike on the road, not standing at the nozzle.



Herman

Jet blast falls off fast with distance. Right at the nozzle it's brutal. A few meters back it's a strong wind. So a bicycle-scale engine is not going to blow over someone across the street. But directly behind it, close, unprepared? Yes. That's a real shove.



Corn

How fast does it fall off? Give me the shape of it.



Herman

Roughly with the square of distance, the way any expanding jet does. Double the distance, quarter the force. So at one meter you might feel a hundred pounds. At two meters, twenty-five. At four meters, six. By the time you're across the street, it's a breeze.



Corn

So the danger zone is small but real.



Herman

Small but real, and it moves with the bike. Which is the thing people forget. The bike is the source. Wherever the bike goes, the danger zone goes with it.



Corn

Now the heat, and I have a feeling this is where the surprise lives.



Herman

This is the one that busts Daniel's intuition. He asked whether being blown over or scalded only happens with huge engines. The answer is no, and the reason is mechanical.



Corn

Go on.



Herman

A turbofan, the engine on an airliner, has a core and a bypass. The hot combustion gas comes out of the core, but it's surrounded and diluted by cold air pushed around the core by the big fan. So by the time it reaches you, it's been mixed down. A pulsejet has no bypass. It dumps raw, undiluted combustion gas straight out the tailpipe. No dilution, no mixing, nothing.



Corn

So the small engine is putting out proportionally hotter, more concentrated exhaust than the big one.



Herman

Per unit of thrust, yes. The big turbofan moves a huge mass of air relatively gently. The pulsejet moves a small mass of air that's on fire. And the tube itself glows red hot while it's running.



Corn

Which means Daniel's instinct that small equals safe is exactly backwards.



Herman

Exactly backwards. And we don't have to theorize about it, because Simpson burned his leg on the pulsejet pipe mounted on his own go-kart. His words. I did burn my leg on the pulse jet pipe, damn. He later had an aluminum mounting strap melt away from the tailpipe heat. Aluminum. Melted. Off the vehicle.



Corn

Aluminum melts at what, twelve hundred degrees?



Herman

Around twelve hundred Fahrenheit, depending on the alloy. So the tailpipe was running hotter than that. On a go-kart. At bicycle scale.



Corn

So the answer to Daniel's blast and heat question is yes to both, at bicycle scale, and the heat is arguably worse than he'd expect rather than better.



Herman

Both hazards are real. A hard shove, and scalding gas plus a red-hot tube you're straddling. The pulsejet is a machine that converts fuel into noise, heat, and a modest amount of thrust, in roughly that order.



Corn

So you'd get shoved and scalded. But here's the thing. The whole enterprise is mathematically pointless. Let's talk about why.



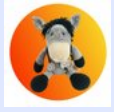
Herman

This is where the numbers get funny.



Corn

Start with thrust-to-weight, because that's the one that kills the video's premise.



Herman

Simpson's kart. A hundred pounds of thrust, and the total weight was about two hundred sixty pounds. That's a hundred seventy pound rider plus a ninety pound kart. So thrust-to-weight is one to two point six.



Corn

Meaning?



Herman

Meaning any slope steeper than one in two point six and the vehicle stalls. It can't climb it. That's not a steep hill. That's a modest grade.



Corn

So Daniel's video, the guy going up a slight incline with traffic behind him.



Herman

A pulsejet bike would be struggling on anything real. Either the incline was gentler than it looked, or the bike was already moving and coasting on momentum, or the engine was bigger than it appeared. The physics doesn't love that video.



Corn

And this is because a pulsejet is efficient only at high speed.



Herman

It's a top-gear engine. Great at speed, terrible at acceleration. On a bicycle you're in the worst possible regime. Low speed, no acceleration, and you're hauling a heavy, fuel-guzzling, deafening engine up a hill it can barely manage.



Corn

Fifty-five gallons an hour to move one person at bicycle speed, when a human on a normal bike needs no fuel at all and a moped needs a thimble.



Herman

That's the definition of no good reason.



Corn

And the noise isn't a side effect, it's a disqualifier. You mentioned the V-1. What did the noise do to the actual engineering programs?



Herman

It killed them. Wikipedia's own summary is that pulsejet noise usually makes them impractical for anything other than military or similarly restricted applications. The XH-26 Jet Jeep helicopter was cancelled partly because of unacceptable pulsejet noise. This is a machine so loud the military looked at it and said, no.



Corn

The military. The people who don't mind loud.



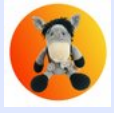
Herman

The people who famously don't mind loud. Which is why Daniel's guess about traffic police is probably the most grounded thing in his whole prompt. A bicycle pulsejet is a public nuisance machine with a rider attached.



Corn

How loud are we actually talking? Give me a number.



Herman

The V-1 was audible from something like ten miles away. Some sources say further. That's a four hundred ninety pound thrust engine, but the sound doesn't scale down the way you'd hope. A hundred-pound pulsejet is still described by everyone who's stood near one as physically painful without hearing protection.



Corn

Physically painful.



Herman

Not just loud. Painful. The kind of thing where your chest feels it, not just your ears. Which is a different category from a motorcycle or a chainsaw.



Corn

So it's not that it's louder than a jet. It's that it's louder than anything has a right to be at that size.



Herman

Right. And that's the recurring theme. Small size doesn't buy you small consequences.



Corn

So the bicycle is pointless. Now give me the gallery. What else have people grafted these onto.



Herman

Closest cousins first. The pulsejet go-kart, which is Simpson's build and the best-documented amateur version of any of this. A pulsejet speedboat. And the pulsejet bicycle itself, which is the documented Instructables project. Those three are the same idea wearing different hats.



Corn

Then it escalates.



Herman

Rotor-tip pulsejets on helicopters. American Helicopter built the XA-5 Top Sergeant in forty-nine, the XA-6, and then the XH-26 Jet Jeep in fifty-two. The idea was to mount the pulsejets at the tips of the rotor blades so you don't need a tail rotor to fight the torque. Clever.



Corn

And cancelled.



Herman

Cancelled. Noise, and autorotation problems. Autorotation is how a helicopter lands safely when the engine quits, and the pulsejet setup made that much harder. So the cleverness cost them the safety case.



Corn

What about the V-1 itself. That's the original.



Herman

The original mass-produced pulsejet vehicle. The Argus As 014, about four hundred ninety pounds of static thrust, pulsing about forty-five times a second. That's the engine that gave the sound its menace, and every hobbyist since has been borrowing that sound for laughs.



Corn

And then there's the serious stuff, which I didn't expect.



Herman

Boeing built something called PETA, the Pulse Ejector Thrust Augmentor, as a serious pulsejet application for vertical takeoff and lift. That's a defense contractor putting real money into the technology. And then Wave Engine Corporation, a University of Maryland spinoff, shipped a digitally controlled pulsejet for drones in twenty twenty-four. Four



Herman (continued)

engines delivered to a customer.



Corn

So the buzz bomb's engine has a modern second act.



Herman

It does. Digital control and modern materials fix a lot of what made the original so crude.



Corn

What does digital control actually buy you?



Herman

Timing, mostly. The original pulsejet runs on its own rhythm, whatever the tube wants to do. A digitally controlled one can modulate the fuel injection to match the resonance, which makes it more efficient and lets you throttle it. The old one was on or off. The new one has a dial.



Corn

So it's the same scream, just better behaved.



Herman

Same scream, better behaved. Which is a strange thing to be able to say about a technology from nineteen forty-four.



Corn

Now the contrast, because I think this is the payoff. Real jet engines are insanely hard.



Herman

Insanely hard. Brian Potter wrote a piece on this in Construction Physics. A commercial turbofan needs about fifty percent of its turbine power just to drive the compressor. That's the back-work ratio. Turbine inlet temperatures near three thousand degrees Fahrenheit, which is nearly double the melting point of the metal the turbine is made of. Blades spinning over ten thousand RPM. Single-crystal superalloy blades with internal cooling channels, because otherwise they'd melt.



Corn

Nearly double the melting point of the metal.



Herman

And they survive it, because the cooling is that good. Development costs run one and a half to seven billion dollars. The RB211's overruns bankrupted Rolls-Royce, and the British government had to nationalize the company in seventy-one.



Corn

A jet engine bankrupted Rolls-Royce.



Herman

And a modern large one generates power on the order of a hundred megawatts. That's a power plant with wings.



Corn

A hundred megawatts. That's what, a small city?



Herman

A small city, or a decent-sized industrial facility. And it's moving through the air at five hundred miles an hour inside a tube you're sitting in.



Corn

So the same physics that makes a real jet engine a civilization-scale achievement is what makes strapping one to a bicycle so gloriously idiotic. The bicycle gains nothing from any of it.



Herman

Nothing. You get all the noise, all the heat, all the danger, and none of the efficiency. It's a tribute to the simplest possible jet engine, performed by someone with a welder and no supervision.



Corn

And it turns out the small-engine hazard isn't just a thought experiment. Hilbert, you've actually seen this play out.



Hilbert

I worked a summer at a small airfield. Line service. Fueling, tugging, moving planes around. There was a safety briefing every season and everyone slept through it.



Corn

What was in it.



Hilbert

Jet blast and intake suction. Everyone nods, everyone thinks it's about the airliners. It wasn't. The story they told was about an APU exhaust. Little thing, sits at the back of the aircraft, nobody looks at it. A guy walked behind one and ended up in the hospital with burns.



Herman

That's the exact point.



Hilbert

He didn't respect it. Nobody respects the small ones. You stand behind a big turbofan, you're careful, because it's obviously a big turbofan. You stand behind the little exhaust because it's small and it's just sitting there. That's the one that gets you.



Corn

So the briefing was about the small engine.



Hilbert

The briefing was about the small engine. The big ones look after themselves.



Herman

Which is the counterintuitive thing we've been circling all episode. No bypass dilution, so the small exhaust is proportionally worse.



Hilbert

I don't know anything about dilution. I know the guy spent a week in the hospital.



Corn

Fair.



Hilbert

Loudest thing I ever heard out there wasn't a jet either. Somebody had rigged a pulsejet to a go-kart for a charity event. Set off every car alarm in the parking lot. You could hear it from the far end of the field.



Herman

That tracks with everything we've said.



Hilbert

The kart didn't go very fast.



Corn

That also tracks.



Herman

That APU story is exactly the point. The small ones are the ones that get you. Which brings us back to the bicycle.



Corn

Here's the misconception I want to put to bed. The thing people believe about this whole genre. The belief is that the danger scales with the size of the engine. Big engine, big danger. Small engine, small danger.



Herman

Wrong, and the mechanism is the bypass. A turbofan dilutes its hot core with cold bypass air, so the exhaust that reaches you has been mixed down. A pulsejet has no bypass. It dumps raw combustion gas straight out the pipe, and the pipe glows red hot while it runs. Per unit of thrust, the small engine is the more concentrated hazard.



Corn

The pulsejet is the simplest possible jet engine. An empty tube and a sparkplug. And it's so loud and so inefficient that the military cancelled helicopters over it.



Herman

They did.



Corn

What does it mean that the simplest version of a technology is also the most antisocial one?



Herman

I think it means the simplicity was never the point. The pulsejet is simple because it doesn't try to solve the hard problems. It doesn't manage heat, it doesn't manage noise, it doesn't manage fuel. It just makes thrust and lets everything else be somebody else's problem. The turbofan is what you get when you decide to solve all of those at once, and that costs you seven billion dollars and a nationalized Rolls-Royce.



Corn

The simplicity is a kind of cheating.



Herman

It's a kind of cheating. It's refusing to do the work that makes the technology usable. Which is fine if you're building a model in your garage. It's not fine if you're trying to fly a helicopter or move a passenger.



Corn

The modern version is being taken seriously again. Wave Engine's drone engine, digitally controlled, modern materials. The buzz bomb's engine might have a quiet second act.



Herman

Quieter than the first one, anyway. That's a low bar.



Corn

The bicycle was never the point. The point is that the gap between a weekend project with a welder and a seven billion dollar turbofan is the entire history of engineering, and someone on YouTube bridged it with a bike and a death wish.



Herman

A burned leg, if he was anything like Simpson.



Corn

A burned leg. That's the episode. Thanks to Hilbert Flumingtop for producing. This has been My Weird Prompts. If you want to send us something, email us at show at my weird prompts dot com.



Herman

We'll be back soon.



Corn

See you tomorrow.