1

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

It may not look like it, but we're professionals. Do us a favor.

2

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

Don't try this at home! Whoa!

3

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

On this episode of MythBusters, the fans take command in mythian control.

4

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

Oops.

5

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

First up, it's the Heinemann versus Newton, as Adam and Jamie cause a cacophony of car carnage.

6

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

One car into one wall at 50 miles an hour, 100 miles per hour crash.

7

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

Bring on the head on collision.

8

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

Testing Jamie's notion on Newton's third law of motion.

9

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

So are you ready for some more wanton destruction?

10

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

Meanwhile, Carrie, Grant and Tori are back in the school of hard knocks.

11

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

As they retest, knock your socks off.

12

00:00:48,000 --> 00:00:49,000

Ow!

13

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

Knock your socks, buster!

14

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

And this time, they're cruising from maximum bruising.

15

00:00:59,000 --> 00:01:01,000

Who are the MythBusters?

16

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

Adam Savage.

17

00:01:02,000 --> 00:01:03,000

That is science.

18

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

And Jamie Heinemann.

19

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

We're gonna have an adventure.

20

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

Between them more than 30 years of special effects experience.

21

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

Fun for the whole family.

22

00:01:13,000 --> 00:01:16,000

Joining them, Grant Imahara.

23

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

Formidable projectile.

24

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

Carrie Byron.

25

00:01:19,000 --> 00:01:20,000

Let's do it.

26

00:01:20,000 --> 00:01:21,000

And Tori Belachie.

27

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

To the hype!

28

00:01:22,000 --> 00:01:27,000

They don't just tell the myths, they put them to the test.

29

00:01:28,000 --> 00:01:40,000

So what's up?

30

00:01:40,000 --> 00:01:43,000

What's up is that the fans are in control.

31

00:01:43,000 --> 00:01:46,000

It is effectively mythian control.

32

00:01:46,000 --> 00:01:47,000

So how does that work?

33

00:01:47,000 --> 00:01:49,000

Cast your mind back to compact, compact.

34

00:01:49,000 --> 00:01:53,000

Remember, we smashed two semis into each other at 50 miles per hour.

35

00:01:53,000 --> 00:01:58,000

Which you said on camera was equivalent to one of them hitting a wall at 100 miles an hour.

36

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

And the fans went nuts.

37

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

They are revolting.

38

00:02:01,000 --> 00:02:03,000

They rose up and they said, no!

39

00:02:03,000 --> 00:02:07,000

Two cars hitting each other at 50 miles an hour is not equivalent to one hitting a wall at 100 miles an hour.

40

00:02:07,000 --> 00:02:10,000

It's equivalent to one hitting a wall at 50 miles an hour.

41

00:02:10,000 --> 00:02:12,000

They say that you were wrong.

42

00:02:13,000 --> 00:02:14,000

Let's test it.

43

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

That's what I thought.

44

00:02:15,000 --> 00:02:18,000

It was the episode that had it all.

45

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

Crashings.

46

00:02:21,000 --> 00:02:22,000

Wow.

47

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

Smashes.

48

00:02:24,000 --> 00:02:28,000

And according to fans, a subtle physics faux pas.

49

00:02:28,000 --> 00:02:32,000

Both trucks were traveling at about 50 miles an hour when the impact occurred.

50

00:02:32,000 --> 00:02:38,000

Now that's equivalent to a single impact going into a solid wall at 100 miles an hour.

51

00:02:38,000 --> 00:02:40,000

Stop right there.

52

00:02:40,000 --> 00:02:42,000

This innocent remark.

53

00:02:42,000 --> 00:02:48,000

Now that's equivalent to a single impact going into a solid wall at 100 miles an hour.

54

00:02:49,000 --> 00:02:51,000

Sparked a fan frenzy.

55

00:02:51,000 --> 00:02:57,000

They reckon that because of Newton's third law, every action has an equal and opposite reaction.

56

00:02:57,000 --> 00:03:07,000

The two cars crashing at 50 miles per hour is the same as one car crashing into a wall at just 50 miles per hour and not a hundred.

57

00:03:08,000 --> 00:03:12,000

But can this counterintuitive argument really be right?

58

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

Well, if the fans are in control, how do they want us to do it?

59

00:03:17,000 --> 00:03:20,000

Obviously they want us to smash some full-sized cars into each other.

60

00:03:20,000 --> 00:03:25,000

But I think we may be able to illuminate some of the physics here with a scale experiment.

61

00:03:25,000 --> 00:03:27,000

Under more controlled circumstances.

62

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

Exactly.

63

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

And then we get to smash some full-sized cars.

64

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

Yes, we do.

65

00:03:33,000 --> 00:03:38,000

But first up, Adam is rigging a rig that will replicate the crash in miniature.

66

00:03:38,000 --> 00:03:43,000

The part of the car will be played by two weights on a pendulum.

67

00:03:43,000 --> 00:03:45,000

It's going to be loud.

68

00:03:45,000 --> 00:03:46,000

And the wall...

69

00:03:46,000 --> 00:03:49,000

Bring in the immovable object!

70

00:03:49,000 --> 00:03:51,000

Bring in the immovable object!

71

00:03:51,000 --> 00:03:54,000

It's time for the immovable object.

72

00:03:54,000 --> 00:03:57,000

...will be played by this hunk of steel.

73

00:03:57,000 --> 00:03:58,000

Allow me to demonstrate the rig here.

74

00:03:58,000 --> 00:03:59,000

This is our car.

75

00:03:59,000 --> 00:04:01,000

It's basically a swinging hammer.

76

00:04:01,000 --> 00:04:03,000

This is our wall.

77

00:04:03,000 --> 00:04:06,000

It's an immovable piece of 1200 pounds of steel.

78

00:04:06,000 --> 00:04:12,000

I will be swinging this car into the wall at speed x and speed 2x,

79

00:04:12,000 --> 00:04:14,000

which is basically double speed x.

80

00:04:14,000 --> 00:04:16,000

That's our 50-mile-per-hour hit.

81

00:04:16,000 --> 00:04:18,000

That's our 100-mile-per-hour hit.

82

00:04:18,000 --> 00:04:23,000

Our measurement will be done simply with a piece of clay that sits right behind the main hammer

83

00:04:23,000 --> 00:04:26,000

and between it and a secondary hammer.

84

00:04:26,000 --> 00:04:30,000

Obviously, when I swing this car into the wall, that clay will compress.

85

00:04:30,000 --> 00:04:35,000

And it will likely compress a different amount at speed x than at speed 2x.

86

00:04:35,000 --> 00:04:41,000

And this gives me a beautiful comparison point when I smack two cars into each other a little bit later.

87

00:04:41,000 --> 00:04:47,000

OK, so the swing from 1x will imitate a 50-mile-per-hour wall crash.

88

00:04:47,000 --> 00:04:54,000

And the 2x swing will double the speed to replicate a crash into a wall at 100 miles per hour.

89

00:04:54,000 --> 00:04:57,000

Car hitting a wall at speed 1x.

90

00:04:57,000 --> 00:05:01,000

In 3, 2, 1.

91

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

Satisfying ding, isn't it?

92

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

Yeah.

93

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

Satisfying may be, but more importantly, their first data point.

94

00:05:10,000 --> 00:05:15,000

Post compression length, 1.5.

95

00:05:15,000 --> 00:05:24,000

For a comprehensive result, the guys get into the swing of things and repeat the test five more times.

96

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

Next, it's time to double the speed to 2x for a full swing.

97

00:05:29,000 --> 00:05:32,000

Uncompress length, 2.6.

98

00:05:32,000 --> 00:05:38,000

Car hitting a wall at speed 2x in 3, 2, 1.

99

00:05:38,000 --> 00:05:42,000

Ha ha ha ha ha ha ha ha.

100

00:05:42,000 --> 00:05:43,000

I think that's more.

101

00:05:43,000 --> 00:05:45,000

I think that's a lot more.

102

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

Yep, and the measurements hammer that home.

103

00:05:48,000 --> 00:05:54,000

0.777. It's a little bit less than twice as compressed as the speed 1x hit.

104

00:05:54,000 --> 00:05:56,000

That makes sense, doesn't it?

105

00:05:56,000 --> 00:05:57,000

It does.

106

00:05:57,000 --> 00:06:07,000

Almost double the compression, but for a larger sample size, they swing into action and repeat the 2x test five times.

107

00:06:07,000 --> 00:06:11,000

And now that their clay collection is complete, what's next?

108

00:06:11,000 --> 00:06:14,000

Well, we've got our metric of speed x and speed 2x.

109

00:06:14,000 --> 00:06:16,000

Now it's time to smack two cars into each other.

110

00:06:16,000 --> 00:06:21,000

So we're going to remove the wall and bring in a second car.

111

00:06:21,000 --> 00:06:24,000

Physicists and fans stand by.

112

00:06:24,000 --> 00:06:26,000

They're identical. Let's do it.

113

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

Because this is the moment of truth.

114

00:06:29,000 --> 00:06:35,000

Now that's equivalent to a single impact going into a solid wall at 100 miles an hour.

115

00:06:35,000 --> 00:06:40,000

Will the clay clear up the controversy or will it be as clear as mud?

116

00:06:45,000 --> 00:06:50,000

Music

117

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

Okay, mission control. What do the fans have for us?

118

00:06:54,000 --> 00:06:55,000

Gas.

119

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

Knock your socks off.

120

00:06:57,000 --> 00:06:58,000

Yep.

121

00:06:58,000 --> 00:06:59,000

Man, we totally busted that one.

122

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

Apparently not. According to the fans, you can knock someone's socks off if you have a hard enough punch.

123

00:07:06,000 --> 00:07:08,000

So apparently we messed it up.

124

00:07:08,000 --> 00:07:09,000

Really?

125

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

What did they say we got wrong?

126

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

Take your pick.

127

00:07:12,000 --> 00:07:14,000

You used the wrong punch.

128

00:07:14,000 --> 00:07:16,000

Your socks had too much elastic in it.

129

00:07:16,000 --> 00:07:18,000

Buster was not supporting his own weight.

130

00:07:18,000 --> 00:07:21,000

Well, looks like we've got to pull our socks up and give this one another go.

131

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

Cool.

132

00:07:22,000 --> 00:07:24,000

Cool.

133

00:07:24,000 --> 00:07:25,000

Cool.

134

00:07:25,000 --> 00:07:31,000

The last time the team tested the myth that one punch could lift Buster out of his legwear,

135

00:07:31,000 --> 00:07:34,000

500 psi was really intense.

136

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

Nothing they tried could knock his socks off.

137

00:07:37,000 --> 00:07:40,000

And the myth was down for the count.

138

00:07:40,000 --> 00:07:41,000

Or was it?

139

00:07:41,000 --> 00:07:43,000

Well, apparently not.

140

00:07:43,000 --> 00:07:47,000

The fans flooded our inbox telling us exactly what we got wrong.

141

00:07:47,000 --> 00:07:53,000

Now, armed with a list of mythical mistakes, the team is ready for a rematch.

142

00:07:53,000 --> 00:07:56,000

So, given the huge ban response, where do we start?

143

00:07:56,000 --> 00:07:59,000

Well, the most prevalent criticism is that we used the wrong sock.

144

00:07:59,000 --> 00:08:04,000

We used elasticized, long sport socks, the worst case scenario for the experiment.

145

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

Meaning they were too difficult to pull off.

146

00:08:06,000 --> 00:08:07,000

Exactly.

147

00:08:07,000 --> 00:08:10,000

Alright, well why don't we start out with the best case scenario sock?

148

00:08:10,000 --> 00:08:13,000

The one that requires the least amount of effort to pull off.

149

00:08:13,000 --> 00:08:16,000

Once we find that, then we can unleash some heavyweight punches on it.

150

00:08:16,000 --> 00:08:22,000

Alright, well since we need to be meticulous about this, we should also test hairy leg versus hairless leg.

151

00:08:22,000 --> 00:08:25,000

So that way we get the best leg sock combination.

152

00:08:25,000 --> 00:08:27,000

Are you volunteering your bare legs?

153

00:08:27,000 --> 00:08:29,000

I don't wax my legs.

154

00:08:29,000 --> 00:08:30,000

Not yet, you don't.

155

00:08:30,000 --> 00:08:31,000

Oh, hey!

156

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

Round one.

157

00:08:34,000 --> 00:08:36,000

Right, first into the ring is the sock.

158

00:08:36,000 --> 00:08:41,000

Add to measure just how much force it takes to pull a sock off a human foot.

159

00:08:41,000 --> 00:08:46,000

I hope this is the sock puller and not the knee dislocator.

160

00:08:46,000 --> 00:08:49,000

Grant has designed this sock stripper.

161

00:08:49,000 --> 00:08:53,000

Let me introduce you to the dual sock pulling and measurement machine.

162

00:08:53,000 --> 00:08:58,000

Here I have a giant pneumatic cylinder capable of generating over 2,400 pounds of force,

163

00:08:58,000 --> 00:09:02,000

which would be equivalent to say, hanging a car on your sock and letting it drop.

164

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

Connected to the clevis is a bar with dual high-precision force meters.

165

00:09:06,000 --> 00:09:07,000

Now, why 2 meters?

166

00:09:07,000 --> 00:09:14,000

Because we want to compare side by side, simultaneously, the difference between a hairy leg and a waxed leg.

167

00:09:14,000 --> 00:09:19,000

And finally, here in the seat, we'll sit our test subject, Tori.

168

00:09:19,000 --> 00:09:22,000

Unfortunately for Tori, he is destined for the hot seat.

169

00:09:22,000 --> 00:09:26,000

So, Kari is wielding the spatula of doom.

170

00:09:26,000 --> 00:09:27,000

How's that feel?

171

00:09:27,000 --> 00:09:29,000

It actually feels kind of good.

172

00:09:29,000 --> 00:09:31,000

What's so bad about waxing?

173

00:09:31,000 --> 00:09:33,000

So, ready? One, two, three.

174

00:09:40,000 --> 00:09:47,000

With Tori's legs now covering both faces, smooth and hairy, it's time to select the sock.

175

00:09:47,000 --> 00:09:49,000

What's with all the socks?

176

00:09:49,000 --> 00:09:53,000

Well, for this test, we are going to leave no sock untested.

177

00:09:53,000 --> 00:09:54,000

Look at this.

178

00:09:54,000 --> 00:10:05,000

We have long socks, short socks, cotton socks, nylon, wool, silk, and finally, genuine 19th century boxing socks.

179

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

We're going to pull all of these socks off of Tori's feet and find the socks of least resistance.

180

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

Ew, Tori's feet disgusting.

181

00:10:13,000 --> 00:10:15,000

Shut up.

182

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

Yep, the sock stripper is set, so the team starts at the top.

183

00:10:19,000 --> 00:10:24,000

Okay, this is sock number one, cotton, long socks, loose elastic.

184

00:10:24,000 --> 00:10:27,000

Three, two, one.

185

00:10:29,000 --> 00:10:35,000

Kari notes the numbers and then it's just apply, strip, and repeat.

186

00:10:35,000 --> 00:10:39,000

Good man. I need you to take off my socks.

187

00:10:39,000 --> 00:10:42,000

Long sock, acrylic, nylon. Push the button.

188

00:10:44,000 --> 00:10:45,000

Ow!

189

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

Didn't even come off my foot.

190

00:10:47,000 --> 00:10:51,000

They both peaked out at 35.38.

191

00:10:51,000 --> 00:11:03,000

Tori gets his socks off over and over and over as the team tries socks of every material and length to leave no sock untested, just as you demand it.

192

00:11:03,000 --> 00:11:07,000

These ones are the lovely socks knit with love from a fan.

193

00:11:07,000 --> 00:11:08,000

All right.

194

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

Woo, those look good.

195

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

5.64 pounds.

196

00:11:13,000 --> 00:11:19,000

Finally, after testing over 50 types of socks, they've got the data they need.

197

00:11:19,000 --> 00:11:25,000

So here's something crazy. Out of our top four contenders, two of them were long socks and two of them were short socks.

198

00:11:25,000 --> 00:11:29,000

So it's looking like fabric is much more important than length. Who would have thunk?

199

00:11:29,000 --> 00:11:36,000

Now, what we also found was that leg hair was a fairly big factor in making it harder to pull the sock off.

200

00:11:36,000 --> 00:11:40,000

In most cases, the smoother leg had less resistance.

201

00:11:40,000 --> 00:11:50,000

But most importantly, the wool knit sock is the sock of least resistance, requiring only 5.6 pounds of force to rip it from a bare leg.

202

00:11:50,000 --> 00:11:59,000

So the combination of variables that makes for the best sock are smooth leg and non-elastic woven woolen sock.

203

00:11:59,000 --> 00:12:03,000

That's going to be your best sock for trying to knock your socks off.

204

00:12:03,000 --> 00:12:05,000

Coming up next.

205

00:12:05,000 --> 00:12:07,000

This is the moment of truth.

206

00:12:07,000 --> 00:12:09,000

Were the fans right?

207

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

In Compact Compact, the fans detected a disturbance in the forest.

208

00:12:21,000 --> 00:12:24,000

The airbag went off.

209

00:12:24,000 --> 00:12:28,000

So now it's Mythbusters versus Sir Isaac Neu.

210

00:12:28,000 --> 00:12:31,000

But for whom does the bell toll?

211

00:12:32,000 --> 00:12:35,000

These two pieces of clay tell the tale.

212

00:12:35,000 --> 00:12:40,000

This is the clay compressed at speed 1x. This is the clay compressed at speed 2x.

213

00:12:40,000 --> 00:12:46,000

Now, if Jamie's right that two cars hitting each other at speed x is equivalent to one car hitting a wall at speed 2x,

214

00:12:46,000 --> 00:12:51,000

then this is what the clay is going to look like when we smash two cars into each other at speed x.

215

00:12:51,000 --> 00:12:55,000

If the myth is true, this is what the clay in those cars is going to look like.

216

00:12:55,000 --> 00:12:58,000

Which is it? I quite honestly have no idea.

217

00:12:58,000 --> 00:13:01,000

This is the moment of truth. Are you ready to go?

218

00:13:01,000 --> 00:13:03,000

What are you doing back there?

219

00:13:03,000 --> 00:13:08,000

I'm ready. I'm going to cut from top dead center so that the amount of force on both is the same.

220

00:13:08,000 --> 00:13:10,000

Okay. Here we go.

221

00:13:10,000 --> 00:13:14,000

Two cars smashing into each other at speed 1x.

222

00:13:14,000 --> 00:13:17,000

In three, two, one.

223

00:13:18,000 --> 00:13:21,000

The clay catastrophe goes under the hammer.

224

00:13:21,000 --> 00:13:27,000

And judging by first impressions, it looks like the fans may be onto something.

225

00:13:28,000 --> 00:13:34,000

Well, I'll tell you right now. The compression I can see from here does not look like no 2x speed hit.

226

00:13:34,000 --> 00:13:36,000

It looks like a 1x speed hit.

227

00:13:36,000 --> 00:13:39,000

It looks a lot closer to a 1x than a 2x, but let's do the measurements.

228

00:13:39,000 --> 00:13:45,000

1.54. 1.28.

229

00:13:45,000 --> 00:13:55,000

The results are in. The two car test clay is almost identical to the clay from the 1x tests and nothing like the 2x tests.

230

00:13:55,000 --> 00:14:02,000

With all the variants and all of our tests, one thing was really consistent was that the 2x speed hits looked a lot like this

231

00:14:02,000 --> 00:14:07,000

and the 1x speed hits look a lot like this. And our head on collision, it looks like this.

232

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

So where are we with the story?

233

00:14:13,000 --> 00:14:19,000

Well, the hammers and clay seem to be saying that it's looking pretty good for the myth that two cars hitting each other at 50 miles an hour

234

00:14:19,000 --> 00:14:25,000

might actually be equivalent to one car hitting a wall at 50 miles an hour and not at 100 as you previously stated.

235

00:14:25,000 --> 00:14:27,000

What do you want to do next?

236

00:14:27,000 --> 00:14:30,000

Next, I want to smash some cars.

237

00:14:30,000 --> 00:14:32,000

Alright then.

238

00:14:32,000 --> 00:14:40,000

Yep, although the impressionable clay supports the fan theory, will that be true when they test the metal of actual automobiles

239

00:14:40,000 --> 00:14:43,000

at a very special location?

240

00:14:44,000 --> 00:14:49,000

It's a platform 120 feet tall just for dropping stuff.

241

00:14:49,000 --> 00:14:55,000

This is a motorized steel barrel just for strapping down a car and turning it upside down.

242

00:14:56,000 --> 00:15:01,000

I'm not sure what this one's for, but I'm pretty sure I could come up with something cool to do with it.

243

00:15:03,000 --> 00:15:09,000

Where am I? I'm in Arizona in the middle of 150 acres of pure awesome.

244

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

This is pretty much what I would design as my ideal playground.

245

00:15:12,000 --> 00:15:19,000

It's a test facility designed to break things, smash things, make them fail, and analyze the aftermath.

246

00:15:19,000 --> 00:15:25,000

This is one of the test facilities owned by Exponent Systems, and today they're going to help us smash some cars.

247

00:15:28,000 --> 00:15:32,000

And first up to feel the crash force is this.

248

00:15:32,000 --> 00:15:34,000

So this is our car.

249

00:15:34,000 --> 00:15:39,000

This is our car. We're going to smash it at 50 miles an hour into a wall.

250

00:15:39,000 --> 00:15:41,000

Well, let's get started.

251

00:15:41,000 --> 00:15:44,000

Alright. How's all this going to go down?

252

00:15:44,000 --> 00:15:47,000

This is a 1280 foot long crash rail.

253

00:15:47,000 --> 00:15:54,000

It has a track embedded in it and a cable that pulls a car along that track towards the impact spot.

254

00:15:55,000 --> 00:16:03,000

These two V8 engines, which have about 800 horsepower between them, pull this cable which pulls the car up to the car.

255

00:16:04,000 --> 00:16:06,000

It's at a desired speed.

256

00:16:06,000 --> 00:16:14,000

When the car gets to about here, the cable is going to release it, so it's traveling only under its own momentum, right into this big steel thing.

257

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

It's at this point that we'll have a complete picture of what happens to a car when it's going 50 miles an hour and comes to a dead stop by crashing into a wall.

258

00:16:24,000 --> 00:16:32,000

It's not just a picture they'll be getting. Jamie has also added some high-tech trickery to capture the force facts.

259

00:16:33,000 --> 00:16:34,000

There we go.

260

00:16:34,000 --> 00:16:44,000

Inside the car, underneath the back seat, is mounted a block of accelerometers that measure deceleration of the impact in three separate axes of movement.

261

00:16:44,000 --> 00:16:49,000

That information is sent back to a data logger that's mounted in the back of the car.

262

00:16:49,000 --> 00:16:53,000

It records all that information. It's kind of like a black box.

263

00:16:53,000 --> 00:17:01,000

This crash is basically a data point, one of two that we will obtain in order to correctly analyze our head-on collision.

264

00:17:01,000 --> 00:17:08,000

Careful viewers will note that in the full scale we're following the same experimental procedure as we did with our hammers and clay.

265

00:17:08,000 --> 00:17:10,000

We think it has a nice symmetry.

266

00:17:10,000 --> 00:17:12,000

Shall we log the pre-crash length?

267

00:17:12,000 --> 00:17:13,000

Sure.

268

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

15 feet.

269

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

All right then.

270

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

All right, the cable's ready. Come on in.

271

00:17:22,000 --> 00:17:32,000

With the length logged and the black box engaged, the car is ready to meet its fate, slamming into a solid steel wall at 50 miles per hour.

272

00:17:33,000 --> 00:17:39,000

All right, this is one car into one wall at 50 miles an hour. Take it away.

273

00:17:39,000 --> 00:17:41,000

Okay Bob, we're ready for the lap.

274

00:17:41,000 --> 00:17:50,000

The V8 engines roar as they spin the cable, and the car gains speed till it's holding it precisely 50 miles per hour.

275

00:17:51,000 --> 00:17:56,000

And then plows headlong into a wall of steel.

276

00:18:05,000 --> 00:18:06,000

Oops.

277

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

I hope they're in short.

278

00:18:14,000 --> 00:18:16,000

Yep, it's a car crash, I think.

279

00:18:16,000 --> 00:18:22,000

Yeah, I'd say what happened here is this car here hit this wall. There.

280

00:18:23,000 --> 00:18:33,000

It's a spectacular smash. The force of the impact crunched the front of the car like a car hitting a steel wall at 50 miles per hour.

281

00:18:34,000 --> 00:18:36,000

Leaving it three and a half feet shorter.

282

00:18:36,000 --> 00:18:38,000

11 feet seven inches.

283

00:18:38,000 --> 00:18:41,000

But of course that's not the only impact stat.

284

00:18:41,000 --> 00:18:44,000

What say we find out what the G-load was?

285

00:18:44,000 --> 00:18:48,000

These guys are downloading the data about the crash right now.

286

00:18:50,000 --> 00:18:52,000

Okay, here's the stats on that crash.

287

00:18:52,000 --> 00:19:01,000

This car hit that wall at 50.7 miles per hour and took an average of 58 G's in the longitudinal direction.

288

00:19:01,000 --> 00:19:08,000

I'm going to go out on a limb and say that when we smash a car into this wall at 100 miles an hour, the G-load is going to be significantly higher.

289

00:19:08,000 --> 00:19:15,000

Well, luckily for us, the only way to confirm that is more car carnage.

290

00:19:38,000 --> 00:19:48,000

The myth busters have the sock of least resistance, so now those slipped right off.

291

00:19:48,000 --> 00:19:52,000

So next they're finding buster, some real legs.

292

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

Now last time we did this experiment, we used these feet.

293

00:19:55,000 --> 00:19:59,000

Now you felt like they didn't have the same kind of resistance that human skin would have.

294

00:19:59,000 --> 00:20:07,000

So I've casted up my foot and now I'm going to try different materials to see what kind of material is as close to human skin.

295

00:20:07,000 --> 00:20:16,000

Tori's used plastic, ballistics medium, foam and lamb skin leather to find something that simulates a skin-like surface.

296

00:20:16,000 --> 00:20:18,000

What is that?

297

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

This feels like somebody uses lotion.

298

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

Carrie likes the lamb skin.

299

00:20:22,000 --> 00:20:29,000

I really think this is going to be the winner because it really just feels the most like skin, which is probably because it is skin.

300

00:20:29,000 --> 00:20:36,000

And after a quick run of tug tests on the sock puller, it turns out her instincts were flawless.

301

00:20:36,000 --> 00:20:38,000

Yes, 6.25.

302

00:20:38,000 --> 00:20:40,000

This is the most like human skin.

303

00:20:40,000 --> 00:20:49,000

The leather leg, complete with articulated ankles, has an identical sock resistance to Tori's wax leg, making it perfect for testing.

304

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

I'm working on my yoga. I think I'm getting pretty good.

305

00:20:57,000 --> 00:21:01,000

And now that buster has two left feet, he's cruising for a bruising.

306

00:21:01,000 --> 00:21:03,000

It looks like a bionic man.

307

00:21:03,000 --> 00:21:07,000

The team have a whole range of punches to throw.

308

00:21:07,000 --> 00:21:09,000

It's like assembling an old friend.

309

00:21:09,000 --> 00:21:14,000

But first, they're starting with a familiar enemy, Nitro Punch.

310

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

Now I originally built this nitrogen cannon to fire a grappling hook from a moving car.

311

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

The first time we tested it, it flew off the table like a rocket.

312

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

The second time we tested it, it punched a hole in the wall.

313

00:21:26,000 --> 00:21:29,000

That is the power of the Nitrogen Cannon.

314

00:21:30,000 --> 00:21:36,000

But before Nitro is unleashed, Grant's devising a system to get the drop on Buster.

315

00:21:36,000 --> 00:21:39,000

So this, my friends, is the laser trigger.

316

00:21:39,000 --> 00:21:41,000

It's got a beam right here and a sensor up here.

317

00:21:41,000 --> 00:21:47,000

When I break the beam, it fires a solenoid that drops Buster on his own way.

318

00:21:52,000 --> 00:21:56,000

Buster's full weight will be on his feet each time he's clobbered.

319

00:21:56,000 --> 00:22:00,000

So seconds out, it's round one, the uppercut.

320

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

We're about to knock you out.

321

00:22:02,000 --> 00:22:06,000

Last time we pulled out Nitro Punch and gave Buster a really good uppercut,

322

00:22:06,000 --> 00:22:10,000

we almost knocked his socks off and that was with a tight sport sock.

323

00:22:10,000 --> 00:22:12,000

Now we're using this woolen handknit sock.

324

00:22:12,000 --> 00:22:14,000

I think this might actually work.

325

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

Well, there's only one way to find out.

326

00:22:17,000 --> 00:22:19,000

500 psi, we're good to go.

327

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

All right.

328

00:22:20,000 --> 00:22:24,000

Okay, this is uppercuts with proper socks and legs.

329

00:22:24,000 --> 00:22:25,000

All right.

330

00:22:25,000 --> 00:22:26,000

Fight.

331

00:22:26,000 --> 00:22:27,000

All right.

332

00:22:27,000 --> 00:22:28,000

Here we go.

333

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

In three, two, one.

334

00:22:32,000 --> 00:22:34,000

What happened?

335

00:22:34,000 --> 00:22:35,000

Wow.

336

00:22:35,000 --> 00:22:36,000

We knocked him out.

337

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

I can't tell if his socks came off or not.

338

00:22:38,000 --> 00:22:45,000

That punch just landed a massive 6,000 Newton uppercut straight to Buster's chin.

339

00:22:45,000 --> 00:22:48,000

That's twice the force of a heavyweight boxer.

340

00:22:48,000 --> 00:22:53,000

We stone cold knocked him out, but his socks are still on.

341

00:22:53,000 --> 00:22:54,000

They're not coming off.

342

00:22:54,000 --> 00:22:58,000

No matter how much force is hitting him, the socks are staying on.

343

00:22:58,000 --> 00:23:01,000

It looks like this is not the punch.

344

00:23:02,000 --> 00:23:07,000

Despite all the fan-inspired changes, the uppercut didn't cut it.

345

00:23:07,000 --> 00:23:11,000

But there's more bare knuckle action to come.

346

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

Fight.

347

00:23:13,000 --> 00:23:18,000

Coming up next on Myth Buster, find out what kind of force it takes to knock socks off.

348

00:23:24,000 --> 00:23:30,000

Doaking it out in the ring could be a dangerous business, but could a prize-fighting punch

349

00:23:30,000 --> 00:23:33,000

knock your socks clean off?

350

00:23:33,000 --> 00:23:35,000

So far, no.

351

00:23:35,000 --> 00:23:36,000

It didn't work before.

352

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

It didn't work this time.

353

00:23:38,000 --> 00:23:41,000

But the Myth Busters aren't throwing in the towel yet.

354

00:23:41,000 --> 00:23:44,000

That's because the fans think we have two other kinds of punches to try.

355

00:23:44,000 --> 00:23:46,000

The right hook and the body blow.

356

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

We'll be testing both of these punches with robots because they have superhuman strength.

357

00:23:50,000 --> 00:23:53,000

And if they can't knock the socks off, they'll never get punched off.

358

00:23:53,000 --> 00:23:56,000

But we're going to start out by getting hooked.

359

00:23:57,000 --> 00:24:02,000

In the sweet signs of bruising, a right hook packs a powerful punch.

360

00:24:02,000 --> 00:24:08,000

By pivoting as he swings, a boxer drives the force of the blow across his opponent's body.

361

00:24:08,000 --> 00:24:15,000

It's this transverse momentum that could focus the friction to force the feet from the socks.

362

00:24:16,000 --> 00:24:21,000

For round two of punching, it's Buster versus the right hook.

363

00:24:21,000 --> 00:24:28,000

So, gentle viewers, to address your very important concerns, I've built this incredible punching robot that simulates a right hook.

364

00:24:29,000 --> 00:24:34,000

And these are the hand-knit wool socks that had the least resistance, and they are over our human-like feet.

365

00:24:35,000 --> 00:24:38,000

And this is our quick release and laser trigger.

366

00:24:38,000 --> 00:24:43,000

So just before impact, it will release Buster, so he's standing on his own weight just as you requested.

367

00:24:43,000 --> 00:24:44,000

We're ready to go.

368

00:24:46,000 --> 00:24:50,000

Buster's Sideways

369

00:24:50,000 --> 00:24:51,000

Fight!

370

00:24:51,000 --> 00:24:54,000

Alright, here we go. In three, two, one.

371

00:24:56,000 --> 00:24:57,000

Wow.

372

00:24:57,000 --> 00:24:58,000

Wow.

373

00:24:58,000 --> 00:24:59,000

We knocked him over.

374

00:24:59,000 --> 00:25:02,000

But look, the socks are still on.

375

00:25:03,000 --> 00:25:08,000

One massive right hook to the head, and the force is enough to knock Buster's sideways.

376

00:25:08,000 --> 00:25:10,000

But not his socks.

377

00:25:11,000 --> 00:25:12,000

That punch was incredible.

378

00:25:12,000 --> 00:25:13,000

I mean, the power. Bang!

379

00:25:14,000 --> 00:25:16,000

And Buster actually did a somersault.

380

00:25:16,000 --> 00:25:19,000

However, did not knock his socks off.

381

00:25:19,000 --> 00:25:21,000

But Buster has one heck of a chin.

382

00:25:22,000 --> 00:25:24,000

Looks like he wants to go for another round.

383

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

And for the last round, the team have the most powerful punch yet, the Body Blow.

384

00:25:32,000 --> 00:25:40,000

Now, our Body Blow machine is the most powerful one we have, and that clock didn't add 52,000 Newtons or 15 times your average boxer.

385

00:25:42,000 --> 00:25:47,000

That massive momentum will be delivered right into Buster's bread basket.

386

00:25:47,000 --> 00:25:50,000

This is Knock Your Socks Off, Straight Forward Body Blow.

387

00:25:50,000 --> 00:25:55,000

We have Knit Socks' Leather Legs and Buster on his own weight, 180 pounds.

388

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

Fight!

389

00:25:56,000 --> 00:26:00,000

Alright, here we go. In three, two, one.

390

00:26:02,000 --> 00:26:03,000

Whoa.

391

00:26:03,000 --> 00:26:04,000

We knocked him out.

392

00:26:05,000 --> 00:26:07,000

But still, his socks remain on.

393

00:26:08,000 --> 00:26:19,000

Although there was some encouraging sock movement, even a punch 15 times that of a heavyweight boxer couldn't separate Buster's legs from his socks.

394

00:26:22,000 --> 00:26:25,000

So, the myth that you can punch someone out of their socks is busted.

395

00:26:25,000 --> 00:26:31,000

The uppercut couldn't do it, the right foot couldn't do it, even a super Body Blow could not do it.

396

00:26:31,000 --> 00:26:34,000

They all failed, even using the socks that were the easiest to come off.

397

00:26:34,000 --> 00:26:37,000

But don't worry, we're not going to give up, we're going to keep trying.

398

00:26:40,000 --> 00:26:41,000

Ugh.

399

00:26:41,000 --> 00:26:43,000

After the break, let's go twice as fast.

400

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

Adam and Jamie drive another car up the wall.

401

00:26:49,000 --> 00:26:51,000

Please do not try what we do on this show at home.

402

00:26:51,000 --> 00:26:53,000

We're what you call experts.

403

00:26:53,000 --> 00:26:55,000

It's safer that way.

404

00:26:58,000 --> 00:27:01,000

Adam and Jamie are having a smashing time.

405

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

All in the name of physics.

406

00:27:05,000 --> 00:27:07,000

How did we get here?

407

00:27:07,000 --> 00:27:10,000

Well, it all started when Jamie said this.

408

00:27:10,000 --> 00:27:13,000

Both trucks were traveling at about 50 miles an hour.

409

00:27:13,000 --> 00:27:18,000

That's equivalent to a single impact going into a solid wall at 100 miles an hour.

410

00:27:19,000 --> 00:27:23,000

That's pretty sound reasoning for my money, but no, the fans cried.

411

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

Two cars hitting each other at 50 miles per hour do not equal one car hitting a wall at 100 miles per hour.

412

00:27:28,000 --> 00:27:33,000

Because their math is the same, they cancel each other out, and it's no different than one car hitting a wall at 50 miles an hour.

413

00:27:33,000 --> 00:27:38,000

I find this surprising and hard to wrap my head around, but our scale experiments seem to bear it out.

414

00:27:39,000 --> 00:27:41,000

But of course, we're not going to leave it there.

415

00:27:41,000 --> 00:27:45,000

This is what happens when you crash a car into a wall at 50 miles an hour.

416

00:27:45,000 --> 00:27:49,000

Next up, we're going to be crashing a car into a wall at 100 miles an hour.

417

00:27:49,000 --> 00:27:51,000

How bad will it be?

418

00:27:51,000 --> 00:27:54,000

We're just going to have to crash it to find out.

419

00:27:55,000 --> 00:27:59,000

So an identical car, well, except for the fact it's lemon yellow.

420

00:27:59,000 --> 00:28:01,000

That's good. Bring it straight in.

421

00:28:01,000 --> 00:28:03,000

Is hooked up to the track.

422

00:28:03,000 --> 00:28:04,000

All right.

423

00:28:05,000 --> 00:28:13,000

Now the 50 mile per hour impact clocked an impressive 58 Gs, but will doubling the speed double the damage to this car.

424

00:28:14,000 --> 00:28:15,000

It's good.

425

00:28:15,000 --> 00:28:18,000

I got to say that after watching that 50 mile an hour crash into the wall,

426

00:28:19,000 --> 00:28:25,000

I have a really hard time imagining that the 100 mile per hour crash is going to compress the car that much more.

427

00:28:25,000 --> 00:28:26,000

I don't know.

428

00:28:27,000 --> 00:28:30,000

So are you ready for some more wanton destruction?

429

00:28:30,000 --> 00:28:33,000

I am. Let's go twice as fast.

430

00:28:33,000 --> 00:28:34,000

All right.

431

00:28:36,000 --> 00:28:42,000

Wanton destruction it is as the mythbusters retire to a safe distance and the countdown begins.

432

00:28:43,000 --> 00:28:45,000

You ready to make this happen?

433

00:28:45,000 --> 00:28:48,000

I can't wait. I haven't seen a 100 mile an hour crash before.

434

00:28:48,000 --> 00:28:52,000

No. All right. Commence with the 100 mile per hour crash.

435

00:28:53,000 --> 00:29:00,000

On Adam's command, the engines were into life, straining to get the car up to exactly 100 miles per hour.

436

00:29:03,000 --> 00:29:05,000

It hurdles down the track.

437

00:29:05,000 --> 00:29:06,000

It's going flat out.

438

00:29:08,000 --> 00:29:12,000

The cable uncouples and the car plows into its final destination.

439

00:29:16,000 --> 00:29:25,000

The guys are understandably speechless.

440

00:29:27,000 --> 00:29:34,000

That impact crushed the lemon car with such force, it should be in a glass with ice and a cocktail umbrella.

441

00:29:38,000 --> 00:29:42,000

It's in a very different state than it was at 50 miles per hour.

442

00:29:42,000 --> 00:29:44,000

Yeah. It's a little shorter.

443

00:29:44,000 --> 00:29:47,000

I mean, we got a clear difference between the two crashes.

444

00:29:47,000 --> 00:29:48,000

Uh-huh.

445

00:29:49,000 --> 00:29:52,000

I can't wait to see what the data set says about the G-Load.

446

00:29:52,000 --> 00:29:54,000

If the data is still intact.

447

00:29:54,000 --> 00:29:56,000

If anything's still intact.

448

00:29:58,000 --> 00:30:02,000

Well, thanks to its position in the trunk, the flag box survived.

449

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

But did we successfully retrieve anything?

450

00:30:05,000 --> 00:30:06,000

We've got good data.

451

00:30:06,000 --> 00:30:07,000

Really?

452

00:30:07,000 --> 00:30:12,000

Yeah, we've got a peak on the left side of 140 and a peak on the right side of 230.

453

00:30:12,000 --> 00:30:15,000

And we'd normally just average those to get a resultant there.

454

00:30:15,000 --> 00:30:17,000

So the midpoint's somewhere around 185?

455

00:30:17,000 --> 00:30:18,000

185.

456

00:30:18,000 --> 00:30:22,000

That's nice. That's significantly more than...what was the last one?

457

00:30:22,000 --> 00:30:23,000

58?

458

00:30:23,000 --> 00:30:24,000

58.

459

00:30:25,000 --> 00:30:26,000

Data!

460

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

Three times the G's of the 50 mile per hour test is certainly significant.

461

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

But that's not the only data set they're collecting.

462

00:30:37,000 --> 00:30:39,000

Before it was 15 feet.

463

00:30:42,000 --> 00:30:43,000

Now it's eight feet.

464

00:30:44,000 --> 00:30:49,000

So not only did the G-Load triple, the crash compacted almost half of the car.

465

00:30:49,000 --> 00:30:53,000

And remember, these two cars were identical.

466

00:30:55,000 --> 00:30:58,000

This may just seem like some gratuitous violence,

467

00:30:58,000 --> 00:31:02,000

but there's actually some really interesting science going on when you compare these two impacts.

468

00:31:03,000 --> 00:31:08,000

You would think that doubling the speed would give you twice the severity of the impact.

469

00:31:08,000 --> 00:31:11,000

But the physics says you're actually looking at more like...

470

00:31:11,000 --> 00:31:13,000

four times the severity of the impact.

471

00:31:14,000 --> 00:31:17,000

Our sensors are showing three times the G's,

472

00:31:17,000 --> 00:31:21,000

and our wreckage is showing about twice the damage.

473

00:31:21,000 --> 00:31:23,000

So what's going on here?

474

00:31:23,000 --> 00:31:29,000

Well, just like this can, the more I crush it, the more it resists crushing.

475

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

There's some complex physics going on here,

476

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

but you don't have to be a rocket scientist to understand it.

477

00:31:34,000 --> 00:31:36,000

The cars speak for themselves.

478

00:31:37,000 --> 00:31:39,000

They certainly do.

479

00:31:39,000 --> 00:31:45,000

And after two spectacular crashes, they have their benchmarks for car carnage.

480

00:31:46,000 --> 00:31:48,000

Well, we've got our data points.

481

00:31:48,000 --> 00:31:49,000

And they are lovely.

482

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

I guess it's time to move on to the main event.

483

00:31:52,000 --> 00:31:53,000

Yep.

484

00:31:55,000 --> 00:31:56,000

Next up.

485

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

Hold on to your socks, Buster!

486

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

The Mythbusters think outside the boxing ring.

487

00:32:07,000 --> 00:32:09,000

Alright, look, we've tried everything.

488

00:32:09,000 --> 00:32:12,000

But even with superhuman strength and the best-case scenario sock,

489

00:32:12,000 --> 00:32:15,000

you still can't knock someone's socks off with a punch.

490

00:32:15,000 --> 00:32:20,000

No, but I think if we take this outside the boxing ring, we're going to see some results.

491

00:32:20,000 --> 00:32:23,000

Yeah, but last time we ramped this up, we used that frightening huge pendulum,

492

00:32:23,000 --> 00:32:24,000

and we still got nowhere.

493

00:32:26,000 --> 00:32:28,000

You know, that's another fan complaint.

494

00:32:28,000 --> 00:32:29,000

Here, listen.

495

00:32:29,000 --> 00:32:33,000

Your pendulum hit Buster at a lower speed than your punching rig.

496

00:32:33,000 --> 00:32:36,000

So this test was actually a ramp down rather than up.

497

00:32:36,000 --> 00:32:38,000

Yeah, but it did weigh a lot more.

498

00:32:38,000 --> 00:32:39,000

True.

499

00:32:39,000 --> 00:32:40,000

But you know what?

500

00:32:40,000 --> 00:32:45,000

To directly address that concern, why don't we increase both the mass and the speed?

501

00:32:45,000 --> 00:32:47,000

Okay, okay, how about this?

502

00:32:47,000 --> 00:32:48,000

Big steel girder.

503

00:32:48,000 --> 00:32:49,000

We weld it to a truck.

504

00:32:49,000 --> 00:32:52,000

We drive straight at Buster and bam!

505

00:32:52,000 --> 00:32:53,000

Ouch!

506

00:32:54,000 --> 00:32:58,000

For the final knockout round, they're heading to Alameda

507

00:32:58,000 --> 00:33:02,000

to definitively ramp this myth up once and for all.

508

00:33:04,000 --> 00:33:06,000

Brian, thank you so much for bringing your truck out.

509

00:33:06,000 --> 00:33:08,000

Now tell me what this thing can do.

510

00:33:08,000 --> 00:33:10,000

This truck is about 20,000 pounds plus loaded.

511

00:33:10,000 --> 00:33:11,000

It's turbo diesel.

512

00:33:11,000 --> 00:33:15,000

It can reach speeds of 80 miles an hour, and it's ready to take down Buster.

513

00:33:15,000 --> 00:33:17,000

I think this is the right truck.

514

00:33:19,000 --> 00:33:21,000

So you guys felt like the pendulum wasn't good enough.

515

00:33:21,000 --> 00:33:22,000

Well, this is what I have for you.

516

00:33:22,000 --> 00:33:28,000

What I have here is a 600-pound steel beam that I'm about to weld to this 13,000-pound truck.

517

00:33:28,000 --> 00:33:34,000

It's a simple build, one giant girder welded to one turbocharged truck.

518

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

Alright, time to fight!

519

00:33:36,000 --> 00:33:38,000

And voila!

520

00:33:38,000 --> 00:33:42,000

Mass plus speed equals the behemoth of all battering ramps.

521

00:33:42,000 --> 00:33:47,000

While further down the range, Grant sets up his laser quick release

522

00:33:47,000 --> 00:33:51,000

and Carrie erects the structure for Buster's last stand.

523

00:33:51,000 --> 00:33:55,000

Now I've built a nice little balanced structure so that Buster can hang,

524

00:33:55,000 --> 00:33:59,000

and then I'm painting the entire thing yellow, maybe a little bit of pink,

525

00:33:59,000 --> 00:34:03,000

so that you can see it from far, far away because it's going to be a really long run-up.

526

00:34:03,000 --> 00:34:10,000

Once Carrie's hangman harness is complete, it's time to guide that girder right into Buster's reinforced guts.

527

00:34:10,000 --> 00:34:15,000

And they're going to start at a bone-crunching 40 miles per hour.

528

00:34:15,000 --> 00:34:24,000

We are about to hit Buster with 4,000 times the power as any boxer to see whether or not we can knock his socks out.

529

00:34:24,000 --> 00:34:29,000

I have a feeling we're going to knock his legs off before his socks come off, but let's see what happens.

530

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

Remember, Buster is wearing the socks of least resistance on his human-like legs.

531

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

He'll be standing at all 180 pounds of his own weight,

532

00:34:37,000 --> 00:34:43,000

and at impact he'll be hit with 4,000 times the force of a heavyweight boxing punch.

533

00:34:43,000 --> 00:34:46,000

Will that be enough for the socks to fly?

534

00:34:46,000 --> 00:34:48,000

Alright, getting into position!

535

00:34:48,000 --> 00:34:51,000

This is human-like surface width.

536

00:34:51,000 --> 00:34:55,000

The socks of least resistance, Buster on his own weight.

537

00:34:55,000 --> 00:34:57,000

Weight, going 40 miles per hour.

538

00:34:57,000 --> 00:35:01,000

Here we go in three, two, one, come on at ya!

539

00:35:02,000 --> 00:35:05,000

The truck speeds down the track at 40 miles per hour.

540

00:35:07,000 --> 00:35:09,000

Come on, do it!

541

00:35:09,000 --> 00:35:11,000

Triggers the quick release.

542

00:35:14,000 --> 00:35:15,000

Contact!

543

00:35:18,000 --> 00:35:20,000

Oh!

544

00:35:22,000 --> 00:35:23,000

Ow!

545

00:35:23,000 --> 00:35:26,000

It didn't knock his socks up, it did not just hand off!

546

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

His hand flew off, but his socks are still on.

547

00:35:32,000 --> 00:35:34,000

We nailed him!

548

00:35:34,000 --> 00:35:40,000

The giant girder made contact, but it still wasn't a socks-off knock.

549

00:35:41,000 --> 00:35:43,000

However, there is good news.

550

00:35:44,000 --> 00:35:45,000

Whoa!

551

00:35:45,000 --> 00:35:47,000

It almost came off in the heel!

552

00:35:47,000 --> 00:35:50,000

It almost lifted him out of his sock!

553

00:35:50,000 --> 00:35:52,000

Well, you know what that means.

554

00:35:52,000 --> 00:35:53,000

We have to ramp it up.

555

00:35:53,000 --> 00:35:54,000

Yeah, you know what?

556

00:35:54,000 --> 00:35:56,000

This will go 65, but with all this weight,

557

00:35:56,000 --> 00:35:58,000

65 miles an hour might be enough to knock his socks off.

558

00:35:58,000 --> 00:35:59,000

Let's do it!

559

00:35:59,000 --> 00:36:00,000

Do it!

560

00:36:00,000 --> 00:36:04,000

We're going to hit him at 65 miles an hour with this steel bead.

561

00:36:04,000 --> 00:36:09,000

And it's going to be not two or three times more powerful than a human boxer.

562

00:36:09,000 --> 00:36:14,000

It's going to be 10,000 times more powerful than that boxer.

563

00:36:14,000 --> 00:36:18,000

Surely this has got to be the thing that knocks him out of his socks.

564

00:36:18,000 --> 00:36:20,000

Surely is right.

565

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

If 10,000 times the force of a boxer can't knock the socks off buster, then it can't be done.

566

00:36:27,000 --> 00:36:29,000

I think we've really got a chance here.

567

00:36:29,000 --> 00:36:30,000

We got all the elements.

568

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

All right, let's do it.

569

00:36:32,000 --> 00:36:37,000

All right, let's hit him at 65 miles an hour.

570

00:36:38,000 --> 00:36:39,000

Here we go!

571

00:36:39,000 --> 00:36:41,000

This is the main event!

572

00:36:41,000 --> 00:36:44,000

Let's see if we can knock both the socks off.

573

00:36:44,000 --> 00:36:48,000

The truck takes its position, then it's pedal to the metal.

574

00:36:48,000 --> 00:36:51,000

Fifty miles an hour!

575

00:36:51,000 --> 00:36:53,000

As it thunders down the track.

576

00:36:53,000 --> 00:36:55,000

Hold on to your socks buster.

577

00:36:55,000 --> 00:36:57,000

Sixty five miles an hour.

578

00:37:01,000 --> 00:37:04,000

Houston we have lift off.

579

00:37:04,000 --> 00:37:05,000

Woo hoo hoo!

580

00:37:05,000 --> 00:37:08,000

We knocked his socks off!

581

00:37:08,000 --> 00:37:09,000

Dude!

582

00:37:09,000 --> 00:37:11,000

Oh my God!

583

00:37:11,000 --> 00:37:13,000

We knocked his socks off!

584

00:37:13,000 --> 00:37:19,000

I turned around, all I could see was like an explosion and I saw two socks floating down to the ground.

585

00:37:19,000 --> 00:37:21,000

There you have it.

586

00:37:21,000 --> 00:37:28,000

One 30 million Newton Knock, one D-socked buster, and three ecstatic myth busters.

587

00:37:28,000 --> 00:37:31,000

But one question remains.

588

00:37:31,000 --> 00:37:33,000

My big question is what came off first?

589

00:37:33,000 --> 00:37:35,000

Socks or the feet?

590

00:37:35,000 --> 00:37:36,000

Oh!

591

00:37:36,000 --> 00:37:38,000

This whole face keeps it.

592

00:37:38,000 --> 00:37:39,000

Yes!

593

00:37:39,000 --> 00:37:40,000

The socks came off!

594

00:37:40,000 --> 00:37:41,000

Look at that!

595

00:37:41,000 --> 00:37:42,000

That's great!

596

00:37:42,000 --> 00:37:43,000

They didn't get dragged off.

597

00:37:43,000 --> 00:37:44,000

No!

598

00:37:44,000 --> 00:37:46,000

They knocked off!

599

00:37:46,000 --> 00:37:51,000

After the first time I heard this boxing myth, I thought to myself, who knows, maybe it's possible.

600

00:37:51,000 --> 00:37:56,000

But after we first tested it, I thought there is no way you can knock somebody's socks off.

601

00:37:56,000 --> 00:37:57,000

Until now.

602

00:37:57,000 --> 00:38:02,000

After seeing what I just saw, well we hit buster, knocked him out of his socks, it's possible.

603

00:38:02,000 --> 00:38:05,000

I mean a boxer couldn't do it, but we could.

604

00:38:05,000 --> 00:38:13,000

So after 20 some odd sock tests, multiple punches, does the phrase knock your socks off still hold true?

605

00:38:13,000 --> 00:38:17,000

Yes, as a matter of fact, you can knock someone's socks off.

606

00:38:17,000 --> 00:38:23,000

The caveat is that it's going to take 10,000 times what a boxer could do.

607

00:38:23,000 --> 00:38:28,000

So yes, you can use the phrase, but use it lightly.

608

00:38:28,000 --> 00:38:39,000

Up next, the myth busters head to head long into a head on collision.

609

00:38:45,000 --> 00:38:49,000

This car right here hit a wall at 50 miles an hour.

610

00:38:52,000 --> 00:38:54,000

This car hit a wall at 100 miles an hour.

611

00:38:54,000 --> 00:38:56,000

I think the difference is pretty clear.

612

00:38:56,000 --> 00:39:01,000

The question is, when we smack two cars together at 50 miles an hour, are they going to look like that?

613

00:39:01,000 --> 00:39:03,000

Or are they going to look like this?

614

00:39:03,000 --> 00:39:06,000

We're going to smash two more cars just to find out.

615

00:39:06,000 --> 00:39:10,000

It's the final act of Carmageddon.

616

00:39:10,000 --> 00:39:14,000

Two cars in a 50 mile per hour head on collisions.

617

00:39:15,000 --> 00:39:16,000

Here's how this breaks down.

618

00:39:16,000 --> 00:39:19,000

At this end of the track, the yellow car.

619

00:39:19,000 --> 00:39:22,000

And at this end sits the orange car.

620

00:39:22,000 --> 00:39:28,000

And here in the middle, these two cars will meet in a 50 mile per hour handshake of destruction

621

00:39:28,000 --> 00:39:33,000

that will hopefully answer all the questions we have about the crash forces involved.

622

00:39:33,000 --> 00:39:38,000

Adam's predicting those answers will give the thumbs up to Newton.

623

00:39:38,000 --> 00:39:42,000

This one has really been a brain bender, but I have a prediction for this final experiment.

624

00:39:42,000 --> 00:39:46,000

I think that when all of a sudden done, it's going to prove that Jamie was wrong

625

00:39:46,000 --> 00:39:47,000

and that the fans were actually right.

626

00:39:47,000 --> 00:39:51,000

That when these two cars hit at 50, they're going to look like the car that hit the wall at 50.

627

00:39:51,000 --> 00:39:53,000

Not the one that hit the wall at 100.

628

00:39:53,000 --> 00:39:55,000

And Jamie agrees.

629

00:39:55,000 --> 00:40:00,000

Based on our small scale testing, what we should see at the end of this head on collision

630

00:40:00,000 --> 00:40:05,000

should look pretty much like the 50 mile an hour crash against a wall.

631

00:40:08,000 --> 00:40:10,000

It's crunch time for a force impact.

632

00:40:10,000 --> 00:40:14,000

Will the full scale test prove the fans right?

633

00:40:14,000 --> 00:40:16,000

That's it.

634

00:40:18,000 --> 00:40:20,000

Well, I think it's time to do the final test.

635

00:40:20,000 --> 00:40:22,000

They're all set up.

636

00:40:22,000 --> 00:40:24,000

It would seem so. I'm going to call it.

637

00:40:24,000 --> 00:40:27,000

Bring on the head on collision.

638

00:40:29,000 --> 00:40:36,000

From each end of the 1280 foot track, the identical 1.5 ton cars take off.

639

00:40:39,000 --> 00:40:45,000

Both cars gain speed as they head headlong down the track towards their head on collision.

640

00:40:46,000 --> 00:40:50,000

Then as both cars reach 50 miles per hour,

641

00:40:50,000 --> 00:40:52,000

It's about to happen.

642

00:40:52,000 --> 00:40:54,000

the cables uncoupled.

643

00:41:02,000 --> 00:41:04,000

That was sick.

644

00:41:05,000 --> 00:41:07,000

What can you say?

645

00:41:08,000 --> 00:41:10,000

What can you say?

646

00:41:11,000 --> 00:41:16,000

That breathtaking finale is the final piece of their physics puzzle.

647

00:41:18,000 --> 00:41:24,000

And as the mythbusters survey the wreck of a two car 50 mile per hour pile up,

648

00:41:24,000 --> 00:41:27,000

they're playing spot the difference.

649

00:41:27,000 --> 00:41:30,000

There's a windshield between them.

650

00:41:30,000 --> 00:41:32,000

It's pretty evident, isn't it?

651

00:41:32,000 --> 00:41:34,000

It really is.

652

00:41:34,000 --> 00:41:37,000

It looks just like the 50 mile an hour against a wall crash.

653

00:41:37,000 --> 00:41:39,000

And nothing like the 100.

654

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

Nope.

655

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

Amazing.

656

00:41:46,000 --> 00:41:48,000

This tells me the whole story.

657

00:41:48,000 --> 00:41:51,000

I don't need to see the accelerometer data or anything.

658

00:41:51,000 --> 00:41:56,000

These two cars which hit each other at 50 miles an hour look exactly like the car

659

00:41:56,000 --> 00:41:58,000

which is back into the wall at 50 miles an hour.

660

00:41:58,000 --> 00:42:01,000

That tells me everything I need to know.

661

00:42:02,000 --> 00:42:08,000

While the figures are in, the orange car got 52 G's, the yellow car got 58 G's,

662

00:42:08,000 --> 00:42:15,000

which, give or take a few G's is the same as what we got against a wall at 50 miles an hour.

663

00:42:15,000 --> 00:42:17,000

G wins.

664

00:42:17,000 --> 00:42:19,000

And the damage data backs up those numbers.

665

00:42:19,000 --> 00:42:27,000

Both of the cars are virtually the same length as the 50 mile per hour wall test at 11.5 feet.

666

00:42:29,000 --> 00:42:33,000

And after a spectacular spree of automotive mayhem,

667

00:42:33,000 --> 00:42:39,000

there is irrefutable proof that those physicist fans had it right.

668

00:42:39,000 --> 00:42:46,000

Newton's third law, every action has an equal and opposite reaction holds true.

669

00:42:46,000 --> 00:42:50,000

Although the two car crash at 50 miles per hour doubles the speed,

670

00:42:50,000 --> 00:42:54,000

the energy of the crash is transferred to twice the mass,

671

00:42:54,000 --> 00:43:01,000

having it resulting in a crash that looks like just one car into a wall at 50 miles per hour.

672

00:43:01,000 --> 00:43:09,000

I made a statement that two cars hitting each other at 50 miles an hour was the same as one car hitting a solid wall at 100.

673

00:43:09,000 --> 00:43:14,000

That was a mistake, but you know what? I'm okay with it. That's how you learn stuff.

674

00:43:15,000 --> 00:43:17,000

I love smashing stuff for science.

675

00:43:17,000 --> 00:43:20,000

One way or another, it's all just shrapnel.