

1

00:00:00,000 --> 00:00:07,000

The Mythbusters are stepping out for science.

2

00:00:07,000 --> 00:00:08,500

We want some destruction!

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00:00:08,500 --> 00:00:14,000

Can you destroy a bridge using just the rhythm of marching feet?

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00:00:14,000 --> 00:00:17,000

Smile with confidence.

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00:00:17,000 --> 00:00:20,000

We're using the ones that were on the top of the toilet.

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00:00:20,000 --> 00:00:23,000

But is there more in those bristles than meets the eye?

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00:00:23,000 --> 00:00:24,000

Sit down more!

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00:00:24,000 --> 00:00:27,000

And ski boat or row boat?

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00:00:27,000 --> 00:00:32,000

Jamie and Adam test the myth of human horsepower.

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00:00:32,000 --> 00:00:34,000

Who are the Mythbusters?

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00:00:34,000 --> 00:00:37,000

Is my missing an eyebrow?

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00:00:37,000 --> 00:00:38,000

Adam Savage.

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00:00:38,000 --> 00:00:41,000

I always enjoyed seeing Adam in pain.

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00:00:41,000 --> 00:00:42,000

Oh!

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00:00:42,000 --> 00:00:43,000

And Jamie Heineman.

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00:00:43,000 --> 00:00:46,000

Jamie wants a big bone.

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00:00:46,000 --> 00:00:50,000

Between them, more than 30 years special effects experience.

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00:00:50,000 --> 00:00:51,000

You're kind of sexy.

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00:00:51,000 --> 00:00:54,000

They don't just tell the myths.

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00:00:54,000 --> 00:00:57,000

They put them to the test.

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00:01:07,000 --> 00:01:10,000

Alright Adam, so we're standing in front of this bridge

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00:01:10,000 --> 00:01:12,000

and we're wearing silly hats.

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00:01:12,000 --> 00:01:13,000

What are we doing?

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00:01:13,000 --> 00:01:15,000

Well, this one is called Breakstep Bridge.

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00:01:15,000 --> 00:01:18,000

And it's actually at least a couple hundred years old.

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00:01:18,000 --> 00:01:23,000

The idea behind it is that soldiers marching in sync across the bridge

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00:01:23,000 --> 00:01:26,000

might actually destroy that bridge.

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00:01:27,000 --> 00:01:31,000

The myth says the problem happens if soldiers marching rhythm

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00:01:31,000 --> 00:01:34,000

matches the bridge's natural vibrations.

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00:01:34,000 --> 00:01:39,000

They amplify the wobble, increasing pressure on the structure.

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00:01:41,000 --> 00:01:44,000

According to folklorist Heather Joseph Witham,

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00:01:44,000 --> 00:01:48,000

history records that as a dangerous combination.

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00:01:48,000 --> 00:01:50,000

The first instance we know of this occurring

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00:01:50,000 --> 00:01:53,000

was April 14th in 1831.

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00:01:53,000 --> 00:01:57,000

The Broughton Suspension Bridge spanned the River Irwell in Manchester, England.

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00:01:57,000 --> 00:02:00,000

There was a group of military men marching across this bridge

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00:02:00,000 --> 00:02:03,000

when a pin collapsed and a chain broke

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00:02:03,000 --> 00:02:06,000

and part of the bridge actually collapsed into the river.

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00:02:06,000 --> 00:02:09,000

The rhythmic marching was blamed

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00:02:09,000 --> 00:02:14,000

and signs like this one on the Albert Bridge started to appear.

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00:02:14,000 --> 00:02:18,000

Breakstep soldier or Break the Bridge was the warning.

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00:02:18,000 --> 00:02:19,000

Don't believe it?

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00:02:19,000 --> 00:02:25,000

A similar thing happened to the Tacoma Narrows Bridge in 1940.

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00:02:25,000 --> 00:02:29,000

A particular wind set the whole structure vibrating

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00:02:29,000 --> 00:02:34,000

and once it started, it couldn't stop till it collapsed.

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00:02:35,000 --> 00:02:38,000

Adam, do you have any experience building a bridge?

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00:02:38,000 --> 00:02:42,000

No, but you know, that doesn't ever stop me before.

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00:02:43,000 --> 00:02:44,000

So here's the plan.

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00:02:44,000 --> 00:02:48,000

The guys will build a bridge and a miniature army to walk on it.

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00:02:48,000 --> 00:02:52,000

Then they'll see if the rhythm of the footsteps can make it vibrate.

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00:02:52,000 --> 00:02:57,000

If it works, the vibrating should get bigger and bigger

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00:02:57,000 --> 00:02:59,000

like a kid bouncing on a trampoline.

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00:03:01,000 --> 00:03:05,000

Fueled by a heady mix of ignorance and enthusiasm,

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00:03:05,000 --> 00:03:09,000

Adam the Mythbuster becomes Adam the Bridge builder.

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00:03:09,000 --> 00:03:11,000

They're making a suspension bridge.

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00:03:11,000 --> 00:03:12,000

Oh, okay.

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00:03:15,000 --> 00:03:19,000

Never want to think small.

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00:03:19,000 --> 00:03:24,000

Adam's first ever bridge will be 60 feet long and 6 feet high,

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00:03:24,000 --> 00:03:26,000

a mini Golden Gate.

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00:03:26,000 --> 00:03:31,000

Essentially, he's making long, flat, strong boxes.

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00:03:31,000 --> 00:03:37,000

He'll need 6 exactly the same to join end to end to make the road bed.

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00:03:37,000 --> 00:03:43,000

And I've only got to make 12 of these, you know, in like a day.

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00:03:44,000 --> 00:03:47,000

I've done more work in less time.

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00:03:47,000 --> 00:03:50,000

He's also been known to do less work in more time,

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00:03:50,000 --> 00:03:53,000

but today he's making progress.

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00:03:53,000 --> 00:03:55,000

That's pretty good.

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00:03:55,000 --> 00:03:59,000

Take the extra time on the front, save it on the back, life's good.

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00:03:59,000 --> 00:04:03,000

Do you remember the guy in the beret and the mustache on that?

69

00:04:03,000 --> 00:04:05,000

Well, that's me. Yeah.

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00:04:06,000 --> 00:04:08,000

Life's good for Jamie too.

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00:04:08,000 --> 00:04:11,000

He's on the hunt for a piece of equipment,

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00:04:11,000 --> 00:04:15,000

and it turns out the guys who make it are fans of the show.

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00:04:15,000 --> 00:04:20,000

Better still, they send a whole box full in no time.

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00:04:20,000 --> 00:04:21,000

Wow.

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00:04:21,000 --> 00:04:24,000

Jamie has a new toy.

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00:04:24,000 --> 00:04:28,000

This is a brand spanking new kinetrol actuator.

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00:04:28,000 --> 00:04:31,000

These would normally open and close a valve on, you know,

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00:04:31,000 --> 00:04:34,000

maybe in some industrial process.

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00:04:34,000 --> 00:04:38,000

Only Jamie could get excited about a piece of industrial equipment,

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00:04:38,000 --> 00:04:43,000

but then only Jamie could see its potential to make little marching robots.

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00:04:43,000 --> 00:04:48,000

Put a crossbar on here with a shoe on the end of each crossbar,

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00:04:48,000 --> 00:04:51,000

and so as this thing swings back and forth like this,

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00:04:51,000 --> 00:04:57,000

the shoes will go up and down, and this thing will go up and down,

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00:04:57,000 --> 00:04:59,000

and that's our walking mechanism.

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00:04:59,000 --> 00:05:05,000

If all goes well, it won't be long before Jamie's hearing the pitter-patter of little feet

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00:05:05,000 --> 00:05:08,000

in army boots.

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00:05:13,000 --> 00:05:15,000

There's a lot of unknowns here.

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00:05:15,000 --> 00:05:18,000

Nothing we're not used to on Mythbusters.

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00:05:19,000 --> 00:05:24,000

What is known is Adam's finished the six sections of road day.

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00:05:24,000 --> 00:05:29,000

Now the two uprights, which stand at either end of the bridge.

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00:05:30,000 --> 00:05:35,000

Not bad for a first attempt.

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00:05:35,000 --> 00:05:38,000

60 feet of steel.

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00:05:39,000 --> 00:05:42,000

This is not comfortable in the least.

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00:05:42,000 --> 00:05:45,000

Good job, by the way. This is a nice piece of work.

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00:05:45,000 --> 00:05:48,000

This is like one of those Marine Corps obstacle courses, right?

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00:05:48,000 --> 00:05:50,000

It's like, how fast can you?

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00:05:53,000 --> 00:05:55,000

I could do it faster than that.

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00:05:56,000 --> 00:05:59,000

How much faster?

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00:05:59,000 --> 00:06:05,000

Many people feel it's a bad idea to train around jagged steel edges,

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00:06:05,000 --> 00:06:10,000

but all Adam is concerned about is making this thing twang

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00:06:10,000 --> 00:06:13,000

like the world's longest guitar string.

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00:06:13,000 --> 00:06:16,000

The goal is to get this bridge to tune it to about three hertz,

103

00:06:16,000 --> 00:06:19,000

which is about three beats per second,

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00:06:19,000 --> 00:06:22,000

which is about a soldier's marching cadence.

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00:06:22,000 --> 00:06:26,000

And then once we get that, we put our frequency oscillator on it.

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00:06:26,000 --> 00:06:29,000

Basically a big weight that hits the bridge at the right moment.

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00:06:29,000 --> 00:06:30,000

Boom, boom, boom.

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00:06:30,000 --> 00:06:33,000

And we'll start to watch the bridge go, you know,

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00:06:33,000 --> 00:06:35,000

wiggly every time we hit it.

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00:06:35,000 --> 00:06:37,000

It should be pretty cool.

111

00:06:40,000 --> 00:06:41,000

Sorry.

112

00:06:41,000 --> 00:06:42,000

I'm sorry.

113

00:06:42,000 --> 00:06:43,000

No, no, no, no.

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00:06:43,000 --> 00:06:44,000

I'm really sorry.

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00:06:44,000 --> 00:06:45,000

No, you cut.

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00:06:45,000 --> 00:06:46,000

Yeah, I'm cut.

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00:06:47,000 --> 00:06:50,000

It's easy to forget this is risky work.

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00:06:50,000 --> 00:06:54,000

One slip and bloodsheds not far behind.

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00:06:55,000 --> 00:06:57,000

It just went through the outer layer.

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00:06:57,000 --> 00:06:59,000

Only a flesh wound, he says.

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00:06:59,000 --> 00:07:03,000

Adam showing a bit of British stiff upper lip.

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00:07:03,000 --> 00:07:07,000

Of course, not everything the Brits do is so rigid.

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00:07:07,000 --> 00:07:11,000

In June of 2000, the new Millennium Pedestrian Bridge

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00:07:11,000 --> 00:07:16,000

across the Thames in London got off to a very shaky start.

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00:07:16,000 --> 00:07:17,000

It seems to be swayed.

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00:07:18,000 --> 00:07:19,000

Not that bad, is it?

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00:07:19,000 --> 00:07:21,000

Well, it feels bad to me.

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00:07:21,000 --> 00:07:22,000

I feel sweet.

129

00:07:23,000 --> 00:07:26,000

The bridge had to be closed for fear it would collapse.

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00:07:26,000 --> 00:07:29,000

Turns out it had a slight sideways wobble

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00:07:29,000 --> 00:07:32,000

and crowds subconsciously swayed with that,

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00:07:32,000 --> 00:07:34,000

making it worse.

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00:07:34,000 --> 00:07:37,000

It eventually reopened after modifications.

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00:07:41,000 --> 00:07:45,000

Back at myth-busting HQ, Jamie's army is falling in.

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00:07:45,000 --> 00:07:47,000

They might not look much now.

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00:07:47,000 --> 00:07:50,000

All plastic helmets and two big boots.

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00:07:50,000 --> 00:07:52,000

But to test this myth,

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00:07:52,000 --> 00:07:56,000

Drill Sergeant Heinemann will turn this spare parts outfit

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00:07:56,000 --> 00:08:00,000

into a well-drilled marching machine.

140

00:08:01,000 --> 00:08:02,000

In the bridge.

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00:08:03,000 --> 00:08:06,000

Adam is soldiering on despite his injured arm.

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00:08:06,000 --> 00:08:10,000

The Mythbusters backlot is about to become a theme park

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00:08:10,000 --> 00:08:14,000

with the addition of a 60-foot suspension bridge.

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00:08:14,000 --> 00:08:19,000

Two main cables span the length of the bridge.

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00:08:24,000 --> 00:08:27,000

Lighter lines run down to the road deck.

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00:08:27,000 --> 00:08:31,000

The whole thing tensioned tight as a drum.

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00:08:34,000 --> 00:08:37,000

We may, we may just be able to walk on this puppy.

148

00:08:37,000 --> 00:08:39,000

Drum roll please.

149

00:08:40,000 --> 00:08:43,000

Adam is a happy camper.

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00:08:43,000 --> 00:08:47,000

It seemed a bridge too far, but it wasn't.

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00:08:47,000 --> 00:08:51,000

I have to say this is one of the more satisfying things I've ever built.

152

00:08:51,000 --> 00:08:54,000

Now, in true Mythbusters fashion,

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00:08:54,000 --> 00:08:58,000

the only thing left to do is see if it can be shaken to pieces

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00:08:58,000 --> 00:09:00,000

by Jamie's soldiers.

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00:09:00,000 --> 00:09:03,000

But first, there's some other busting to do.

156

00:09:04,000 --> 00:09:07,000

It's the unspeakable myth.

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00:09:07,000 --> 00:09:10,000

The one you just can't flush away.

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00:09:10,000 --> 00:09:12,000

There's poo everywhere.

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00:09:12,000 --> 00:09:15,000

Is there more than toothpaste on that brush?

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00:09:19,000 --> 00:09:23,000

There's actually a bunch of myths around and surrounding bathrooms

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00:09:23,000 --> 00:09:27,000

and cleanliness and ideas of what the clean parts of our house are.

162

00:09:27,000 --> 00:09:30,000

But actually, I think the main idea is to make sure

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00:09:30,000 --> 00:09:32,000

that the bristles of a wet toothbrush

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00:09:32,000 --> 00:09:37,000

make an ideal collection surface for things like airborne bacteria.

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00:09:37,000 --> 00:09:42,000

There's no rosy way to say this, so let's cut to the chase.

166

00:09:42,000 --> 00:09:46,000

What we're talking about here is fecal coliform bacteria.

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00:09:46,000 --> 00:09:49,000

The bacteria that lives, well, you know where.

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00:09:49,000 --> 00:09:52,000

The belief is that you shouldn't leave your toothbrush in the bathroom,

169

00:09:52,000 --> 00:09:55,000

particularly not too close to the toilet.

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00:09:55,000 --> 00:09:58,000

Because there's all sorts of bacteria floating in the air

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00:09:58,000 --> 00:10:01,000

which ends up on your toothbrush and therefore in your mouth.

172

00:10:01,000 --> 00:10:04,000

Adam, you know, before we even start this experiment,

173

00:10:04,000 --> 00:10:07,000

we should probably do a simple test to see whether the toilet

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00:10:07,000 --> 00:10:09,000

actually produces an aerosol.

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00:10:09,000 --> 00:10:12,000

You mean like whether when it's flushing it actually makes little droplets

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00:10:12,000 --> 00:10:14,000

and vapor that go everywhere?

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00:10:14,000 --> 00:10:15,000

Exactly.

178

00:10:15,000 --> 00:10:19,000

Some color in the water, and Adam's got any flying droplets

179

00:10:19,000 --> 00:10:21,000

covered in a layer of water.

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00:10:21,000 --> 00:10:22,000

Go.

181

00:10:22,000 --> 00:10:24,000

Well, I see some drops.

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00:10:24,000 --> 00:10:26,000

All right, well, there you go.

183

00:10:26,000 --> 00:10:28,000

The aerosol part of the myth is definitely true.

184

00:10:28,000 --> 00:10:30,000

Yeah, these are probably the least of our worries

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00:10:30,000 --> 00:10:33,000

because we can see these and they're big heavy drops.

186

00:10:33,000 --> 00:10:35,000

What we should be concerned about, I think,

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00:10:35,000 --> 00:10:37,000

are the ones that we don't see.

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00:10:37,000 --> 00:10:40,000

They're little tiny things that may be going, who knows where.

189

00:10:40,000 --> 00:10:43,000

But can those tiny droplets drift away?

190

00:10:43,000 --> 00:10:45,000

I think we should be concerned about that.

191

00:10:45,000 --> 00:10:47,000

I think we should be concerned about that.

192

00:10:47,000 --> 00:10:49,000

I'm not going to be on who knows where.

193

00:10:49,000 --> 00:10:54,000

But can those tiny droplets drift all the way to your toothbrush?

194

00:10:54,000 --> 00:10:56,000

The mythbusters aim to find out.

195

00:10:56,000 --> 00:10:58,000

Well, do we have a plan?

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00:10:58,000 --> 00:11:00,000

Of course we have a plan. This is mythbusters.

197

00:11:00,000 --> 00:11:03,000

The reason we've got so many toothbrushes here is because we want to lay out

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00:11:03,000 --> 00:11:08,000

a really broad test pattern to see if distance from the toilet

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00:11:08,000 --> 00:11:11,000

orientation to the toilet and height from the toilet

200

00:11:11,000 --> 00:11:16,000

affect the number of fecal coliforms that we can find when we test the toothbrushes.

201

00:11:16,000 --> 00:11:22,000

Adam has clearly given this whole dirty toothbrush thing an awful lot of thought.

202

00:11:22,000 --> 00:11:26,000

In no time, he's fitting out the bathroom in the mythbusters workshop.

203

00:11:26,000 --> 00:11:31,000

I'm going to use this PVC and some fittings to make a pair of toothbrush racks.

204

00:11:33,000 --> 00:11:35,000

I'll show the rig begins.

205

00:11:37,000 --> 00:11:41,000

Forget fancy blueprints. He's making it up as he goes along.

206

00:11:41,000 --> 00:11:44,000

It only has to last for a month.

207

00:11:47,000 --> 00:11:53,000

It's not pretty, but it'll do.

208

00:11:53,000 --> 00:11:56,000

What the hell have you done in my bathroom?

209

00:11:56,000 --> 00:12:00,000

We're going to set up 24 toothbrushes in this and every morning we'll have a protocol.

210

00:12:00,000 --> 00:12:04,000

And we will each be responsible to take each toothbrush,

211

00:12:04,000 --> 00:12:09,000

wash it in distilled water so we don't cross contaminate and put the wet toothbrush back.

212

00:12:09,000 --> 00:12:12,000

Then there will also be two controlled toothbrushes on top of the toilet

213

00:12:12,000 --> 00:12:15,000

that we will brush our teeth with and at the end of a month

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00:12:15,000 --> 00:12:20,000

we will check and do fecal coliform tests on the toothbrushes and see which ones have gathered the most.

215

00:12:20,000 --> 00:12:22,000

Next up, the brushes.

216

00:12:22,000 --> 00:12:28,000

The guys will wash their hands with antibacterial soap every time before they touch them

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00:12:28,000 --> 00:12:30,000

to prevent possible contamination.

218

00:12:30,000 --> 00:12:36,000

And importantly for the experiment, this bathroom will stay open for business.

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00:12:36,000 --> 00:12:40,000

A chart will keep track of exactly how much business is getting done.

220

00:12:40,000 --> 00:12:42,000

What do you think one, two and three would be?

221

00:12:42,000 --> 00:12:44,000

One would be...

222

00:12:44,000 --> 00:12:45,000

Urine.

223

00:12:45,000 --> 00:12:46,000

Two would be...

224

00:12:46,000 --> 00:12:47,000

Fecal matter.

225

00:12:47,000 --> 00:12:48,000

And three...

226

00:12:48,000 --> 00:12:50,000

I don't know, what's number three?

227

00:12:50,000 --> 00:12:56,000

Let's say perhaps an aerated approach to dispersing fecal matter.

228

00:12:56,000 --> 00:13:02,000

For a breath of fresh air, two more brushes will be kept in the office away from the bathroom.

229

00:13:02,000 --> 00:13:08,000

Jamie, these are our external controls, uncontaminated toothbrushes outside of all the experimental conditions.

230

00:13:08,000 --> 00:13:12,000

We'll rub these with a little toothpaste and rinse them with the water as well.

231

00:13:12,000 --> 00:13:19,000

If fecal coliform bacteria are found out here, they'll be embarrassed looks all around.

232

00:13:23,000 --> 00:13:29,000

It'll take a month, but the Mythbusters hope to answer a question that lurks in every bathroom.

233

00:13:29,000 --> 00:13:32,000

Is that toothbrush safe?

234

00:13:32,000 --> 00:13:39,000

If you want to know more about the robot and the water skier,

235

00:13:39,000 --> 00:13:42,000

sit down more, I'm straight.

236

00:13:42,000 --> 00:13:49,000

Stanford University has, if they pull this off, they'll become myth-busting immortals.

237

00:13:49,000 --> 00:13:51,000

This is Apollo 13, baby.

238

00:13:51,000 --> 00:13:53,000

In Houston, we don't have a problem.

239

00:13:53,000 --> 00:13:55,000

Big guy, what is the one we're doing today?

240

00:13:55,000 --> 00:13:58,000

We have a new sport. It's called row skiing.

241

00:13:58,000 --> 00:14:00,000

Row skiing?

242

00:14:00,000 --> 00:14:02,000

Yeah, you water ski behind a rowboat.

243

00:14:02,000 --> 00:14:04,000

So what are we going to get out of a little dingy rowboat?

244

00:14:04,000 --> 00:14:08,000

I'm going to start battling as fast as I can while you try and get up on water skis.

245

00:14:08,000 --> 00:14:11,000

Actually, it's skiing behind a rowing eight.

246

00:14:11,000 --> 00:14:13,000

Now that's an eight-person rowing shell.

247

00:14:13,000 --> 00:14:16,000

The question is, can we do that?

248

00:14:16,000 --> 00:14:19,000

Actually, it's skiing behind a rowing eight.

249

00:14:19,000 --> 00:14:21,000

Now that's an eight-person rowing shell.

250

00:14:21,000 --> 00:14:26,000

The question is, can we get up on a plane with water skis behind a boat like that?

251

00:14:26,000 --> 00:14:32,000

So we're going to ask eight strapping young lads in the prime of life to yank our sorry asses out of the water?

252

00:14:32,000 --> 00:14:34,000

That's the gist of it.

253

00:14:34,000 --> 00:14:37,000

Skiing behind a rowboat?

254

00:14:37,000 --> 00:14:40,000

Who ever heard of such a thing?

255

00:14:40,000 --> 00:14:46,000

Folklorist Heather Joseph Witham says this myth was made up by rowers for rowers.

256

00:14:46,000 --> 00:14:51,000

You're not going to have construction workers talking about a rowing eight or water skiing,

257

00:14:51,000 --> 00:14:54,000

but you're going to have rowers talking about this.

258

00:14:54,000 --> 00:15:02,000

Probably not even water skiers, because this functions for rowers as a way to comment on what they're doing,

259

00:15:02,000 --> 00:15:04,000

as a way for them to comment upon their sport.

260

00:15:04,000 --> 00:15:08,000

It's saying, look how fast we manly men can go.

261

00:15:11,000 --> 00:15:19,000

The fast manly men at the Stanford University's varsity rowing team

262

00:15:19,000 --> 00:15:24,000

have confidently agreed to put their egos on the line to test this one.

263

00:15:24,000 --> 00:15:25,000

Fire!

264

00:15:25,000 --> 00:15:27,000

Picking up the water!

265

00:15:27,000 --> 00:15:32,000

These boats are \$30,000 worth of carbon fiber rocket ship.

266

00:15:32,000 --> 00:15:37,000

With crew on board, it weighs nearly a ton,

267

00:15:37,000 --> 00:15:40,000

but the acceleration isn't like a motorboat.

268

00:15:40,000 --> 00:15:43,000

It surges and sinks with every stroke.

269

00:15:43,000 --> 00:15:47,000

It is about accelerating only when the blade actually enters the water.

270

00:15:47,000 --> 00:15:50,000

Once it's out of the water, it's all poetry and love sonnets.

271

00:15:50,000 --> 00:15:52,000

Everything is cool and easy.

272

00:15:52,000 --> 00:15:55,000

Once the blade goes back in, it's dark and violent thoughts.

273

00:15:55,000 --> 00:15:58,000

Sam, stay focused.

274

00:15:58,000 --> 00:16:04,000

A racing crew will be having those dark and violent thoughts about 40 times a minute.

275

00:16:04,000 --> 00:16:09,000

Going fast, they'll generate a boat speed of about 15 miles an hour.

276

00:16:09,000 --> 00:16:13,000

Skiing is normally done at 20 or more.

277

00:16:13,000 --> 00:16:17,000

Have you heard the myth about water skiers being pulled behind these boats?

278

00:16:17,000 --> 00:16:20,000

Yeah, I think it's urban legend, but we're out to prove them wrong.

279

00:16:20,000 --> 00:16:22,000

You think it can happen?

280

00:16:22,000 --> 00:16:27,000

I don't know, man. These guys got legs like steel and arms like pipes.

281

00:16:27,000 --> 00:16:29,000

I think they can do it.

282

00:16:30,000 --> 00:16:34,000

Even at top speed, they're slow by skiing standards.

283

00:16:34,000 --> 00:16:38,000

And that's before they add the drag of the skier.

284

00:16:38,000 --> 00:16:42,000

But failure is not a word in this coach's vocabulary.

285

00:16:42,000 --> 00:16:45,000

You know, I got a feeling that good things are going to happen.

286

00:16:45,000 --> 00:16:47,000

I think we might have a new business.

287

00:16:47,000 --> 00:16:50,000

We might be pulling people here. These workouts might be a good way for us to go faster.

288

00:16:50,000 --> 00:16:54,000

Amazing to watch. It made me feel pretty fat and old.

289

00:16:55,000 --> 00:17:01,000

They're so in sync and there's so much testosterone flowing on those boats, you can just feel it.

290

00:17:01,000 --> 00:17:06,000

And, you know, we give them a real challenge, like get this guy up out of the water.

291

00:17:06,000 --> 00:17:10,000

They're going to be, you know, just scrambling for it. It's going to be fun to watch.

292

00:17:12,000 --> 00:17:15,000

Now the mythbusters have a big problem.

293

00:17:15,000 --> 00:17:21,000

The athletes might be up to the challenge, but neither Jamie nor Adam knows how to ski.

294

00:17:22,000 --> 00:17:25,000

Let's see Willie. Adam.

295

00:17:25,000 --> 00:17:31,000

They don't just need a fast teacher. They need the water ski terminator.

296

00:17:31,000 --> 00:17:33,000

Good. So you guys are skiing now?

297

00:17:33,000 --> 00:17:35,000

We are. We're here for some lessons.

298

00:17:35,000 --> 00:17:37,000

We're going to get the lessons going here.

299

00:17:38,000 --> 00:17:41,000

This will be an unusual session for Willie.

300

00:17:41,000 --> 00:17:44,000

He'll be teaching them how to go slow.

301

00:17:44,000 --> 00:17:49,000

He was a champion skier in Germany before moving to America and turning pro.

302

00:17:49,000 --> 00:17:54,000

We'll go about 1500 rpm to establish the minimum speed for him to ski at.

303

00:17:55,000 --> 00:18:01,000

This would be about the same in terms of speed, what it feels for him behind the rowboat.

304

00:18:01,000 --> 00:18:03,000

Jamie, move on and out.

305

00:18:04,000 --> 00:18:07,000

Beginners start on a boom, not a rope.

306

00:18:07,000 --> 00:18:12,000

When the boat pulls, keep your shoulders back. Don't let them come forward. Ready?

307

00:18:20,000 --> 00:18:23,000

This is why I wanted Jamie to go first.

308

00:18:23,000 --> 00:18:28,000

You made the mistake and Ben and his arms. You got to keep his arms straight.

309

00:18:28,000 --> 00:18:34,000

That's his thing. Arm straight? Keep them straight. Slowly stand up.

310

00:18:34,000 --> 00:18:42,000

Jamie, stand tall. Get your shoulders up. There you go.

311

00:18:42,000 --> 00:18:46,000

Jamie's a fast learner, but he's going more than 20 miles an hour.

312

00:18:46,000 --> 00:18:48,000

The water feels solid.

313

00:18:48,000 --> 00:18:54,000

You're going to slow you down to the speed behind the rowboat. 15 miles per hour.

314

00:18:54,000 --> 00:18:58,000

When Willie drops the speed, staying upright gets harder.

315

00:18:58,000 --> 00:19:08,000

Jamie, slowly sit down. Get in the squat. Sit down. Sit down. More. Sit down more. Arm straight.

316

00:19:08,000 --> 00:19:11,000

Okay, slowly stand up.

317

00:19:11,000 --> 00:19:17,000

Get your shoulders up, Jamie. There you go. Very nice.

318

00:19:17,000 --> 00:19:24,000

Perhaps it's just fear of upsetting Willie, but Jamie is skiing like a natural.

319

00:19:24,000 --> 00:19:27,000

Turns out he's just as good on the rope.

320

00:19:33,000 --> 00:19:36,000

That felt pretty good. We did get it down pretty slow.

321

00:19:36,000 --> 00:19:42,000

I think we just nudged 10 miles an hour, which is, my guess is probably the minimum

322

00:19:42,000 --> 00:19:47,000

that we can really reasonably expect to stay up on the surface of the water.

323

00:19:47,000 --> 00:19:49,000

The slower you go, the harder it is.

324

00:19:50,000 --> 00:19:53,000

Now it's Adam's turn.

325

00:19:53,000 --> 00:19:56,000

Never had a pair of big old paddle straps on my feet before.

326

00:19:56,000 --> 00:20:00,000

We'll see how much of a fool I make of myself. Hopefully a lot.

327

00:20:01,000 --> 00:20:07,000

In fact, he does just fine. He's on the rope in a jiffy.

328

00:20:13,000 --> 00:20:18,000

Unfortunately, his legs give out a jiffy after that.

329

00:20:31,000 --> 00:20:33,000

I think Adam is one tired cookie.

330

00:20:33,000 --> 00:20:39,000

Even with the falls, Jamie and Adam have Willie's seal of approval. They're ready for the challenge.

331

00:20:39,000 --> 00:20:44,000

I do believe that both skiers you have here, Jamie and Adam, can do this.

332

00:20:44,000 --> 00:20:52,000

I think the only difficulty that I can think of is for the crew to generate enough speed

333

00:20:52,000 --> 00:20:55,000

initially to get him out of the water.

334

00:20:55,000 --> 00:21:00,000

Jamie can have this one. He can water ski behind that boat.

335

00:21:00,000 --> 00:21:07,000

I'm not in shape. It's all this upper thigh and lower back power that you've got to do,

336

00:21:07,000 --> 00:21:13,000

just halfway in this crouch. A couple of times I just dropped because I had no more strength.

337

00:21:13,000 --> 00:21:19,000

I think if the guys are actually physically capable of pulling me through the water, I can do it.

338

00:21:19,000 --> 00:21:23,000

It's just a question of how fast they can get going with that kind of load.

339

00:21:23,000 --> 00:21:28,000

It's all up to those Stanford, you know, butch guys.

340

00:21:28,000 --> 00:21:35,000

Stanford will get its chance, but first there's that other nasty myth to attend to.

341

00:21:38,000 --> 00:21:42,000

The mythbusters have become slaves to dental hygiene.

342

00:21:42,000 --> 00:21:50,000

Every morning they carefully wash their hands, put toothpaste on each of 24 brushes,

343

00:21:51,000 --> 00:21:54,000

and rinse them off again using distilled water.

344

00:21:54,000 --> 00:21:58,000

Lesson one, never give Adam a squirt gun.

345

00:22:05,000 --> 00:22:10,000

Next, they clean their teeth using two very special brushes.

346

00:22:10,000 --> 00:22:15,000

We're using the ones that were on the top of the toilet, the closest ones.

347

00:22:15,000 --> 00:22:21,000

At the end of the month, they'll test the brushes for fecal coliform bacteria.

348

00:22:21,000 --> 00:22:26,000

If nothing else, they've busted the myth that television is a glamorous industry.

349

00:22:26,000 --> 00:22:29,000

Today, it's toilet bowl close-ups.

350

00:22:29,000 --> 00:22:32,000

You've reached the pinnacle of your career.

351

00:22:32,000 --> 00:22:35,000

I couldn't get any business with this, could I?

352

00:22:37,000 --> 00:22:43,000

Toilets and cleanliness are the subject of many an urban legend, including this one.

353

00:22:43,000 --> 00:22:48,000

There's a young couple, honeymooning, somewhere in the Caribbean, and they come back to their room

354

00:22:48,000 --> 00:22:50,000

and they see that it's been ransacked.

355

00:22:50,000 --> 00:22:52,000

They've been burgled of just about everything.

356

00:22:52,000 --> 00:22:56,000

There's only two things remaining, their camera and their toothbrushes.

357

00:22:56,000 --> 00:22:59,000

So they go out and they purchase new clothes and other necessities,

358

00:22:59,000 --> 00:23:02,000

and they end up having a fantastic time.

359

00:23:02,000 --> 00:23:05,000

So they get home and they develop their film.

360

00:23:05,000 --> 00:23:11,000

And upon looking at the different photographs, they get to one that, what's that?

361

00:23:11,000 --> 00:23:15,000

And they notice that one thief has taken a picture of the other thief, mooning,

362

00:23:15,000 --> 00:23:20,000

and the picture is of his backside with their toothbrushes sticking out.

363

00:23:21,000 --> 00:23:25,000

Jamie and Adam aren't swallowing any of this myth.

364

00:23:25,000 --> 00:23:30,000

But they are professionals and they're on the scent of something big.

365

00:23:30,000 --> 00:23:37,000

You know, given that I've had toothbrushes sitting near toilets for nigh on 30 years at this point, 35 years,

366

00:23:37,000 --> 00:23:39,000

it doesn't bother me at all.

367

00:23:40,000 --> 00:23:44,000

It's a long, boring, dirty job ahead.

368

00:23:44,000 --> 00:23:49,000

But if anyone's qualified for this sort of work, it's the Mythbusters.

369

00:23:56,000 --> 00:24:01,000

Jamie Heineman has one of the world's most unusual day jobs.

370

00:24:01,000 --> 00:24:05,000

Nike wanted us to take a shoe and turn it into a motorcycle,

371

00:24:05,000 --> 00:24:10,000

a radio-controlled motorcycle that looked like something that somebody would actually build.

372

00:24:10,000 --> 00:24:15,000

And it was to illustrate how fast the shoe is, because it's an athletic shoe.

373

00:24:18,000 --> 00:24:23,000

His company makes special effects props for ads and movies.

374

00:24:23,000 --> 00:24:31,000

We had to start off with pre-existing motorcycles and check them out and learn how they were put together.

375

00:24:31,000 --> 00:24:37,000

And then we modified that kind of thing and ended up actually pretty much building from scratch

376

00:24:37,000 --> 00:24:42,000

an entire motorcycle mechanism to fit within the shoe.

377

00:24:43,000 --> 00:24:46,000

It wanted us to run it on an asterotourk.

378

00:24:48,000 --> 00:24:53,000

With this thing even having even a small pebble is like running over a speed bump.

379

00:24:54,000 --> 00:24:59,000

It's what I live for. It's what I enjoy doing.

380

00:24:59,000 --> 00:25:03,000

If I have time off, I'm down here at the shop.

381

00:25:03,000 --> 00:25:07,000

Sometimes I'll wake up in the middle of the night giggling with some idea,

382

00:25:07,000 --> 00:25:11,000

and I just come down, turn the music up, and all of a sudden I've got this thing

383

00:25:11,000 --> 00:25:14,000

that nobody ever thought of before, didn't exist before.

384

00:25:24,000 --> 00:25:31,000

Now the guys are using the same ingenuity when it comes to testing the BreakStep bridge.

385

00:25:31,000 --> 00:25:36,000

But seeing as no one would let them wreck a real bridge, Adam has built one himself.

386

00:25:36,000 --> 00:25:40,000

And Jamie's built, well, he's built these things.

387

00:25:41,000 --> 00:25:45,000

Not just one, but twelve little dudes.

388

00:25:45,000 --> 00:25:50,000

Custom-made Stompers, whose mission is to shake this bridge to death.

389

00:25:50,000 --> 00:25:53,000

It's certainly got the neighbors talking.

390

00:25:53,000 --> 00:25:55,000

So Ed, have you heard the story about the BreakStep bridge?

391

00:25:55,000 --> 00:25:56,000

Yes, I have.

392

00:25:56,000 --> 00:25:57,000

What have you heard?

393

00:25:57,000 --> 00:26:03,000

Well, I've heard that it was a battalion of men, soldiers walking across the bridge.

394

00:26:03,000 --> 00:26:06,000

The bridge was supposed to have wobbled and tumbled.

395

00:26:06,000 --> 00:26:08,000

That's what we're going to try and replicate here.

396

00:26:08,000 --> 00:26:10,000

It's great. It's great.

397

00:26:10,000 --> 00:26:16,000

The plan is to hook the soldiers up to an air compressor, normally used to power a jackhammer.

398

00:26:16,000 --> 00:26:19,000

Jamie's little guys should start marching.

399

00:26:19,000 --> 00:26:23,000

If they get the speed right, that should set the bridge vibrating.

400

00:26:23,000 --> 00:26:24,000

They're going to launch these things.

401

00:26:24,000 --> 00:26:27,000

It may like flip the whole bridge over or something.

402

00:26:27,000 --> 00:26:30,000

With the first turn on of the switch.

403

00:26:30,000 --> 00:26:32,000

There's no way these are going to flip my bridge.

404

00:26:32,000 --> 00:26:34,000

Not even close.

405

00:26:34,000 --> 00:26:36,000

This was built to last.

406

00:26:36,000 --> 00:26:38,000

Okay, let it down.

407

00:26:40,000 --> 00:26:43,000

Maybe it's not indestructible after all.

408

00:26:43,000 --> 00:26:46,000

All right, cool. At least we're finding all the weak points.

409

00:26:49,000 --> 00:26:50,000

All right.

410

00:26:51,000 --> 00:26:56,000

A few repairs and the bridge is over its troubled waters.

411

00:26:56,000 --> 00:26:59,000

And now they're ready to wreck it.

412

00:27:00,000 --> 00:27:02,000

I see we go for it.

413

00:27:02,000 --> 00:27:05,000

Okay. You're the bridge builder.

414

00:27:06,000 --> 00:27:10,000

Power on.

415

00:27:10,000 --> 00:27:15,000

Remember, Jamie's worried the force could tip the bridge over.

416

00:27:25,000 --> 00:27:27,000

Jamie's made a doo-wop group.

417

00:27:27,000 --> 00:27:29,000

Not a battalion of soldiers.

418

00:27:29,000 --> 00:27:31,000

It's like the California raisins.

419

00:27:32,000 --> 00:27:35,000

The boys are looking a little wimpy.

420

00:27:35,000 --> 00:27:39,000

Seems Jamie's not feeding them enough air from the compressor.

421

00:27:39,000 --> 00:27:42,000

This has to have two hoses on it.

422

00:27:43,000 --> 00:27:54,000

It seems that Jamie didn't really inspect the equipment with any real kind of an eyeball before testing the compressor.

423

00:27:57,000 --> 00:27:59,000

Okay, here we go.

424

00:27:59,000 --> 00:28:05,000

This time there should be less doo-wop and more destruction.

425

00:28:07,000 --> 00:28:09,000

Now we're talking.

426

00:28:16,000 --> 00:28:21,000

They've got plenty of power now, but the soldiers aren't perfectly in time.

427

00:28:22,000 --> 00:28:29,000

They're not getting the single regular vibration through the bridge, called for in the myth.

428

00:28:29,000 --> 00:28:35,000

Instead, those boots are just smashing Adam's road deck to pieces.

429

00:28:42,000 --> 00:28:44,000

This is bothering me.

430

00:28:44,000 --> 00:28:46,000

Well, sorry.

431

00:28:46,000 --> 00:28:53,000

I wish you'd thought about that, because people are going to watch this and start to smash up the stuff without it moving.

432

00:28:53,000 --> 00:28:55,000

People are going to be like, what the f\*\*\* is he telling us?

433

00:28:55,000 --> 00:29:02,000

To get the timing exactly right, Jamie will have to individually adjust the airflow to each of his soldiers.

434

00:29:02,000 --> 00:29:07,000

It's a fiddly process, and fiddly is not Adam's strong suit.

435

00:29:07,000 --> 00:29:15,000

I have to say that at the very start of this, Jamie and I had a big argument about whether or not to do this electrically or electrically.

436

00:29:15,000 --> 00:29:18,000

Or pneumatically, with air.

437

00:29:18,000 --> 00:29:23,000

And I strongly suggested that we not use air.

438

00:29:23,000 --> 00:29:29,000

I explained it to him in great detail, and he decided to ignore a good portion of it.

439

00:29:29,000 --> 00:29:32,000

I'm pleased that the actuators are definitely doing what we needed.

440

00:29:32,000 --> 00:29:40,000

They were the right choice for this job, and they'll certainly go as fast or as slow as we need to get them to go.

441

00:29:40,000 --> 00:29:44,000

I think the biggest problem is not my little soldiers, it's the bridge.

442

00:29:45,000 --> 00:29:49,000

There's blame in the air.

443

00:29:49,000 --> 00:29:53,000

But it's not always easy to destroy a bridge.

444

00:29:53,000 --> 00:30:01,000

In a master stroke of forward planning, this one in North Carolina was completed just before Adam was due to flood the valley.

445

00:30:01,000 --> 00:30:07,000

So, gathered around a very small table, the authorities decided to knock it down.

446

00:30:07,000 --> 00:30:10,000

First, they piled on huge weights.

447

00:30:10,000 --> 00:30:17,000

That only resulted in an amazing new use for animated arrows.

448

00:30:17,000 --> 00:30:23,000

So, they called in the Air Force, but the fly boys were having an off day.

449

00:30:23,000 --> 00:30:26,000

So, was the artillery come to that?

450

00:30:26,000 --> 00:30:31,000

Finally, mines did the trick in spectacular fashion.

451

00:30:31,000 --> 00:30:39,000

Adam and Jamie are desperate to destroy their bridge with a bucking Bronco vibration that shakes it to bits.

452

00:30:39,000 --> 00:30:46,000

When we hit the resonance of the bridge, the bridge going up and down with it will be extremely rhythmic and will get bigger every time.

453

00:30:46,000 --> 00:30:48,000

And it'll actually be pretty catastrophic.

454

00:30:48,000 --> 00:30:53,000

Catastrophic destruction is the desired outcome for most Mythbusters experiments.

455

00:30:53,000 --> 00:30:59,000

So, for the third and final time, Jamie's army is ready for combat.

456

00:30:59,000 --> 00:31:03,000

Alright, Jamie, nice and slow.

457

00:31:10,000 --> 00:31:19,000

The troop is marching its metal heart out, but it can't match the frequency of the bridge.

458

00:31:19,000 --> 00:31:23,000

There's no wave of vibration rolling through the roadbed.

459

00:31:23,000 --> 00:31:27,000

Something's got to give.

460

00:31:27,000 --> 00:31:32,000

Come on!

461

00:31:33,000 --> 00:31:38,000

Come on!

462

00:31:48,000 --> 00:31:56,000

They've broken the bridge, but only through sledgehammer power, not sweet, harmonic vibration.

463

00:31:56,000 --> 00:31:58,000

All my cables held?

464

00:31:58,000 --> 00:32:01,000

Yeah, these things are starting to work.

465

00:32:01,000 --> 00:32:05,000

Yeah, look, the whole thing parallelogrammed. That's where it failed.

466

00:32:05,000 --> 00:32:09,000

These things appear to me that we were just beating on the thing.

467

00:32:09,000 --> 00:32:16,000

And while the beating was in a certain rhythm, I don't see the bridge responding to it in that rhythm.

468

00:32:16,000 --> 00:32:20,000

Jamie's army will be sent home in disgrace.

469

00:32:20,000 --> 00:32:27,000

But like the two last soldiers left out in the jungle, the Mythbusters refuse to accept defeat.

470

00:32:27,000 --> 00:32:33,000

Jamie is already planning another monster robot to attack the bridge.

471

00:32:33,000 --> 00:32:39,000

They might have lost the battle, but later in the show, they will resume the BreakStep Bridge War.

472

00:32:39,000 --> 00:32:43,000

I think I could get this bridge back up and running in half a day.

473

00:32:43,000 --> 00:32:47,000

Well, it looks like we're not quite done, but it was fun to see these guys pound away.

474

00:32:47,000 --> 00:32:49,000

They were kind of cute, weren't they?

475

00:32:49,000 --> 00:32:53,000

They were very cute. Cute for science.

476

00:32:58,000 --> 00:33:03,000

There's absolutely nothing cute about the toothbrush surprise.

477

00:33:03,000 --> 00:33:07,000

I'd like to point out the difference between my toothbrush and Jamie's toothbrush.

478

00:33:07,000 --> 00:33:09,000

Bring it up.

479

00:33:09,000 --> 00:33:14,000

Jamie's is neat and perfect. Mine is absolutely trashed.

480

00:33:14,000 --> 00:33:17,000

I don't know what that says.

481

00:33:17,000 --> 00:33:22,000

The only good news, this is the last day before the brushes will be tested.

482

00:33:22,000 --> 00:33:27,000

I get them wet, and then I foam the toothpaste on, and then I rinse them out.

483

00:33:27,000 --> 00:33:30,000

We could do a myth about how fast paint dries.

484

00:33:30,000 --> 00:33:40,000

For the last month, they've been testing the myth that microscopic fecal coliforms can waft from your toilet onto your toothbrush when you flush.

485

00:33:40,000 --> 00:33:45,000

A month is a long time for this kind of work.

486

00:33:46,000 --> 00:33:56,000

You'll watch every action-packed second as water and toothpaste meet in a fecal coliform farm of total destruction.

487

00:33:56,000 --> 00:34:05,000

To see if there really is something to worry about, the mythbusters have called on expert microbiologist Dr. Joanne Engel.

488

00:34:05,000 --> 00:34:12,000

She's going to subject the mythbusters bathroom to more scrutiny than is strictly desirable.

489

00:34:12,000 --> 00:34:17,000

I'm taking the toothbrush and I'm spreading it on the auger here, so if there's a lot of bacteria on here, it'll grow.

490

00:34:17,000 --> 00:34:20,000

And then I'm also dipping it into this bacterial broth.

491

00:34:20,000 --> 00:34:27,000

And again, if there's just even a couple of bacteria on here, it'll grow overnight after I incubate these in a nice warm oven.

492

00:34:33,000 --> 00:34:36,000

Every single toothbrush is sampled.

493

00:34:36,000 --> 00:34:40,000

These are the ones that we've actually been using to brush our teeth.

494

00:34:40,000 --> 00:34:43,000

It's been a very busy bathroom.

495

00:34:43,000 --> 00:34:47,000

But there's also the two controls kept out in the kitchen.

496

00:34:47,000 --> 00:34:50,000

This is the first time I've ever, these toothbrushes, has been in the bathroom.

497

00:34:50,000 --> 00:34:52,000

Okay.

498

00:34:53,000 --> 00:34:54,000

But they've been brushed with.

499

00:34:54,000 --> 00:34:55,000

Yes.

500

00:34:55,000 --> 00:34:59,000

They've undergone the same treatment.

501

00:35:00,000 --> 00:35:04,000

I'm going to incubate them in a 37 degree oven overnight.

502

00:35:04,000 --> 00:35:07,000

And if there's bacteria on here, we should be able to see them.

503

00:35:07,000 --> 00:35:12,000

The whole gang is relieved to finally be getting out of that little bathroom.

504

00:35:12,000 --> 00:35:18,000

And soon they'll know for sure if their toothbrushes hold an unwelcome surprise.

505

00:35:24,000 --> 00:35:27,000

The MythBusters are ready for the water ski challenge.

506

00:35:27,000 --> 00:35:30,000

Can you ski behind a rowing 8?

507

00:35:30,000 --> 00:35:32,000

So you ready?

508

00:35:32,000 --> 00:35:35,000

There's more than a myth on the line this morning.

509

00:35:35,000 --> 00:35:39,000

Stanford University has volunteered its best crew for the job.

510

00:35:39,000 --> 00:35:43,000

Their reputation is at stake, though coach is playing it cool.

511

00:35:43,000 --> 00:35:50,000

With the expert crew that MythBusters has provided, I believe that there's no way we can fail.

512

00:35:50,000 --> 00:35:57,000

First things first, these perfect fragile rowing shells don't come standard with a ski rope.

513

00:35:57,000 --> 00:36:02,000

The MythBusters have got to tie one on without tearing a hole in the boat.

514

00:36:02,000 --> 00:36:09,000

If we run a line of thin, like, high strength cord to each one of these outriggers, times 8,

515

00:36:09,000 --> 00:36:13,000

that's more than enough distributed load across the whole boat

516

00:36:13,000 --> 00:36:15,000

and you ought to be able to water ski all day behind it.

517

00:36:15,000 --> 00:36:17,000

All day, huh?

518

00:36:17,000 --> 00:36:20,000

That's only your thighs that are going to give out, buddy.

519

00:36:20,000 --> 00:36:27,000

By distributing the load over the 8 rigors, Adam will minimize the strain on the boat and the rowers.

520

00:36:28,000 --> 00:36:30,000

For the most part, these guys won't even be able to see this rig.

521

00:36:30,000 --> 00:36:32,000

It won't affect their rowing at all.

522

00:36:32,000 --> 00:36:34,000

\$30,000 per boat.

523

00:36:34,000 --> 00:36:37,000

We don't want to put a nick in the darn thing.

524

00:36:38,000 --> 00:36:40,000

That's the ski rope taking care of.

525

00:36:40,000 --> 00:36:42,000

But that's the easy part.

526

00:36:42,000 --> 00:36:48,000

The bare minimum speed required to pull Jamie out of the water is 10 miles an hour.

527

00:36:48,000 --> 00:36:55,000

In a race, a crew can reach 15, but Jamie's drag is sure to slow them down.

528

00:36:55,000 --> 00:36:58,000

It certainly helps if I weight a lot less than I do.

529

00:36:58,000 --> 00:37:01,000

I weight about 180, 170, 180.

530

00:37:01,000 --> 00:37:06,000

And, you know, if I weight 100 pounds, I'm sure it would be easier on them.

531

00:37:06,000 --> 00:37:08,000

But that's why we came to Stanford.

532

00:37:09,000 --> 00:37:15,000

Another problem for Jamie is unlike a speedboat, the power here won't be constant.

533

00:37:15,000 --> 00:37:19,000

It will surge with each stroke, pulling him off balance.

534

00:37:19,000 --> 00:37:20,000

Coach has a strategy.

535

00:37:20,000 --> 00:37:22,000

You're going to have to just do the walk on guy, you know what I'm saying?

536

00:37:22,000 --> 00:37:23,000

Yeah.

537

00:37:23,000 --> 00:37:25,000

And just withstand the jerky, jerky.

538

00:37:25,000 --> 00:37:26,000

It's going to whip you.

539

00:37:26,000 --> 00:37:28,000

Yeah, I know. I've got to dampen it.

540

00:37:28,000 --> 00:37:31,000

Remember, for Jamie and Adam, this is just another myth.

541

00:37:31,000 --> 00:37:34,000

But for Stanford, it's a matter of honor.

542

00:37:34,000 --> 00:37:35,000

Just sit up.

543

00:37:35,000 --> 00:37:36,000

Don't think length.

544

00:37:36,000 --> 00:37:40,000

Think connection of hips and straight arm cable and draw.

545

00:37:40,000 --> 00:37:43,000

Let's have the boat just tug him a little bit.

546

00:37:43,000 --> 00:37:47,000

Suddenly, Jamie's being dragged into something bigger than he realized.

547

00:37:47,000 --> 00:37:50,000

It's too late for second thoughts.

548

00:37:50,000 --> 00:37:56,000

This is about sporting glory or national televised failure.

549

00:37:56,000 --> 00:37:58,000

And there are no excuses.

550

00:37:58,000 --> 00:38:00,000

Explanations did not get the man on the moon.

551

00:38:00,000 --> 00:38:02,000

It will not get this myth buster out of the water.

552

00:38:02,000 --> 00:38:03,000

Okay.

553

00:38:03,000 --> 00:38:05,000

This is Apollo 13, baby.

554

00:38:05,000 --> 00:38:07,000

In Houston, we don't have a problem.

555

00:38:07,000 --> 00:38:08,000

Get ready.

556

00:38:09,000 --> 00:38:10,000

Attention.

557

00:38:12,000 --> 00:38:13,000

Go!

558

00:38:18,000 --> 00:38:19,000

Go!

559

00:38:19,000 --> 00:38:20,000

Get back here!

560

00:38:22,000 --> 00:38:23,000

Wait up!

561

00:38:23,000 --> 00:38:24,000

Ho!

562

00:38:24,000 --> 00:38:25,000

Ho!

563

00:38:25,000 --> 00:38:26,000

Hey!

564

00:38:26,000 --> 00:38:27,000

Hey!

565

00:38:27,000 --> 00:38:28,000

Stop rolling!

566

00:38:28,000 --> 00:38:30,000

If you're not pulling, stop!

567

00:38:30,000 --> 00:38:31,000

Jim and Jack Christmas.

568

00:38:31,000 --> 00:38:33,000

These guys are still rolling.

569

00:38:33,000 --> 00:38:35,000

So close.

570

00:38:35,000 --> 00:38:38,000

He was up, but couldn't hold on with the surge.

571

00:38:38,000 --> 00:38:41,000

This might just be possible.

572

00:38:41,000 --> 00:38:43,000

Jamie, man, that was beautiful.

573

00:38:43,000 --> 00:38:44,000

It was working.

574

00:38:44,000 --> 00:38:46,000

You think you can get it going?

575

00:38:46,000 --> 00:38:50,000

It's just in a state of constant, almost out of the water.

576

00:38:50,000 --> 00:38:51,000

Right.

577

00:38:51,000 --> 00:38:53,000

It's the hardest thing that a skier can do, I think.

578

00:38:53,000 --> 00:38:55,000

Well, you think you're good for another go?

579

00:38:55,000 --> 00:38:56,000

Oh, yeah.

580

00:38:56,000 --> 00:38:57,000

Excellent.

581

00:38:57,000 --> 00:38:59,000

Nice lock on, big dog.

582

00:38:59,000 --> 00:39:00,000

That was all you.

583

00:39:00,000 --> 00:39:01,000

That was all you.

584

00:39:01,000 --> 00:39:06,000

We got to be quicker with the second stroke or longer with the first stroke.

585

00:39:06,000 --> 00:39:10,000

It's just going to be up to me to maintain it, I think.

586

00:39:10,000 --> 00:39:13,000

Sam, same thing that you guys just did.

587

00:39:13,000 --> 00:39:18,000

So Jamie, big dog Heinemann prepares to battle the surge again.

588

00:39:18,000 --> 00:39:22,000

The guys in the engine room have proved they've got the muscle to get him up.

589

00:39:22,000 --> 00:39:24,000

He can't let them down.

590

00:39:24,000 --> 00:39:26,000

Attention!

591

00:39:30,000 --> 00:39:31,000

Go!

592

00:39:34,000 --> 00:39:36,000

Stay up. Stay up. Come on, dog. Stay up.

593

00:39:36,000 --> 00:39:38,000

Come on, big dog. Stay up!

594

00:39:38,000 --> 00:39:41,000

Go! Bring it up! Bring it up, boys!

595

00:39:41,000 --> 00:39:43,000

Jeez! We had it!

596

00:39:45,000 --> 00:39:48,000

It's close, but still no cigar.

597

00:39:48,000 --> 00:39:52,000

These Stanford guys won't settle for near enough.

598

00:39:52,000 --> 00:39:56,000

Jamie will ski even if it kills him.

599

00:39:56,000 --> 00:39:59,000

Power was there, I was having trouble dealing with the surgingness.

600

00:39:59,000 --> 00:40:02,000

Try and put the weight back when that surge hits you.

601

00:40:02,000 --> 00:40:06,000

So you've got a little more hip and power into it, because it's going to surge.

602

00:40:06,000 --> 00:40:08,000

That wasn't bad for the first two runs, though.

603

00:40:08,000 --> 00:40:10,000

No, no. Well, we ain't done yet.

604

00:40:10,000 --> 00:40:13,000

You're pulling your ass out. You're going to be doing this thing without a wetsuit and the bray.

605

00:40:13,000 --> 00:40:15,000

Glass is on if I can have my way.

606

00:40:15,000 --> 00:40:19,000

Get up, guys. Let's pull this toy out of the water.

607

00:40:19,000 --> 00:40:22,000

Heinemann, that was twice as good as last time.

608

00:40:22,000 --> 00:40:25,000

You think you can do it twice as good as that?

609

00:40:25,000 --> 00:40:28,000

I'll keep trying. Just need like a good 30-second run.

610

00:40:28,000 --> 00:40:32,000

Come to the steer. Come to the steer.

611

00:40:32,000 --> 00:40:35,000

This is the third and final attempt.

612

00:40:35,000 --> 00:40:38,000

Coach can smell something special in the air.

613

00:40:38,000 --> 00:40:40,000

Stay tough, all right? Stay tough.

614

00:40:40,000 --> 00:40:46,000

Never enjoying it. It's like you guys are right on the cusp of both meeting together at a higher plane.

615

00:40:46,000 --> 00:40:48,000

Looks good.

616

00:40:48,000 --> 00:40:51,000

I want you to put him on a ride that he won't forget.

617

00:40:51,000 --> 00:40:55,000

So once you get him up, keep him up and make it.

618

00:40:55,000 --> 00:40:57,000

Let's get his skin tone a little bit fearful.

619

00:40:57,000 --> 00:41:00,000

Little white. Let's scare him.

620

00:41:00,000 --> 00:41:05,000

Jam! Jam on it. Let's do something that's never been done. Here we go.

621

00:41:05,000 --> 00:41:08,000

Attention. Go!

622

00:41:17,000 --> 00:41:20,000

He's up and he's skiing.

623

00:41:21,000 --> 00:41:24,000

Nicely done, Jerry.

624

00:41:24,000 --> 00:41:26,000

Yeah!

625

00:41:29,000 --> 00:41:32,000

Keep it going, big dog! Keep it going, big dog!

626

00:41:32,000 --> 00:41:37,000

Good man, ball! Good man, ball! Good man, ball!

627

00:41:45,000 --> 00:41:50,000

It's not pretty. Jamie's fighting every surge, but they've done it.

628

00:41:58,000 --> 00:42:00,000

Nice job, big dog!

629

00:42:02,000 --> 00:42:06,000

Yeah, guys! Yeah! Nice job!

630

00:42:08,000 --> 00:42:12,000

Jamie's run lasted nearly 40 seconds.

631

00:42:12,000 --> 00:42:16,000

I'm pleased. This punch, that worked better than I'd ever hoped for.

632

00:42:16,000 --> 00:42:22,000

The fact that I could do this says that it ain't as ridiculous at all as we thought.

633

00:42:23,000 --> 00:42:26,000

Yeah, it was a workout. I was breathing hard after that.

634

00:42:26,000 --> 00:42:28,000

Whoa! Whoa!

635

00:42:28,000 --> 00:42:30,000

Good job.

636

00:42:32,000 --> 00:42:39,000

Stanford's finest have prevailed and proved this weird myth really is possible.

637

00:42:39,000 --> 00:42:44,000

Never underestimate young, strong myth busters.

638

00:42:46,000 --> 00:42:50,000

One of those good things about youth is they don't know obstacles.

639

00:42:50,000 --> 00:42:54,000

You demand, or as we say, Y.D.M.

640

00:42:59,000 --> 00:43:05,000

Flush with success, da men now have to see da women.

641

00:43:05,000 --> 00:43:08,000

The toothbrush surprise results are in.

642

00:43:08,000 --> 00:43:12,000

Did we actually find any fecal coliform on the toothbrushes?

643

00:43:12,000 --> 00:43:16,000

Well, we did, but in fact, all the toothbrushes...

644

00:43:16,000 --> 00:43:21,000

That'll leave a bad taste in your mouth, but the slides don't lie.

645

00:43:21,000 --> 00:43:26,000

Those little pink dots are fecal coliforms found on the brushes,

646

00:43:26,000 --> 00:43:31,000

and it made no difference how near or far they were from the toilet.

647

00:43:31,000 --> 00:43:35,000

Can we say that the exposure to the bathroom to the air

648

00:43:35,000 --> 00:43:38,000

contaminated these with a small amount of fecal coliform?

649

00:43:38,000 --> 00:43:44,000

So that'd be one interpretation, but recall that you also exposed these guys to distilled water

650

00:43:44,000 --> 00:43:47,000

and some toothpaste, and they got handled a little bit,

651

00:43:47,000 --> 00:43:50,000

so it could have also come from other sources as well.

652

00:43:50,000 --> 00:43:53,000

But brace yourself, folks. There's more.

653

00:43:53,000 --> 00:43:58,000

Remember those control toothbrushes kept outside the bathroom?

654

00:43:58,000 --> 00:44:02,000

There was also fecal coliform on our controls, which were nowhere near the bathroom.

655

00:44:02,000 --> 00:44:08,000

That's right. These guys here, so they have some pink colonies on them, too.

656

00:44:08,000 --> 00:44:15,000

Unpleasant as it seems, fecal coliforms are virtually an unavoidable part of daily living.

657

00:44:15,000 --> 00:44:17,000

But it's not all bad news.

658

00:44:17,000 --> 00:44:20,000

So, you know, this is perhaps the most critical question.

659

00:44:20,000 --> 00:44:23,000

Should the American toothbrushing public be worried about our results

660

00:44:23,000 --> 00:44:25,000

that there is fecal coliform on their toothbrushes?

661

00:44:25,000 --> 00:44:28,000

I don't think they should be. It's a very low level, and as you can see,

662

00:44:28,000 --> 00:44:31,000

we're all happy and healthy standing here and been exposed to that.

663

00:44:31,000 --> 00:44:36,000

Easy for her to say. Adam and Jamie have just learned a valuable lesson.

664

00:44:36,000 --> 00:44:40,000

Some myths are best left unanswered.

665

00:44:40,000 --> 00:44:43,000

You know, we put our bodies on the line a lot on this show,

666

00:44:43,000 --> 00:44:46,000

but brushing my teeth with fecal coliform for a month,

667

00:44:46,000 --> 00:44:49,000

that goes just a little bit farther than I really wanted to go.

668

00:44:49,000 --> 00:44:52,000

There's poo everywhere. What are we going to do?

669

00:44:58,000 --> 00:45:02,000

The Mythbusters are rebuilding the Breakstep Bridge.

670

00:45:02,000 --> 00:45:06,000

We weren't really happy with the collapse of the bridge the first time on the Breakstep Bridge,

671

00:45:06,000 --> 00:45:10,000

so I'm putting it back together, and we're going to try it a second time,

672

00:45:10,000 --> 00:45:13,000

a little more scientifically, perhaps.

673

00:45:13,000 --> 00:45:18,000

The science of this myth is the regular, rhythmic footfalls of marching soldiers

674

00:45:18,000 --> 00:45:22,000

can resonate within a bridge, causing it to collapse.

675

00:45:22,000 --> 00:45:28,000

And the challenge is to induce a regular vibration that gets bigger with every beat

676

00:45:28,000 --> 00:45:32,000

till the whole thing shakes itself apart.

677

00:45:32,000 --> 00:45:38,000

Wind caused a similar thing to happen in a famous collapse at the Tacoma Narrows.

678

00:45:38,000 --> 00:45:44,000

So far, the Mythbusters' attempts with little marching soldiers failed.

679

00:45:45,000 --> 00:45:49,000

So instead, Jamie's making one big, heavy one.

680

00:45:52,000 --> 00:45:54,000

That's starting to be pretty cool.

681

00:45:54,000 --> 00:45:58,000

We're getting a nice, controllable, harmonic out of this thing.

682

00:45:58,000 --> 00:46:01,000

I think we have what we need to work with.

683

00:46:01,000 --> 00:46:05,000

Could this be the monster that will destroy the bridge?

684

00:46:05,000 --> 00:46:10,000

The mechanical arrangement on the soldiers was such that it was a little more messy.

685

00:46:10,000 --> 00:46:15,000

This thing, I think, will be able to isolate what exactly is going on

686

00:46:15,000 --> 00:46:18,000

by being able to watch just this.

687

00:46:18,000 --> 00:46:24,000

We've got this fairly large wave, but we want to hit that wave exactly at the perfect time

688

00:46:24,000 --> 00:46:29,000

each time it comes back, and that's what it is to match a harmonic.

689

00:46:29,000 --> 00:46:33,000

So if the timing's even a little bit off, we won't be correct at all.

690

00:46:34,000 --> 00:46:41,000

So in the name of inducing wanton destruction, the Mythbusters lay it on the line one more time.

691

00:46:41,000 --> 00:46:43,000

A little faster, maybe?

692

00:46:45,000 --> 00:46:47,000

That's too fast, slower.

693

00:46:48,000 --> 00:46:50,000

Yeah, you see how it got cancelled out?

694

00:46:50,000 --> 00:46:52,000

We had something there for a second.

695

00:46:52,000 --> 00:46:54,000

Go back and...that's really close.

696

00:46:54,000 --> 00:47:00,000

Believe it or not, that tiny little wobble is more success than they got last time.

697

00:47:01,000 --> 00:47:07,000

But they can't seem to turn that ripple into a tsunami that will wreck the bridge.

698

00:47:07,000 --> 00:47:10,000

We'll get a lot more reaction with more weight on it.

699

00:47:10,000 --> 00:47:12,000

Alright, let's try it then.

700

00:47:14,000 --> 00:47:20,000

Ah, the old Mythbusters motto, when in doubt, adds something heavy.

701

00:47:20,000 --> 00:47:24,000

Now bear in mind, Adam has bled for this bridge.

702

00:47:24,000 --> 00:47:28,000

It was big, complicated, and time-consuming.

703

00:47:28,000 --> 00:47:32,000

It's his pride and joy, and he really wants this to work.

704

00:47:32,000 --> 00:47:33,000

Let's go.

705

00:47:43,000 --> 00:47:48,000

Once again, the bridge has failed before any real vibration got going.

706

00:47:48,000 --> 00:47:51,000

All that hard work has come to nothing.

707

00:47:53,000 --> 00:47:55,000

Adam's taking it quite well.

708

00:47:56,000 --> 00:47:59,000

Best just stand back for this.

709

00:48:00,000 --> 00:48:02,000

We're on some f\*\*\*ing destruction.

710

00:48:08,000 --> 00:48:09,000

Feel better now?

711

00:48:09,000 --> 00:48:10,000

I do feel better now.

712

00:48:10,000 --> 00:48:11,000

Good for you.

713

00:48:16,000 --> 00:48:17,000

The bridge is dead.

714

00:48:17,000 --> 00:48:19,000

Adam killed it.

715

00:48:19,000 --> 00:48:24,000

For all their time and effort, they couldn't replicate the myth.

716

00:48:24,000 --> 00:48:27,000

Maybe this one just never happened.

717

00:48:27,000 --> 00:48:31,000

My thinking on this would be, given your average platoon of soldiers

718

00:48:31,000 --> 00:48:37,000

and your average large suspension bridge, there's no danger they pose to the bridge.

719

00:48:37,000 --> 00:48:38,000

I'd say the myth is totally busted.

720

00:48:38,000 --> 00:48:44,000

It would have to be that they were so close to the overloading weight of the bridge

721

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to begin with, to create that kind of force, that I think it is truly a myth.

722

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Excellent.

723

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Let's pack this puppy up.

724

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I'm tired of busting myths today.