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

Attention viewers, do not try anything you're about to see at home.

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

We're what you call experts.

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

On this high velocity episode of Mythbusters...

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

You killed the dwarf!

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

Adam and Jamie investigate yet another way your car could kill you.

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

This is fun.

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

As they test the myth of exploding crumpers.

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

Now this is actually really scary.

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

It's hot, smelly, dangerous word.

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

We're fully armed.

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

And that's the way we like it.

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

Then, Kari, Tori and Grant are on the edge of their saddle.

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

Yeah, got him!

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

As they challenge an awesome myth of medieval cavalry.

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

You're going the wrong way!

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00:00:47,000 --> 00:00:52,000

Can an expertly fired arrow really penetrate double deep with a galloping start?

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

And how far will they go to prove the point?

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

We're all in quiver.

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

Who are the Mythbusters?

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00:01:02,000 --> 00:01:04,000

Adam Savage.

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00:01:04,000 --> 00:01:06,000

I ate a radio for science.

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00:01:06,000 --> 00:01:08,000

And Jamie Heidemann.

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00:01:08,000 --> 00:01:10,000

I'll deflect the ball.

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00:01:10,000 --> 00:01:14,000

Between them more than 30 years of special effects experience.

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00:01:14,000 --> 00:01:16,000

There's your problem.

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00:01:16,000 --> 00:01:19,000

Joining them, Tori Belleggi.

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00:01:19,000 --> 00:01:21,000

Punch through!

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00:01:21,000 --> 00:01:22,000

Grant Imahara.

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00:01:22,000 --> 00:01:24,000

That's right. I'm going to build a robot.

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00:01:24,000 --> 00:01:25,000

And Kari Byron.

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00:01:25,000 --> 00:01:27,000

This is going to be a whole lot of fun, huh?

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00:01:27,000 --> 00:01:29,000

They don't just tell the myths.

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00:01:29,000 --> 00:01:31,000

They put them to the test.

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00:01:46,000 --> 00:01:48,000

What are you doing?

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00:01:48,000 --> 00:01:52,000

Is it time for like fire safety tips or something?

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00:01:52,000 --> 00:01:58,000

In fact it is. Today's fire safety tip is don't stand near a car that's on fire.

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00:01:58,000 --> 00:02:00,000

Okay. Why?

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

Alright. I'm glad you asked.

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

Because it turns out that some cars have a bumper attached to them by a shock absorber.

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00:02:06,000 --> 00:02:10,000

And this is to allow the bumper to absorb some of the hit when it bumps into something.

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00:02:10,000 --> 00:02:13,000

And that in a car fire that shock absorber can overheat and explode.

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00:02:13,000 --> 00:02:21,000

And send the bumper shooting out potentially knee capping anybody who's unfortunate enough to be standing in front of or behind the car on fire.

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00:02:21,000 --> 00:02:24,000

I sense a car fire in our near future.

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00:02:24,000 --> 00:02:26,000

I think it's definitely something we should test.

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00:02:26,000 --> 00:02:27,000

Okay.

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00:02:27,000 --> 00:02:33,000

Bumpers are designed to protect your car by absorbing some of the impact from a low speed collision.

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00:02:33,000 --> 00:02:42,000

But if your car's on fire, this myth contends that the gas filled pistons can heat up to a point where the bumper becomes a deadly projectile.

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00:02:42,000 --> 00:02:46,000

And its range is an incredible 50 feet.

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00:02:46,000 --> 00:02:49,000

As far as the methodology goes, I think it's pretty straightforward.

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00:02:49,000 --> 00:02:55,000

We just go to a junkyard, we get some bumpers of the appropriate type, we subject them to some really high heat and we test them.

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00:02:55,000 --> 00:03:08,000

Right. But since this whole thing is about what happens to these bumpers in a car fire, I think our very first step is to simply set a car on fire and take some measurements and readings to figure out what kind of temperatures we're actually talking about.

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00:03:08,000 --> 00:03:09,000

Agreed.

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00:03:10,000 --> 00:03:14,000

So the boys bolt up to the bomb range to set a car on fire.

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00:03:14,000 --> 00:03:17,000

This is familiar Mythbusters territory.

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00:03:17,000 --> 00:03:19,000

So how hard can it be?

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00:03:19,000 --> 00:03:21,000

Well, as hard as you want to make it.

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00:03:27,000 --> 00:03:28,000

We're all right.

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00:03:28,000 --> 00:03:30,000

What the hell are you doing?

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00:03:30,000 --> 00:03:32,000

Having some fun.

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00:03:32,000 --> 00:03:37,000

Jamie's idea of fun is likely different to yours, mine and Adam's.

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00:03:37,000 --> 00:03:40,000

But you really can get in trouble with one of these things.

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00:03:43,000 --> 00:03:47,000

It's an app start to a day that will not go quite to plan.

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

We have found some potential cases of this actually happening.

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00:03:50,000 --> 00:03:57,000

Maybe bumpers shot off during car fires and the researchers have found us a make and model similar to those in the reports that we have.

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00:03:57,000 --> 00:04:04,000

So we're going to set this thing on fire, find out how hot a car fire actually gets, take temperature readings all around it.

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

And if we're very lucky, maybe we'll get a bumper shooting off.

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00:04:08,000 --> 00:04:10,000

That would be a bonus.

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00:04:10,000 --> 00:04:15,000

But remember, their primary purpose is to see just how hot a car fire gets.

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00:04:15,000 --> 00:04:18,000

Fortunately, there's some adult supervision on hand.

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00:04:18,000 --> 00:04:19,000

Good morning.

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00:04:19,000 --> 00:04:23,000

We got just a smoke car fire we're going to set and hopefully help ask you guys to put out.

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00:04:23,000 --> 00:04:25,000

No problem, sir.

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00:04:25,000 --> 00:04:31,000

Adam draws on boyhood skills to raise the car and strip the wheels in next to no time.

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

Here in California, it's a crime to burn tires.

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00:04:34,000 --> 00:04:39,000

For some reason, it's not a crime to wear a silver suit with suspenders.

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00:04:39,000 --> 00:04:44,000

As Adam slips into something less comfortable, Jamie considers the finer details.

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00:04:44,000 --> 00:04:51,000

We're going to light the car on fire and being as the engine has fuel, it has oil, it has plastic parts.

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00:04:51,000 --> 00:04:55,000

It's got batteries with electricity.

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00:04:55,000 --> 00:04:58,000

You've got all the elements you need to create an energetic fire.

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00:04:58,000 --> 00:05:01,000

And that also happens to be the area around the bumper.

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00:05:01,000 --> 00:05:06,000

So that's where we're going to focus our ignition and we'll see what happens.

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00:05:06,000 --> 00:05:14,000

And just for good measure, when the car is ablaze, they'll get accurate temperature measurements

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00:05:14,000 --> 00:05:17,000

by circling it with a thermal imaging camera.

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00:05:17,000 --> 00:05:19,000

That ought to do. What do you think?

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00:05:19,000 --> 00:05:21,000

Go for it.

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00:05:21,000 --> 00:05:23,000

This is fun.

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00:05:23,000 --> 00:05:27,000

But try as he might, Adam can't manage to set fire to the engine.

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00:05:27,000 --> 00:05:31,000

Even though it's swimming in gasoline.

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00:05:31,000 --> 00:05:35,000

Making fire is something even cavemen master.

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00:05:35,000 --> 00:05:37,000

But we've struggled with this before.

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00:05:37,000 --> 00:05:41,000

Who could forget the shaky start to trailblazers?

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00:05:41,000 --> 00:05:45,000

It's hard to stuff the light.

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00:05:45,000 --> 00:05:49,000

It only lights when it gets mystified.

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00:05:49,000 --> 00:05:55,000

This delayed ignition is risky business and statistically, it's getting more perilous by the second.

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00:05:55,000 --> 00:05:59,000

I mean, nothing's gone wrong for almost 40 minutes.

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00:05:59,000 --> 00:06:02,000

Whoa!

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00:06:02,000 --> 00:06:05,000

I'm okay.

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00:06:05,000 --> 00:06:07,000

You've got a little bit of a haircut there, didn't you?

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00:06:07,000 --> 00:06:13,000

I've got a little bit of a... not a haircut, I've got a little bit of a hair on the back of my hand.

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00:06:13,000 --> 00:06:20,000

Considering the rough start, the cars quickly engulfed in flames.

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00:06:20,000 --> 00:06:23,000

It's all happening a lot faster than I thought it would.

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00:06:23,000 --> 00:06:26,000

That's one out of control car park.

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

You were afraid that it was going to burn itself out.

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00:06:29,000 --> 00:06:33,000

As the wind shifts, Adam's forced to move the thermal camera 20 feet to the left.

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00:06:33,000 --> 00:06:41,000

Any thoughts of certain ablaze are abandoned as the flames follow the smoke in an unpredictable arc.

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00:06:41,000 --> 00:06:43,000

Are you getting any kind of a reading yet?

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00:06:43,000 --> 00:06:47,000

Yeah, I'm actually getting, you know, easily a thousand degrees.

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00:06:47,000 --> 00:06:48,000

Okay.

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00:06:48,000 --> 00:06:51,000

1,050, 1,100.

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00:06:51,000 --> 00:06:54,000

It's hot.

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00:06:54,000 --> 00:06:59,000

At this point, a bumper flying 50 feet would confirm the myth.

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00:06:59,000 --> 00:07:05,000

The skipper and Gilligan could high five each other, share a man hug, and head home.

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00:07:05,000 --> 00:07:10,000

But it's just not that kind of a day.

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00:07:10,000 --> 00:07:12,000

Well, our pistons are still there.

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00:07:12,000 --> 00:07:15,000

But the bumper is melted.

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00:07:15,000 --> 00:07:19,000

And that actually tells us something about what temperatures were achieved,

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00:07:19,000 --> 00:07:25,000

because the bumpers are aluminum and aluminum melts at around 660 Celsius.

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00:07:25,000 --> 00:07:27,000

Well, riddle me this Batman.

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00:07:27,000 --> 00:07:29,000

What's the melting point of glass?

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00:07:29,000 --> 00:07:30,000

Look at that.

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00:07:30,000 --> 00:07:32,000

You never see anything like that.

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00:07:32,000 --> 00:07:37,000

That's even hotter because that melts at around 1400 Celsius.

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00:07:37,000 --> 00:07:43,000

There's no doubt they had the heat, an impressive 1400 degrees Celsius.

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00:07:43,000 --> 00:07:45,000

And that's what they came here to measure.

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00:07:45,000 --> 00:07:48,000

Still, the bumpers didn't go ballistic.

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00:07:48,000 --> 00:07:50,000

Of course, they're designed not to.

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00:07:50,000 --> 00:07:54,000

But there are those who swear they've seen this myth in action.

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00:07:54,000 --> 00:08:01,000

What this tells us is that this is a very, very specific set of circumstances that is required to make this happen.

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00:08:01,000 --> 00:08:06,000

I think now we've got to go back to the shop, work on some individual shocks,

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00:08:06,000 --> 00:08:09,000

heating them and seeing what kind of results we can get.

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00:08:09,000 --> 00:08:11,000

So how's your hand?

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

It hurts a little bit, but it'll be better by tomorrow.

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00:08:14,000 --> 00:08:15,000

And you've got another one.

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00:08:15,000 --> 00:08:17,000

I do.

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00:08:18,000 --> 00:08:23,000

Shortly, Adam and Jamie take this dangerous testing indoors.

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00:08:23,000 --> 00:08:25,000

Right there is a pipe bomb.

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00:08:25,000 --> 00:08:31,000

But next, Tori, Grant and Carrie take aim at the myth of double deadly medieval arrows.

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00:08:31,000 --> 00:08:33,000

Yeah!

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00:08:42,000 --> 00:08:46,000

You know, you guys, ever since we did Huacha, I've really wanted to do some more medieval weaponry myths.

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00:08:46,000 --> 00:08:51,000

That is perfect because we have one that comes out of the Hungarian army during the 1500s.

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00:08:51,000 --> 00:08:55,000

Now, apparently they believe that an archer riding on the back of a galloping horse,

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00:08:55,000 --> 00:09:01,000

if he were to shoot an arrow, that arrow would have twice the penetrating power as an archer firing an arrow standing still.

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00:09:01,000 --> 00:09:03,000

Sounds like a myth to me.

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00:09:03,000 --> 00:09:04,000

I know, it's hard to believe, right?

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

Physics, history, let's do it.

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

Two of my worst subjects.

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

Back in the 1500s, Hungarian archers were the most skilled and feared warriors in Europe.

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00:09:14,000 --> 00:09:18,000

In fact, archery was practiced as a martial art.

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00:09:18,000 --> 00:09:24,000

And the boldest claim made by these master bowmen was that they could actually get twice the penetration

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00:09:24,000 --> 00:09:28,000

when the arrow was shot from the back of a galloping horse.

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00:09:28,000 --> 00:09:32,000

Okay, so it sounds like we need to get our hands on a medieval-style bow,

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

fire arrows at the target from a stationary position, and then gallop at the target and fire arrows again.

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

Right, well then we'll look at the two sets of arrows and see which ones go deeper into the target.

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

Wait a minute, so if you're firing a bow from the top of the horse,

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00:09:46,000 --> 00:09:51,000

that means you have no hands to hold on to the reins, and don't they gallop at like 40 miles an hour?

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00:09:51,000 --> 00:09:54,000

Exactly, that's why you have to be an expert horse rider.

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00:09:54,000 --> 00:09:56,000

What could possibly go wrong?

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00:09:57,000 --> 00:10:01,000

Custer's very words to the 7th Cavalry at Little Bighorn.

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00:10:01,000 --> 00:10:06,000

The team has wisely chosen a venue that specializes in mounted archery.

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00:10:08,000 --> 00:10:11,000

We're doing a little squeeze and a click.

161

00:10:12,000 --> 00:10:15,000

That way, that way, yeah.

162

00:10:15,000 --> 00:10:18,000

Okay, that wasn't the way I wanted to go.

163

00:10:18,000 --> 00:10:22,000

He's got steering, it's just not power steering. That way, hard left.

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00:10:22,000 --> 00:10:28,000

Forget archery at the gallop. Let's see if these amateur light horsemen can shoot from a saunter.

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

I think we're ready to attack.

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00:10:30,000 --> 00:10:32,000

Grant's the first to try his luck.

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00:10:37,000 --> 00:10:39,000

Interesting strategy, Grant.

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00:10:39,000 --> 00:10:41,000

Interesting isn't quite the word.

169

00:10:41,000 --> 00:10:44,000

Grant, you're going the wrong way. Attack!

170

00:10:44,000 --> 00:10:50,000

A man with a drawn bow on a wayward horse is a deadly threat to all and sundry.

171

00:10:50,000 --> 00:10:54,000

Choose the horse, Grant. Choose the horse.

172

00:10:54,000 --> 00:10:55,000

Oh!

173

00:10:55,000 --> 00:11:01,000

More by good luck than good management, the horse eventually turns toward the target.

174

00:11:01,000 --> 00:11:03,000

Try not to shoot the horse in the head.

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00:11:04,000 --> 00:11:06,000

Oh, so close!

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00:11:06,000 --> 00:11:12,000

Carrie's horse has a much better sense of direction, but still no sense of occasion.

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00:11:12,000 --> 00:11:13,000

Go faster.

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00:11:18,000 --> 00:11:21,000

Now if we could just do that a little faster.

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00:11:23,000 --> 00:11:27,000

At least she hit the target. Let's see if Tori can do it a little faster.

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00:11:30,000 --> 00:11:32,000

Yeah, got him!

181

00:11:32,000 --> 00:11:37,000

Not bad at all, but we're testing a myth based on the best mounted archers in history.

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

There's no point in our guys taking a static comparison shot.

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

It's time to saddle up the professionals.

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00:11:45,000 --> 00:11:49,000

Now the three pieces of data that we need are the speed of the horse,

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00:11:51,000 --> 00:11:54,000

the terminal velocity of the arrow,

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00:11:55,000 --> 00:12:01,000

and then finally the thing about which this myth is truly about is the penetration of the arrow.

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

So the team demotes itself to setting up the gizmos that should accurately measure the speed of the arrow and the penetration.

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00:12:11,000 --> 00:12:14,000

We're also going to be measuring the speed of the horses.

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00:12:14,000 --> 00:12:19,000

So I've got this radar gun, and we'll point it at the horses, and it'll give us their speed in miles per hour.

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00:12:20,000 --> 00:12:25,000

First up, Lucas, Katie and Holm take a bunch of shots from a standing start.

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00:12:25,000 --> 00:12:31,000

This is the key control data they'll need to compare with arrows fired at the gallop.

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00:12:31,000 --> 00:12:37,000

Average arrow speed is right on the money for the myth, between 130 and 140 miles per hour.

193

00:12:38,000 --> 00:12:41,000

Six and an eighth inches deep into the foam.

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00:12:41,000 --> 00:12:43,000

Eight inches and three-eighths.

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00:12:44,000 --> 00:12:46,000

Ten and three-quarter inches.

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00:12:46,000 --> 00:12:48,000

And now for some real riding.

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00:12:48,000 --> 00:12:52,000

Top speed for light cavalry is recommended close to 40 miles per hour.

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00:12:52,000 --> 00:12:58,000

So to properly test the myth, they all need to hit 40 and hit the target.

199

00:12:58,000 --> 00:12:59,000

Wow, nice shot!

200

00:12:59,000 --> 00:13:02,000

You know she smiles the entire time.

201

00:13:02,000 --> 00:13:04,000

Like, oh yeah, whatever.

202

00:13:04,000 --> 00:13:08,000

She's galloping at 44 miles an hour and hitting the target. I'd be smiling too.

203

00:13:12,000 --> 00:13:14,000

Every arrow that hits home...

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00:13:15,000 --> 00:13:16,000

Dang, she hit her.

205

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

Ha, good!

206

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

...gets wrenched out and measured.

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00:13:20,000 --> 00:13:23,000

Eleven and a half inches, twelve and a half inches.

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00:13:23,000 --> 00:13:31,000

On average, the penetration is deeper, but not by much, suggesting that this medieval myth might be horse manure.

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00:13:31,000 --> 00:13:34,000

But the data just isn't consistent enough to make a call.

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00:13:35,000 --> 00:13:38,000

Three different archers, three different horses.

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00:13:38,000 --> 00:13:42,000

Arrows fired at different speeds from a variable distance.

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00:13:42,000 --> 00:13:44,000

The data is diabolical.

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00:13:44,000 --> 00:13:45,000

Our riders did really great.

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00:13:45,000 --> 00:13:48,000

I mean, they were accurate and they had a great speed.

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00:13:48,000 --> 00:13:54,000

Unfortunately, all of these numbers are just not consistent enough to give us a really good conclusion.

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00:13:55,000 --> 00:14:00,000

Nothing here really supports the myth, but I'm afraid that our margin of error is way too big.

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00:14:00,000 --> 00:14:05,000

I mean, we've got moving horses and we're of course human errors involved here.

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00:14:05,000 --> 00:14:08,000

So I think we really need to take this back to the shop, see what variables we can cut out,

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00:14:08,000 --> 00:14:15,000

and see if we can just find the core of this myth, which is, will the momentum of movement add penetration to the shot?

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00:14:16,000 --> 00:14:17,000

After the break.

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00:14:17,000 --> 00:14:22,000

Adam and Jamie turn up the heat on the urban myth of exploding bumpers.

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00:14:22,000 --> 00:14:23,000

I hope this one works.

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00:14:23,000 --> 00:14:24,000

Me too.

224

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

And later, Tori Grant and Kerry add modern mechanics to medieval mayhem.

225

00:14:32,000 --> 00:14:33,000

Does this work?

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00:14:33,000 --> 00:14:47,000

Testing the myth of exploding bumpers, Adam and Jamie torched a car to see just how hot it burns.

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00:14:47,000 --> 00:14:50,000

Around 1400 degrees Celsius.

228

00:14:53,000 --> 00:14:56,000

The car fared much worse than Adam.

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00:14:56,000 --> 00:14:57,000

I'm totally alright.

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00:14:57,000 --> 00:14:58,000

It just scared me.

231

00:14:58,000 --> 00:15:01,000

But the bumpers failed to blast off.

232

00:15:01,000 --> 00:15:03,000

Now our pistons are still there.

233

00:15:03,000 --> 00:15:06,000

But the bumper is melted.

234

00:15:07,000 --> 00:15:10,000

Time for a pit stop to pick up the parts they'll need.

235

00:15:10,000 --> 00:15:11,000

Yeah, this one's there.

236

00:15:11,000 --> 00:15:16,000

Specifically, the kind of bumper shocks that supposedly launched the legend.

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00:15:16,000 --> 00:15:18,000

Like little rockets right there, huh?

238

00:15:18,000 --> 00:15:21,000

You've got an internal sleeve and an external sleeve.

239

00:15:21,000 --> 00:15:24,000

And when you hit something at a slow speed, the internal sleeve moves slightly.

240

00:15:24,000 --> 00:15:28,000

It's pushing against some kind of gas and that hopefully reduces damage to the car.

241

00:15:28,000 --> 00:15:35,000

But when you heat that gas that it's pushing against, it expands causing this thing to fail catastrophically

242

00:15:35,000 --> 00:15:37,000

and maybe hurt some safety personnel in the vicinity.

243

00:15:37,000 --> 00:15:38,000

At least that's the theory.

244

00:15:38,000 --> 00:15:40,000

That's what we've got to test out.

245

00:15:40,000 --> 00:15:46,000

They'll start the testing without the actual bumper because these are the alleged culprits.

246

00:15:47,000 --> 00:15:49,000

Adam sets up the blast screen.

247

00:15:50,000 --> 00:15:54,000

As Jamie spot welds a steel tube to a heavy stand.

248

00:15:54,000 --> 00:15:59,000

At a certain point, we suspect we're going to reach a critical kind of heat level

249

00:15:59,000 --> 00:16:03,000

where the gas pressure exceeds what this chamber will hold

250

00:16:03,000 --> 00:16:06,000

and this shoots out this way at high velocity.

251

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

Adam attaches a thermocouple to monitor the surface temperature.

252

00:16:11,000 --> 00:16:13,000

And now for the heat source.

253

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

Jamie lights an oxyacetyl in torch and they're good to go.

254

00:16:17,000 --> 00:16:18,000

Moving it in.

255

00:16:18,000 --> 00:16:19,000

All right.

256

00:16:20,000 --> 00:16:21,000

That looks good.

257

00:16:21,000 --> 00:16:23,000

Trying not to bump that.

258

00:16:23,000 --> 00:16:25,000

Temperature's rising fast.

259

00:16:25,000 --> 00:16:28,000

10 seconds in or 50 degrees Celsius.

260

00:16:28,000 --> 00:16:31,000

They don't expect this to get quite as hot as the car fire.

261

00:16:31,000 --> 00:16:35,000

After all, that was 1400 degrees Celsius.

262

00:16:35,000 --> 00:16:41,000

The aim here is to see if directional heat works where an unfocused inferno failed.

263

00:16:41,000 --> 00:16:43,000

Any predictions as to when it's going to blow?

264

00:16:44,000 --> 00:16:46,000

I'm guessing 620 degrees.

265

00:16:47,000 --> 00:16:48,000

I don't know.

266

00:16:48,000 --> 00:16:51,000

All I do know is that right there is a pipe bomb.

267

00:16:51,000 --> 00:16:57,000

It's at about 500 Fahrenheit. 295 Celsius.

268

00:16:57,000 --> 00:17:00,000

You know, this is actually really scary.

269

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

I agree.

270

00:17:01,000 --> 00:17:03,000

Ho, ho, ho.

271

00:17:03,000 --> 00:17:05,000

Looks like we got some kind of failure.

272

00:17:05,000 --> 00:17:09,000

Nine minutes in with the temperature just past 400 degrees,

273

00:17:09,000 --> 00:17:12,000

toxic smoke starts to billow from the piston.

274

00:17:12,000 --> 00:17:14,000

No one knows for sure what it is,

275

00:17:14,000 --> 00:17:18,000

but the noxious smell is enough to put the fear into everyone.

276

00:17:18,000 --> 00:17:19,000

You going to turn it off?

277

00:17:19,000 --> 00:17:20,000

Yeah.

278

00:17:20,000 --> 00:17:21,000

It's just making a lot of smoke.

279

00:17:21,000 --> 00:17:23,000

I think we've lost pressure.

280

00:17:23,000 --> 00:17:24,000

All right.

281

00:17:24,000 --> 00:17:26,000

Let's all clear out of here and evacuate this place.

282

00:17:26,000 --> 00:17:27,000

Who knows what that is?

283

00:17:27,000 --> 00:17:28,000

Yeah.

284

00:17:28,000 --> 00:17:30,000

When the smoke clears and the piston cools,

285

00:17:30,000 --> 00:17:34,000

they decide to do what maybe they should have done first off.

286

00:17:34,000 --> 00:17:37,000

Cut the darn thing in half to see how it works.

287

00:17:37,000 --> 00:17:42,000

Oh, interesting.

288

00:17:42,000 --> 00:17:44,000

There's an O-ring in there, actually.

289

00:17:44,000 --> 00:17:46,000

Yeah, it's a melted plastic.

290

00:17:46,000 --> 00:17:50,000

They know that somewhere inside the inner tube is a fluid chamber,

291

00:17:50,000 --> 00:17:54,000

and somewhere else there's a compressed gas chamber.

292

00:17:54,000 --> 00:17:56,000

And that's what they're looking for.

293

00:17:56,000 --> 00:17:58,000

I'm going to get this at all.

294

00:17:58,000 --> 00:18:00,000

Just as confusion hits critical mass.

295

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

So it looks like that is the gas chamber.

296

00:18:02,000 --> 00:18:06,000

So one way or another, that's where the heat has to go.

297

00:18:06,000 --> 00:18:08,000

We were heating it up at the other end.

298

00:18:08,000 --> 00:18:09,000

Yeah.

299

00:18:09,000 --> 00:18:11,000

So we got to put the flame right on the end of this.

300

00:18:11,000 --> 00:18:13,000

And hopefully it won't melt the seals.

301

00:18:13,000 --> 00:18:14,000

Hopefully.

302

00:18:14,000 --> 00:18:17,000

Test two proceeds with a more focused flame,

303

00:18:17,000 --> 00:18:20,000

hopefully raising the heat so fast that the gas explodes

304

00:18:20,000 --> 00:18:22,000

before the sealing ring melts,

305

00:18:22,000 --> 00:18:26,000

and lets it dissipate, disappointingly, safely.

306

00:18:26,000 --> 00:18:29,000

We're getting that back end as hot as possible, as fast as possible.

307

00:18:29,000 --> 00:18:34,000

But these smoke signals are not sending a hopeful message.

308

00:18:34,000 --> 00:18:37,000

Does that mean I'm burning a hole?

309

00:18:37,000 --> 00:18:40,000

Ha ha ha ha ha!

310

00:18:40,000 --> 00:18:42,000

That means you burned a hole.

311

00:18:42,000 --> 00:18:45,000

52 seconds.

312

00:18:45,000 --> 00:18:48,000

I'll bet that hole is part of the design process.

313

00:18:48,000 --> 00:18:52,000

I'll bet that's made to fail, just in that exact way.

314

00:18:52,000 --> 00:18:54,000

This thing's made to not blow.

315

00:18:54,000 --> 00:18:56,000

How are we going to get it to blow?

316

00:18:56,000 --> 00:18:59,000

Don't you hate it when something you've paid good money for

317

00:18:59,000 --> 00:19:02,000

won't break the way you want it to?

318

00:19:02,000 --> 00:19:05,000

As for blowing this thing the mythical 50 feet,

319

00:19:05,000 --> 00:19:08,000

50 miles looks just as likely.

320

00:19:08,000 --> 00:19:10,000

This is failing, but it's failing safely.

321

00:19:10,000 --> 00:19:12,000

We don't want a safe failure.

322

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

We want a kaboom.

323

00:19:13,000 --> 00:19:16,000

We want this thing to become a projectile.

324

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

So, next thing we're thinking of is putting heat right here at the neck,

325

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

away from this safety release, away from this O-ring,

326

00:19:22,000 --> 00:19:24,000

away from this plastic, hopefully,

327

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

to get enough pressure in this gas chamber

328

00:19:27,000 --> 00:19:31,000

to cause the catastrophic failure we're looking for.

329

00:19:31,000 --> 00:19:32,000

Is it metal?

330

00:19:32,000 --> 00:19:33,000

That looks good.

331

00:19:33,000 --> 00:19:34,000

Okay.

332

00:19:34,000 --> 00:19:35,000

Okay.

333

00:19:35,000 --> 00:19:38,000

Now it's getting a red hot there.

334

00:19:38,000 --> 00:19:41,000

Yeah, that's really fast.

335

00:19:41,000 --> 00:19:47,000

And a rapid heat spike might just do the trick.

336

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

Then again, it might not.

337

00:19:49,000 --> 00:19:51,000

Too much heat, too quickly.

338

00:19:51,000 --> 00:19:52,000

Too much heat, too quickly.

339

00:19:52,000 --> 00:19:55,000

This failure to launch becomes all the more frustrating

340

00:19:55,000 --> 00:19:58,000

when Adam and Jamie get new intelligence from the researchers.

341

00:19:58,000 --> 00:20:03,000

They found a real live person who's experienced a genuine

342

00:20:03,000 --> 00:20:05,000

exploding bumper event.

343

00:20:05,000 --> 00:20:09,000

Oakland firefighter Jennifer Schmidt wasn't just a witness,

344

00:20:09,000 --> 00:20:11,000

she was a casualty.

345

00:20:11,000 --> 00:20:12,000

Can you tell us what happened?

346

00:20:12,000 --> 00:20:13,000

Sure.

347

00:20:13,000 --> 00:20:17,000

We got called one night for a vehicle fire

348

00:20:17,000 --> 00:20:19,000

in someone's driveway up next to a house.

349

00:20:19,000 --> 00:20:22,000

When we got there, the car was on fire.

350

00:20:22,000 --> 00:20:25,000

So, I pulled the hose line around to the side of the car,

351

00:20:25,000 --> 00:20:27,000

the right side, and started to put the fire on.

352

00:20:27,000 --> 00:20:30,000

And started to put the nozzle up under the wheel well

353

00:20:30,000 --> 00:20:32,000

to put the flames out.

354

00:20:32,000 --> 00:20:34,000

And that's when we heard the first of two explosions

355

00:20:34,000 --> 00:20:35,000

at that point.

356

00:20:35,000 --> 00:20:38,000

I thought initially that it was the right front tire

357

00:20:38,000 --> 00:20:41,000

that exploded because I've heard and seen that several times

358

00:20:41,000 --> 00:20:42,000

during car fires.

359

00:20:42,000 --> 00:20:45,000

And I moved in front of the car and just as I opened the nozzle,

360

00:20:45,000 --> 00:20:47,000

we heard another explosion.

361

00:20:47,000 --> 00:20:49,000

And that's when something hit my legs.

362

00:20:49,000 --> 00:20:53,000

And I was knocked to the ground and started yelling for help.

363

00:20:53,000 --> 00:20:54,000

I had no idea what happened.

364

00:20:54,000 --> 00:20:56,000

So, it turned out to be the bumper that hit you?

365

00:20:56,000 --> 00:20:57,000

Yes.

366

00:20:57,000 --> 00:20:59,000

And they brought the bumpers actually to the hospital

367

00:20:59,000 --> 00:21:00,000

to show me.

368

00:21:00,000 --> 00:21:03,000

So, it was kind of scary to see that.

369

00:21:03,000 --> 00:21:05,000

What were the extent of your injuries?

370

00:21:05,000 --> 00:21:09,000

Well, the bumper hit both legs, but it only broke my left lower leg.

371

00:21:09,000 --> 00:21:12,000

And it broke both bones, the tibia and the fibula.

372

00:21:12,000 --> 00:21:16,000

The tibia was broken in about 20 pieces.

373

00:21:16,000 --> 00:21:19,000

So, pretty significant.

374

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

But our myth from the fan site is a bit more extreme.

375

00:21:23,000 --> 00:21:26,000

There's no doubt that Jennifer was badly injured.

376

00:21:26,000 --> 00:21:31,000

But bits of this bumper flew 15 feet, not 50.

377

00:21:31,000 --> 00:21:34,000

Still, this first-hand account of Jen's trauma

378

00:21:34,000 --> 00:21:37,000

inspires Adam to rethink his methods.

379

00:21:37,000 --> 00:21:39,000

But the difference between our setup and the real world

380

00:21:39,000 --> 00:21:42,000

is that that chuck is usually mounted to a bumper.

381

00:21:42,000 --> 00:21:44,000

And the bumper in question is a massive piece of aluminum

382

00:21:44,000 --> 00:21:47,000

about a quarter-inch thick that is acting as a heat sink,

383

00:21:47,000 --> 00:21:51,000

i.e., it is pulling heat away from the end of that bumper

384

00:21:51,000 --> 00:21:55,000

exactly where we're finding one of the most effective safety valves.

385

00:21:55,000 --> 00:21:58,000

So, we're going to bolt back a piece of bumper onto that shock,

386

00:21:58,000 --> 00:22:01,000

heat it in the same place and see if we get a different result.

387

00:22:04,000 --> 00:22:06,000

There you go, one big heat sink coming up.

388

00:22:06,000 --> 00:22:09,000

And a finishing touch from Jamie.

389

00:22:09,000 --> 00:22:11,000

This is perforated metal.

390

00:22:11,000 --> 00:22:14,000

I'm going to wire a couple of these pieces on there.

391

00:22:14,000 --> 00:22:17,000

And so, hopefully, this will spread the heat out

392

00:22:17,000 --> 00:22:20,000

to where we don't end up with a red-hot molten area

393

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

that will burst the chamber before it, like,

394

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

explodes the way we want it to.

395

00:22:24,000 --> 00:22:26,000

I hope this one works.

396

00:22:26,000 --> 00:22:28,000

Me too.

397

00:22:28,000 --> 00:22:31,000

These one-in-a-million myths kick our ass every time.

398

00:22:31,000 --> 00:22:36,000

And these two must have targets tattooed on their own rear bumpers.

399

00:22:36,000 --> 00:22:38,000

After five minutes...

400

00:22:38,000 --> 00:22:41,000

Oh, where did that come from?

401

00:22:41,000 --> 00:22:44,000

Looks like it blew a hole in that front part.

402

00:22:44,000 --> 00:22:46,000

Where it did before?

403

00:22:46,000 --> 00:22:47,000

Yeah.

404

00:22:47,000 --> 00:22:48,000

Damn it!

405

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

I don't think we can do anything more with this.

406

00:22:50,000 --> 00:22:53,000

It could take a lifetime of testing to replicate

407

00:22:53,000 --> 00:22:56,000

what must be a one-in-a-million occurrence.

408

00:22:56,000 --> 00:23:00,000

And the boys might have better things to do with their twilight years.

409

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

I think we have to abandon it.

410

00:23:02,000 --> 00:23:06,000

But if you think they're giving up before we see a bumper gobalistic,

411

00:23:06,000 --> 00:23:09,000

just remember, you're watching Mythbusters.

412

00:23:09,000 --> 00:23:10,000

What?

413

00:23:10,000 --> 00:23:11,000

Coming up...

414

00:23:11,000 --> 00:23:12,000

How!

415

00:23:12,000 --> 00:23:13,000

How!

416

00:23:13,000 --> 00:23:16,000

The high-tech solution to a low-tech myth.

417

00:23:16,000 --> 00:23:18,000

Why is everybody scaring Adam?

418

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

And later, Jamie and Adam find a spectacular way to launch that bumper.

419

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

Perfect.

420

00:23:28,000 --> 00:23:33,000

Remember, do not try anything you are about to see at home.

421

00:23:33,000 --> 00:23:36,000

Despite the best efforts of our amateurs...

422

00:23:36,000 --> 00:23:38,000

Yeah, no!

423

00:23:38,000 --> 00:23:40,000

And the pros...

424

00:23:40,000 --> 00:23:46,000

inconsistent data means that our medieval archery myth remains unresolved.

425

00:23:46,000 --> 00:23:50,000

The legend we're testing is that expert Eastern European archers

426

00:23:50,000 --> 00:23:54,000

got twice the penetration shooting from the middle of the world.

427

00:23:54,000 --> 00:23:57,000

And the most important thing is that the best of our amateurs

428

00:23:57,000 --> 00:24:01,000

The legend we're testing is that expert Eastern European archers

429

00:24:01,000 --> 00:24:04,000

got twice the penetration shooting from horseback.

430

00:24:04,000 --> 00:24:09,000

To bust or confirm it, man and beast need to take a back seat.

431

00:24:09,000 --> 00:24:12,000

Mounted archers were amazing,

432

00:24:12,000 --> 00:24:14,000

but the results just not consistent enough to call it.

433

00:24:14,000 --> 00:24:16,000

Yeah, to make this an accurate experiment,

434

00:24:16,000 --> 00:24:18,000

we need to have the speed of the horse,

435

00:24:18,000 --> 00:24:21,000

the speed of the arrow and the accuracy all be repeatable.

436

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

And with humans and horses in the equation, that's just not going to happen.

437

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

Alright, well why don't we get rid of both?

438

00:24:26,000 --> 00:24:29,000

We'll replace the bow with a crossbow that's calibrated to a medieval bow,

439

00:24:29,000 --> 00:24:31,000

and then we'll replace the horse with a vehicle,

440

00:24:31,000 --> 00:24:34,000

so that way we make sure it's going at the same speed every time.

441

00:24:34,000 --> 00:24:36,000

And to make sure that we're firing from the same place every time,

442

00:24:36,000 --> 00:24:38,000

we can mount the crossbow.

443

00:24:38,000 --> 00:24:41,000

This is going to be great. I know the perfect vehicle.

444

00:24:41,000 --> 00:24:43,000

I'll go get it.

445

00:24:43,000 --> 00:24:45,000

Okay, he better not be going for my car.

446

00:24:45,000 --> 00:24:47,000

Then you'll have a crossbow attached to your car.

447

00:24:50,000 --> 00:24:52,000

Carrie's wheels are safe for now.

448

00:24:52,000 --> 00:24:55,000

Grant's already sourced a replacement horse

449

00:24:55,000 --> 00:24:58,000

that will do 40 miles per hour every time.

450

00:24:58,000 --> 00:25:00,000

Guaranteed.

451

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

Oh my God, it's perfect!

452

00:25:02,000 --> 00:25:05,000

The Jeep comes fitted with what looks like a 50 cal machine gun.

453

00:25:05,000 --> 00:25:07,000

Does this work?

454

00:25:07,000 --> 00:25:09,000

No, now it's a replica.

455

00:25:09,000 --> 00:25:12,000

Tori plans to replace that with a compound crossbow.

456

00:25:12,000 --> 00:25:15,000

Naturally, he'll have to test it first.

457

00:25:15,000 --> 00:25:17,000

So now for one of those definitive,

458

00:25:17,000 --> 00:25:20,000

don't try this at home moments.

459

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

It looks like it's accurate.

460

00:25:27,000 --> 00:25:29,000

Now whether or not it's consistent,

461

00:25:29,000 --> 00:25:31,000

I'll find out.

462

00:25:31,000 --> 00:25:35,000

While Tori sets the platform for a more credible set of crossbow tests,

463

00:25:35,000 --> 00:25:39,000

Carrie carves out a hood ornament

464

00:25:39,000 --> 00:25:42,000

that honors the origins of the myth.

465

00:25:42,000 --> 00:25:44,000

We have to take the horse out of the equation,

466

00:25:44,000 --> 00:25:46,000

but I don't want to take it out entirely

467

00:25:46,000 --> 00:25:48,000

because really it's the essence of the myth.

468

00:25:48,000 --> 00:25:50,000

So I'm going to try to get it out of the way.

469

00:25:50,000 --> 00:25:52,000

I'm going to try to get it out of the way.

470

00:25:52,000 --> 00:25:54,000

I don't want to take it out entirely

471

00:25:54,000 --> 00:25:56,000

because really it's the essence of the myth.

472

00:25:56,000 --> 00:25:58,000

So I'm going to dress up our car so it looks a little more like a horse.

473

00:25:58,000 --> 00:26:00,000

Meantime, Tori's found a target

474

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

to test the consistency of the penetration.

475

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

That would be the back of Grant's head.

476

00:26:11,000 --> 00:26:14,000

As you'd expect, the damage done to the jelly brain

477

00:26:14,000 --> 00:26:17,000

is almost the same from each shot.

478

00:26:17,000 --> 00:26:19,000

2 1/8 inches.

479

00:26:19,000 --> 00:26:21,000

And Tori's fine-tuned the bow speed

480

00:26:21,000 --> 00:26:24,000

back to a more leisurely medieval pace.

481

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

We're taking out a few variables here

482

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

so we can just get down to that one little question.

483

00:26:29,000 --> 00:26:32,000

Our horse is now a car horse.

484

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

That way we don't have all of the jostling

485

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

and we have a constant speed

486

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

because the horses, they just weren't getting it

487

00:26:38,000 --> 00:26:40,000

when I was explaining to them to go one speed.

488

00:26:40,000 --> 00:26:42,000

With a horse head to the fore

489

00:26:42,000 --> 00:26:44,000

and a horse tail aft,

490

00:26:44,000 --> 00:26:48,000

this custom jeep is undeniably one of a kind.

491

00:26:48,000 --> 00:26:50,000

Especially when the whole thing is sprayed in,

492

00:26:50,000 --> 00:26:52,000

we mean business black.

493

00:26:52,000 --> 00:26:54,000

Black shooting. That's their name.

494

00:26:54,000 --> 00:26:57,000

Black shooting. Get it?

495

00:26:57,000 --> 00:27:02,000

But Grant's head is way too small to be a viable target.

496

00:27:02,000 --> 00:27:04,000

So the man himself offers up an alternative

497

00:27:04,000 --> 00:27:09,000

with a similar density to the flesh of a barbarian enemy.

498

00:27:09,000 --> 00:27:11,000

Now this foam is going to make a great target

499

00:27:11,000 --> 00:27:14,000

for comparing the penetrating power of our arrows.

500

00:27:14,000 --> 00:27:16,000

But I think it's missing a little something.

501

00:27:16,000 --> 00:27:19,000

I think it's missing that hint of realism.

502

00:27:19,000 --> 00:27:22,000

Time to breast down for the occasion.

503

00:27:22,000 --> 00:27:23,000

What exactly are we?

504

00:27:23,000 --> 00:27:25,000

We're ancient warriors.

505

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

It's not really very accurate, but...

506

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

Yeah, we're the invading horde.

507

00:27:30,000 --> 00:27:32,000

Okay?

508

00:27:32,000 --> 00:27:34,000

This isn't the history channel.

509

00:27:34,000 --> 00:27:36,000

Grant sets the timer on the camera

510

00:27:36,000 --> 00:27:41,000

and the crew do their best to say cheese in barbarian.

511

00:27:41,000 --> 00:27:43,000

We're left with a happy snap

512

00:27:43,000 --> 00:27:47,000

well and truly fit for a big foam dartboard.

513

00:27:47,000 --> 00:27:50,000

Good. I thought that was good.

514

00:27:50,000 --> 00:27:53,000

I felt angry. That's good.

515

00:27:53,000 --> 00:27:59,000

Next up, Torey's man parts succumb to hostile fire.

516

00:27:59,000 --> 00:28:02,000

Right in the ding dong.

517

00:28:02,000 --> 00:28:04,000

While Jamie and Adam find a brand new way

518

00:28:04,000 --> 00:28:07,000

to obliterate a crash test dummy.

519

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

Two, one.

520

00:28:14,000 --> 00:28:19,000

It's one thing to ride a horse at speed without falling off.

521

00:28:19,000 --> 00:28:23,000

It's at least twice as hard to drop the reins and shoot an arrow.

522

00:28:23,000 --> 00:28:27,000

But will that arrow get twice the penetration?

523

00:28:27,000 --> 00:28:29,000

I think we're ready to attack.

524

00:28:29,000 --> 00:28:33,000

Carrie, Torey and Grant began testing their medieval archery myth

525

00:28:33,000 --> 00:28:36,000

with real horses and a handheld bow.

526

00:28:36,000 --> 00:28:39,000

Oh, so close.

527

00:28:39,000 --> 00:28:41,000

For the sake of consistency,

528

00:28:41,000 --> 00:28:44,000

they've changed up to a jeep and a crossbow.

529

00:28:44,000 --> 00:28:47,000

But the principle is just the same.

530

00:28:47,000 --> 00:28:50,000

Could a modest 40 miles per hour running start

531

00:28:50,000 --> 00:28:53,000

double the depth of the arrow?

532

00:28:53,000 --> 00:28:56,000

Ha ha ha.

533

00:28:56,000 --> 00:28:59,000

Got our own billboard.

534

00:29:01,000 --> 00:29:04,000

Zena, Conan, Papa Smurf.

535

00:29:04,000 --> 00:29:07,000

Hopefully they've nailed the consistency.

536

00:29:07,000 --> 00:29:10,000

But let's remember that this myth rests in G.

537

00:29:10,000 --> 00:29:13,000

The horse myth rests entirely on added momentum.

538

00:29:13,000 --> 00:29:19,000

Torey needs to shoot at speed precisely 60 feet short of the target.

539

00:29:19,000 --> 00:29:22,000

60 feet, right here.

540

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

It's a legend that's been hotly debated for 500 years.

541

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

So I guess we can hang on for a few more minutes

542

00:29:29,000 --> 00:29:33,000

to call it confirmed, plausible, or busted.

543

00:29:35,000 --> 00:29:37,000

You've seen a little bit of us learning to ride,

544

00:29:37,000 --> 00:29:39,000

but of course there's a whole lot more we couldn't fit in.

545

00:29:39,000 --> 00:29:42,000

And have another laugh at our expense.

546

00:29:42,000 --> 00:29:45,000

Log on to Discovery.com slash MythBusters.

547

00:29:50,000 --> 00:29:53,000

Back in the 1930s, there was nothing funnier

548

00:29:53,000 --> 00:29:57,000

than watching an automobile deconstruct after a minor collision.

549

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

Okay, it's still funny.

550

00:30:03,000 --> 00:30:05,000

I told you not to make that last payment.

551

00:30:05,000 --> 00:30:10,000

But these days, we're less inclined to laugh at catastrophic car failure.

552

00:30:13,000 --> 00:30:15,000

Adam and Jamie have gone into meltdown

553

00:30:15,000 --> 00:30:19,000

trying to replicate the myth of the exploding bumper.

554

00:30:21,000 --> 00:30:26,000

Jennifer Schmidt said the bumper that broke her leg traveled just 15 feet.

555

00:30:26,000 --> 00:30:29,000

But the myth we're working with says 50.

556

00:30:29,000 --> 00:30:34,000

So far, Adam and Jamie haven't managed to shoot a bumper 5 inches.

557

00:30:34,000 --> 00:30:38,000

Damn it. Man, this one is kicking my butt.

558

00:30:38,000 --> 00:30:42,000

I mean, we are just not seeing any of the exploding bumper action

559

00:30:42,000 --> 00:30:44,000

we're trying to get out of these shocks.

560

00:30:44,000 --> 00:30:46,000

Well, yeah, but it kind of makes sense.

561

00:30:46,000 --> 00:30:50,000

I mean, these things are designed to not fail catastrophically.

562

00:30:50,000 --> 00:30:52,000

We still have to get that shot.

563

00:30:52,000 --> 00:30:55,000

We still have to see a bumper shooting 50 feet through the air.

564

00:30:55,000 --> 00:30:57,000

So how do we get that?

565

00:30:57,000 --> 00:30:59,000

When in doubt, C4.

566

00:30:59,000 --> 00:31:02,000

Well, maybe not C4, but you get the picture.

567

00:31:02,000 --> 00:31:03,000

I do.

568

00:31:04,000 --> 00:31:08,000

So now throwing caution and custom to the wind,

569

00:31:08,000 --> 00:31:12,000

they're engineering the spectacle we've all been begging for.

570

00:31:12,000 --> 00:31:15,000

Jamie cuts two massively upscaled pistons.

571

00:31:15,000 --> 00:31:20,000

And the plan here is to stuff them with sand, water and explosives.

572

00:31:22,000 --> 00:31:26,000

The best venue in these situations, as always, is the bomb range.

573

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

I got surgeon.

574

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

Nicely done.

575

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

We've got one main thing to do before we run this experiment,

576

00:31:34,000 --> 00:31:37,000

which is attach the bumper to the car.

577

00:31:37,000 --> 00:31:40,000

And it's got a little more support than your average bumper.

578

00:31:40,000 --> 00:31:43,000

These explosive pistons are about 14 inches deep.

579

00:31:43,000 --> 00:31:46,000

And I need to hog out enough of the car's structure

580

00:31:46,000 --> 00:31:49,000

to get this puppy in there to attach the bumpers.

581

00:31:49,000 --> 00:31:52,000

Adam enthusiastically hogs out the front end,

582

00:31:52,000 --> 00:31:56,000

making room for Jamie's upscaled and built pistons.

583

00:31:57,000 --> 00:31:59,000

I think that's pretty much it.

584

00:31:59,000 --> 00:32:02,000

Now for the explosive bit.

585

00:32:02,000 --> 00:32:06,000

To make it happen, we've re-enlisted the man who set a similar charge

586

00:32:06,000 --> 00:32:09,000

for motorcycle flip, pyrotechnician Matt Herron.

587

00:32:09,000 --> 00:32:10,000

Boom.

588

00:32:10,000 --> 00:32:12,000

Boom.

589

00:32:12,000 --> 00:32:16,000

We're ramping it up, which is a little bit more than a hundred feet.

590

00:32:16,000 --> 00:32:17,000

Boom.

591

00:32:17,000 --> 00:32:20,000

We're ramping it up, which is kind of what we do on this show.

592

00:32:20,000 --> 00:32:25,000

So in this case, what we're doing here is putting the same amount of gunpowder

593

00:32:25,000 --> 00:32:28,000

that we used just a little while ago on motorcycle flip

594

00:32:28,000 --> 00:32:34,000

to shoot a motorcycle that weighed, you know, 250 pounds or so straight up in the air.

595

00:32:38,000 --> 00:32:40,000

Well, the timing was perfect.

596

00:32:40,000 --> 00:32:42,000

If you say so, Junior.

597

00:32:43,000 --> 00:32:49,000

In this case, all we've got to do is launch about 50 or 75 pounds straight that way.

598

00:32:49,000 --> 00:32:51,000

So it's going.

599

00:32:51,000 --> 00:32:52,000

So what do you think?

600

00:32:52,000 --> 00:32:54,000

Charging the end, sand the rest of the way?

601

00:32:54,000 --> 00:32:57,000

Sounds like a plan, yeah.

602

00:32:58,000 --> 00:33:02,000

Adam's plan is to place a mannequin exactly 50 feet in front of the car,

603

00:33:02,000 --> 00:33:04,000

just like the myth says.

604

00:33:06,000 --> 00:33:08,000

Cooperative love.

605

00:33:08,000 --> 00:33:12,000

For some reason, he's overcome by an urge to paint it red.

606

00:33:12,000 --> 00:33:14,000

Well, that increases its visibility.

607

00:33:14,000 --> 00:33:18,000

Meantime, Jamie's focused on the details of the detonations.

608

00:33:18,000 --> 00:33:24,000

Now, instead of compressed gas, we're going to put some gunpowder and a bunch of wet sand in here.

609

00:33:24,000 --> 00:33:25,000

Okay.

610

00:33:26,000 --> 00:33:27,000

Why the wet sand?

611

00:33:27,000 --> 00:33:31,000

Well, if we just packed this with gunpowder, we'd have a pipe bomb.

612

00:33:31,000 --> 00:33:36,000

So the wet sand actually acts as a shock absorber for the gunpowder

613

00:33:36,000 --> 00:33:40,000

and it translates that bang into forward movement.

614

00:33:41,000 --> 00:33:44,000

Matt connects both charges to the same circuit.

615

00:33:44,000 --> 00:33:46,000

This is my favorite part.

616

00:33:46,000 --> 00:33:49,000

So the two shocks should blow simultaneously.

617

00:33:50,000 --> 00:33:54,000

Jamie lards up the cylinders to minimize the friction.

618

00:33:54,000 --> 00:33:55,000

That ought to do it.

619

00:33:55,000 --> 00:33:57,000

And the bumper gets refitted.

620

00:33:59,000 --> 00:34:00,000

Nice and tight.

621

00:34:02,000 --> 00:34:03,000

Looks good right there.

622

00:34:03,000 --> 00:34:04,000

Perfect.

623

00:34:05,000 --> 00:34:06,000

What do you think?

624

00:34:06,000 --> 00:34:08,000

I think we're going to hit this guy.

625

00:34:08,000 --> 00:34:10,000

I think this thing's going to fly 50 feet.

626

00:34:10,000 --> 00:34:11,000

I have a good feeling.

627

00:34:11,000 --> 00:34:14,000

I think the bumper's going to stay still and the car's going to go up the hill.

628

00:34:14,000 --> 00:34:15,000

You don't really think that?

629

00:34:15,000 --> 00:34:16,000

No.

630

00:34:16,000 --> 00:34:17,000

Yeah, I think so.

631

00:34:17,000 --> 00:34:19,000

So Matt sets the twin fuses.

632

00:34:20,000 --> 00:34:21,000

We're fully armed.

633

00:34:21,000 --> 00:34:22,000

We're hot.

634

00:34:22,000 --> 00:34:26,000

And hopefully, we're about to get the finish we've come to expect.

635

00:34:26,000 --> 00:34:33,000

All right, simulated bumper blast in three, two, one.

636

00:34:37,000 --> 00:34:38,000

Damn.

637

00:34:38,000 --> 00:34:39,000

Wow.

638

00:34:43,000 --> 00:34:45,000

We may have almost done that.

639

00:34:46,000 --> 00:34:49,000

Overdone is a word we discourage here on Mythbusters.

640

00:34:49,000 --> 00:34:51,000

The trajectory was perfect.

641

00:34:51,000 --> 00:34:53,000

The mannequins a shattered wreck.

642

00:34:53,000 --> 00:34:55,000

And hey, we got what we came for.

643

00:34:56,000 --> 00:34:58,000

Well, definitely flew 50 feet.

644

00:34:59,000 --> 00:35:01,000

Oh, look, it's up there on the hill.

645

00:35:01,000 --> 00:35:02,000

Wow.

646

00:35:03,000 --> 00:35:05,000

Looks like we're going to have to get another dummy.

647

00:35:08,000 --> 00:35:10,000

We go through these mannequins like candy.

648

00:35:12,000 --> 00:35:19,000

They had to fudge the method, but now we have an insight into how unlikely a 50-foot blast must be.

649

00:35:20,000 --> 00:35:27,000

The bumper that smashed Jennifer's leg broke in three because the two shocks didn't explode in unison.

650

00:35:27,000 --> 00:35:33,000

We needed Matt's expertise and two plugs of gunpowder to make that happen.

651

00:35:33,000 --> 00:35:34,000

Still...

652

00:35:36,000 --> 00:35:40,000

These red stripes right here, those are your kneecaps.

653

00:35:40,000 --> 00:35:48,000

Now, granted, we might have exaggerated a little bit with this, but we know that this did happen with a very similar device with a car.

654

00:35:49,000 --> 00:35:53,000

So if you see a car fire, you shouldn't stand around it.

655

00:35:55,000 --> 00:35:56,000

You might get hurt.

656

00:35:57,000 --> 00:35:58,000

I'm pretty happy.

657

00:35:58,000 --> 00:36:01,000

We came here to make a bumper fly 50 feet and we totally exceeded that.

658

00:36:01,000 --> 00:36:02,000

It's a good test.

659

00:36:06,000 --> 00:36:12,000

Hey, it's a great test, but simultaneous catastrophic failure and a 50-foot launch?

660

00:36:12,000 --> 00:36:14,000

No way in the wide world.

661

00:36:14,000 --> 00:36:16,000

This one's busted.

662

00:36:19,000 --> 00:36:20,000

Still to come.

663

00:36:20,000 --> 00:36:22,000

Ah-hoo! Shoo-dee! Away!

664

00:36:22,000 --> 00:36:27,000

A Mad Max climax to the medieval myth of double-deep arrows.

665

00:36:31,000 --> 00:36:35,000

And now, another episode of Diesel Diaries.

666

00:36:35,000 --> 00:36:41,000

Okay, I love the 2009 Chet of TDI, but isn't Diesel really dirty and a huge contributor to greenhouse gases?

667

00:36:41,000 --> 00:36:43,000

I swear, Diesel gets such a bad rap.

668

00:36:43,000 --> 00:36:44,000

Here, let me borrow your scarf.

669

00:36:44,000 --> 00:36:45,000

What for?

670

00:36:45,000 --> 00:36:46,000

I'm going to show you something.

671

00:36:46,000 --> 00:36:47,000

Grant, start the car up.

672

00:36:49,000 --> 00:36:53,000

Now, if I cover the tailpipe like this, we'll get a visual of what's coming out.

673

00:36:53,000 --> 00:36:54,000

You're going to owe me a new scarf.

674

00:36:54,000 --> 00:36:56,000

But look, it's still white.

675

00:36:56,000 --> 00:36:57,000

You're still owe me a new scarf.

676

00:36:57,000 --> 00:36:59,000

All right, that's a cute little trick.

677

00:36:59,000 --> 00:37:04,000

But I took the Jetta in for a more scientific test, a CO2 test.

678

00:37:04,000 --> 00:37:10,000

CO2 is a leading contributor to greenhouse gases and the majority of it comes directly from vehicle emissions.

679

00:37:10,000 --> 00:37:13,000

Yeah, if a car doesn't have less than 15% CO2, there's something wrong with it.

680

00:37:13,000 --> 00:37:15,000

And the Jetta got 3.5%.

681

00:37:15,000 --> 00:37:16,000

That's amazing.

682

00:37:16,000 --> 00:37:19,000

That's over 70% less than an average car.

683

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

Really?

684

00:37:20,000 --> 00:37:21,000

You don't say.

685

00:37:21,000 --> 00:37:22,000

All right, fine.

686

00:37:22,000 --> 00:37:23,000

You win.

687

00:37:23,000 --> 00:37:25,000

Diesel isn't a dirty word anymore.

688

00:37:30,000 --> 00:37:40,000

Grant, Harry and Tori are testing the myth that an arrow fired from a galloping horse has twice the penetration of an arrow fired from rest.

689

00:37:40,000 --> 00:37:43,000

They've had to make a few adjustments along the way.

690

00:37:43,000 --> 00:37:49,000

Even with trained horses, they might gallop at a different speed on each run.

691

00:37:49,000 --> 00:37:55,000

And even with expert archers, sometimes you might draw back the bow just a little bit further.

692

00:37:55,000 --> 00:37:58,000

So what we're doing right now is getting rid of all those variables.

693

00:37:58,000 --> 00:38:04,000

So the horse becomes a jeep and the medieval bow gets replaced by a modern crossbow.

694

00:38:04,000 --> 00:38:09,000

The changes are essential for reliable, repeatable testing.

695

00:38:09,000 --> 00:38:12,000

The first set of data points we're going to take are static shots.

696

00:38:12,000 --> 00:38:14,000

We're going to shoot a bunch of arrows into our target.

697

00:38:14,000 --> 00:38:16,000

I'm going to mark and measure each one.

698

00:38:16,000 --> 00:38:20,000

And that way we'll have a great comparison for when we actually do our moving shots.

699

00:38:20,000 --> 00:38:25,000

Tori's ready to rip through 10 arrows in quick succession from a standing start.

700

00:38:25,000 --> 00:38:28,000

In 3, 2, 1, fire.

701

00:38:28,000 --> 00:38:30,000

Fire.

702

00:38:33,000 --> 00:38:34,000

Nice.

703

00:38:34,000 --> 00:38:36,000

In 3, 2, 1.

704

00:38:37,000 --> 00:38:39,000

Ah-ha!

705

00:38:39,000 --> 00:38:45,000

He is consistent, but there's an unsettling pattern developing here.

706

00:38:45,000 --> 00:38:47,000

That was a little too close for comfort there.

707

00:38:47,000 --> 00:38:49,000

Still, nice grouping.

708

00:38:49,000 --> 00:38:52,000

3, 2, 1.

709

00:38:52,000 --> 00:38:54,000

Oh!

710

00:38:54,000 --> 00:38:57,000

Right in the ding-dong!

711

00:38:57,000 --> 00:39:00,000

Now it's up to Kari to mark the depth of each shaft.

712

00:39:02,000 --> 00:39:05,000

Oh, and it had to hurt right there in the genetic legacy.

713

00:39:05,000 --> 00:39:07,000

Ow!

714

00:39:07,000 --> 00:39:09,000

It's like I was aiming or something.

715

00:39:09,000 --> 00:39:11,000

Then put her back into it.

716

00:39:16,000 --> 00:39:21,000

10 test arrows should give us a good average static depth to work from.

717

00:39:21,000 --> 00:39:25,000

The average from our static shots is 8.77 inches of penetration.

718

00:39:25,000 --> 00:39:28,000

So now we're going to take our moving shots and compare the two.

719

00:39:28,000 --> 00:39:30,000

Here we go.

720

00:39:30,000 --> 00:39:32,000

Grant revs the Jeep like it's a rental.

721

00:39:35,000 --> 00:39:37,000

Then gets it up to speed.

722

00:39:37,000 --> 00:39:42,000

Tori steadies, aims, and makes one tiny mistake.

723

00:39:46,000 --> 00:39:47,000

I'm excited!

724

00:39:47,000 --> 00:39:50,000

I'm not so excited I forgot to take the save, y'all!

725

00:39:50,000 --> 00:39:52,000

Okay, good practice right, everyone.

726

00:39:52,000 --> 00:39:54,000

Alright, this one's for me.

727

00:39:54,000 --> 00:39:56,000

Good job, everyone.

728

00:39:56,000 --> 00:39:57,000

Alright!

729

00:39:57,000 --> 00:39:59,000

I owe Shudi a wave!

730

00:39:59,000 --> 00:40:01,000

Alright.

731

00:40:02,000 --> 00:40:08,000

Now let's see if Tori can keep his composure and hit the target.

732

00:40:11,000 --> 00:40:12,000

Go!

733

00:40:21,000 --> 00:40:24,000

The first three shots found a steady latitude.

734

00:40:24,000 --> 00:40:29,000

One hit the shield, one hit Tori, and the last hit Kari in her favorite kidney.

735

00:40:30,000 --> 00:40:34,000

I keep forgetting we're trying to get some actual data from all this.

736

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

Yeah, oops!

737

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

Dude, I thought we were just having fun.

738

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

Yeah, don't forget to do the science.

739

00:40:41,000 --> 00:40:44,000

Yeah, let's not forget the science.

740

00:40:44,000 --> 00:40:50,000

These 10 running shots will bust or confirm the myth that our shot forwards at 40 miles per hour

741

00:40:50,000 --> 00:40:53,000

bury themselves twice as deep in the target.

742

00:40:53,000 --> 00:40:55,000

You're ready to go!

743

00:41:00,000 --> 00:41:04,000

Tori turns out to be a natural born archer.

744

00:41:04,000 --> 00:41:09,000

If shooting a crossbow from the back of a moving jeep was an Olympic sport,

745

00:41:10,000 --> 00:41:12,000

actually, why isn't it?

746

00:41:17,000 --> 00:41:20,000

Oh, I can do this all day!

747

00:41:20,000 --> 00:41:22,000

I gotta remember to stop!

748

00:41:22,000 --> 00:41:24,000

I didn't look like I was going!

749

00:41:24,000 --> 00:41:26,000

This just never gets old.

750

00:41:26,000 --> 00:41:28,000

But Tori's down to his last arrow.

751

00:41:28,000 --> 00:41:30,000

Ready when you are.

752

00:41:30,000 --> 00:41:35,000

And so far, Barbarian Dwarf Grant is unscathed.

753

00:41:46,000 --> 00:41:48,000

You got the dwarf!

754

00:41:48,000 --> 00:41:50,000

I got the dwarf!

755

00:41:50,000 --> 00:41:51,000

Yeah!

756

00:41:51,000 --> 00:41:53,000

You got the little bearded Grant!

757

00:41:53,000 --> 00:41:55,000

I'm dead!

758

00:41:55,000 --> 00:41:57,000

I thought you were going to get out of this battle unscathed.

759

00:41:57,000 --> 00:41:59,000

I don't think so, friend.

760

00:41:59,000 --> 00:42:01,000

Alright, now for the fun part!

761

00:42:01,000 --> 00:42:02,000

Yeah, Tata!

762

00:42:02,000 --> 00:42:04,000

I'm going to go do math.

763

00:42:04,000 --> 00:42:06,000

Don't be jealous.

764

00:42:06,000 --> 00:42:10,000

Once more, Kari marks the shafts exactly where they pierced the foam.

765

00:42:10,000 --> 00:42:13,000

And they're even harder to extract than last time.

766

00:42:18,000 --> 00:42:21,000

I feel like they're falling further.

767

00:42:22,000 --> 00:42:24,000

Now for the tail of the tape.

768

00:42:24,000 --> 00:42:27,000

As Kari measures the penetration of all ten arrows

769

00:42:27,000 --> 00:42:30,000

shot from a 40 mile per hour running start.

770

00:42:30,000 --> 00:42:32,000

The figures are actually pretty interesting.

771

00:42:32,000 --> 00:42:35,000

We are getting an average of 11 inches with all the moving shots.

772

00:42:35,000 --> 00:42:39,000

Which is a little over 2 inches more penetration than all the static shots.

773

00:42:39,000 --> 00:42:41,000

So we are getting more penetration.

774

00:42:41,000 --> 00:42:45,000

But it's not the double that the myth actually claims.

775

00:42:45,000 --> 00:42:46,000

Fire!

776

00:42:48,000 --> 00:42:53,000

If it was double, these arrows would have buried themselves all the way up to their feathers.

777

00:42:53,000 --> 00:42:55,000

Okay, Kari, so what do you got?

778

00:42:55,000 --> 00:42:58,000

Well for the static shots, I got an average of 8.77.

779

00:42:58,000 --> 00:43:02,000

Now for the moving shots, I got an average of 11.04 inches.

780

00:43:02,000 --> 00:43:05,000

Alright, well before we call this a bust, I think we need to go back to the shop,

781

00:43:05,000 --> 00:43:09,000

double check the high speed, and see what the speeds of the arrows were.

782

00:43:09,000 --> 00:43:11,000

Woo!

783

00:43:12,000 --> 00:43:17,000

The key to this myth is penetration, but after measuring our arrows, this one's busted.

784

00:43:17,000 --> 00:43:22,000

Yeah, and we use speed foam, which has a similar density to both our ballistic material and the human body.

785

00:43:22,000 --> 00:43:26,000

And we only got 25% more penetration, which is far from what their stories told.

786

00:43:26,000 --> 00:43:29,000

And that was backed up by our high speed footage,

787

00:43:29,000 --> 00:43:33,000

which showed that our iron and force increased the speed of our arrows by 31%,

788

00:43:33,000 --> 00:43:37,000

resulting in only a 72% increase in kinetic energy.

789

00:43:37,000 --> 00:43:38,000

Not quite double.

790

00:43:38,000 --> 00:43:42,000

Yeah, but you gotta give it to them. Riding horseback did give them some advantage.

791

00:43:42,000 --> 00:43:44,000

It just wasn't exactly as much as they bragged about.

792

00:43:44,000 --> 00:43:49,000

Yeah, but that being said, the arrows still didn't go twice as deep, so this one's busted. Busted.

793

00:43:49,000 --> 00:43:50,000

Busted.

