

1

00:00:00,000 --> 00:00:09,480

On this episode of Mythbusters, it's revenge of the creepy crawlies as the whole team bugs

2

00:00:09,480 --> 00:00:12,080

out in the bug special.

3

00:00:12,080 --> 00:00:14,040

Kind of like an upside down kite.

4

00:00:14,040 --> 00:00:17,000

First Adam and Jamie take on the light of the bumblebee.

5

00:00:17,000 --> 00:00:19,300

I hate being run bees.

6

00:00:19,300 --> 00:00:26,040

As they put this viral video to the test, can 1000 bees really make a laptop lift off?

7

00:00:26,040 --> 00:00:28,080

Come on bees, go, up.

8

00:00:28,080 --> 00:00:32,800

Meanwhile, Carrie Grant and Tori take on the year's most requested myth.

9

00:00:32,800 --> 00:00:35,200

Can bags of water repel flies?

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00:00:35,200 --> 00:00:37,200

Ding ding ding ding, trout-er!

11

00:00:37,200 --> 00:00:40,400

And finally, they get even more bang for their bug.

12

00:00:40,400 --> 00:00:44,360

Oh, it's a cute little bug of death.

13

00:00:44,360 --> 00:00:49,880

With the tail of a speeding motorcycle is fatally floored by an insect impact.

14

00:00:49,880 --> 00:00:52,880

Oh my god.

15

00:00:52,880 --> 00:00:56,880

Who are the Mythbusters?

16

00:00:57,680 --> 00:00:58,680

Adam Savage.

17

00:00:58,680 --> 00:00:59,680

I am ready.

18

00:00:59,680 --> 00:01:01,680

And Jamie Heineman.

19

00:01:01,680 --> 00:01:02,680

Bugs!

20

00:01:02,680 --> 00:01:07,080

Between them more than 30 years of special effects experience.

21

00:01:07,080 --> 00:01:09,800

Joining them, Grant Imahara.

22

00:01:09,800 --> 00:01:11,560

Into the belly of the beast.

23

00:01:11,560 --> 00:01:12,560

Carrie Byron.

24

00:01:12,560 --> 00:01:14,840

Kind of wreck this car.

25

00:01:14,840 --> 00:01:15,840

And Tori Bellachy.

26

00:01:15,840 --> 00:01:16,840

Oh, he survived.

27

00:01:16,840 --> 00:01:22,840

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

28

00:01:26,880 --> 00:01:38,840

Why are you smiling?

29

00:01:38,840 --> 00:01:43,320

Because we're about to do a story that I'm pretty sure is going to make you very uncomfortable.

30

00:01:43,320 --> 00:01:44,320

Oh, what?

31

00:01:44,320 --> 00:01:45,800

Well, it involves bees.

32

00:01:45,800 --> 00:01:51,760

In fact, it comes from a viral video that shows about 1000 bees glued to the top of

33

00:01:51,760 --> 00:01:54,960

the lightweight laptop and they fly away with it.

34

00:01:54,960 --> 00:01:56,400

I hate bees.

35

00:01:56,400 --> 00:02:03,120

I do know that clip and it is without a doubt something we should test.

36

00:02:03,120 --> 00:02:07,800

This is the bee movie that has the internet abuzz.

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00:02:07,800 --> 00:02:15,600

Supposedly glue, honey and 1000 bees lift this laptop off a log.

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00:02:15,600 --> 00:02:18,040

But can this really be true?

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00:02:18,040 --> 00:02:19,880

Or is it a flight of fancy?

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00:02:19,880 --> 00:02:23,120

How do you think we should tackle this one?

41

00:02:23,120 --> 00:02:26,200

Well, we should do what they did in the clip and see if it works.

42

00:02:26,200 --> 00:02:28,760

We should put protective gear on us, right?

43

00:02:28,760 --> 00:02:29,760

If you want.

44

00:02:29,760 --> 00:02:30,760

I want.

45

00:02:30,760 --> 00:02:36,440

Yep, but Marshall's farm, they've got all the protection Adam needs.

46

00:02:36,440 --> 00:02:37,440

Let's do it.

47

00:02:37,440 --> 00:02:40,960

And of course, Adam's nemeses, the bees.

48

00:02:40,960 --> 00:02:45,480

Look, I think we all know that I don't like bees.

49

00:02:45,480 --> 00:02:46,800

Remember the hypnotism episode?

50

00:02:46,800 --> 00:02:52,760

I told you I'd do this for science and I told you I wouldn't like it one bit.

51

00:02:52,760 --> 00:02:54,760

Oh, dang.

52

00:02:55,440 --> 00:02:59,240

I'm looking forward to this because I think it's going to be fascinating, but I think

53

00:02:59,240 --> 00:03:02,760

if you check in with Future Me when we're in the middle of this experiment, he's going

54

00:03:02,760 --> 00:03:05,480

to think it's fascinating, but he's not going to like being there.

55

00:03:05,480 --> 00:03:06,640

That's totally correct.

56

00:03:06,640 --> 00:03:09,840

This is fascinating, but I don't like being here one bit.

57

00:03:09,840 --> 00:03:13,520

See, it's like I foretold the future.

58

00:03:13,520 --> 00:03:18,960

But while they make Adam nervous, Janie has nothing but respect for the humble honey bees.

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00:03:18,960 --> 00:03:20,840

Bees are just incredible creatures.

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00:03:20,840 --> 00:03:23,000

An average worker bee only lives six weeks.

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00:03:23,240 --> 00:03:26,960

And for half that time, she's up foraging for nectar, where she can make 10 trips per

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00:03:26,960 --> 00:03:29,000

day up to four miles away.

63

00:03:29,000 --> 00:03:33,160

So over the course of her lifetime, she could travel over 1600 miles.

64

00:03:33,160 --> 00:03:38,640

All that effort for not much, since it takes 12 of these bees to get one teaspoon of honey.

65

00:03:38,640 --> 00:03:40,640

It's amazing.

66

00:03:40,640 --> 00:03:45,320

There's no doubt these bees can go the distance, but can they also weight lift?

67

00:03:45,320 --> 00:03:48,800

So what I've got here is exactly what we've seen in the video.

68

00:03:48,800 --> 00:03:52,360

The same glue, the same laptop, and some honey.

69

00:03:52,360 --> 00:03:59,280

And with the laptop coated in a layer of short-acting bee-friendly glue, next, Adam adds a dash

70

00:03:59,280 --> 00:04:00,280

of honey.

71

00:04:00,280 --> 00:04:03,480

All right, let's do it.

72

00:04:03,480 --> 00:04:06,240

Then it's time for Janie to bring on the bees.

73

00:04:06,240 --> 00:04:08,680

Oh, look at all of those.

74

00:04:08,680 --> 00:04:10,800

Let's grab that end.

75

00:04:10,800 --> 00:04:11,800

You ready, Adam?

76

00:04:11,800 --> 00:04:12,800

Yeah, ready.

77

00:04:12,800 --> 00:04:13,800

Come on.

78

00:04:13,800 --> 00:04:15,800

Hurry up, the glue's drying.

79

00:04:15,800 --> 00:04:16,800

All right.

80

00:04:17,800 --> 00:04:19,800

Oh, look at that.

81

00:04:19,800 --> 00:04:22,800

Oh, man, I had some bad dreams like this.

82

00:04:22,800 --> 00:04:25,800

Ah, bad.

83

00:04:25,800 --> 00:04:30,800

But unlike the video, one frame doesn't equal a bee-smothered laptop.

84

00:04:30,800 --> 00:04:32,800

Yo, up, lift.

85

00:04:32,800 --> 00:04:37,800

Well, in the video, they lay down the glue, they bring over a frame of bees, give it a

86

00:04:37,800 --> 00:04:40,800

shake, and the whole laptop is covered with bees.

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00:04:40,800 --> 00:04:43,800

In our experience, that's not exactly what happens.

88

00:04:43,800 --> 00:04:48,800

I think this is at least going to take two frames of bees to get full coverage, if not

89

00:04:48,800 --> 00:04:51,800

more, and that's if the adhesive works.

90

00:04:51,800 --> 00:04:56,800

So for more coverage, Janie brings in another swarm of bees.

91

00:04:56,800 --> 00:04:58,800

Okay, here's the next batch.

92

00:04:58,800 --> 00:04:59,800

Okay.

93

00:04:59,800 --> 00:05:01,800

Oh, hey, wow.

94

00:05:02,800 --> 00:05:04,800

That made a noise.

95

00:05:04,800 --> 00:05:06,800

Well, that's a lot of bees on there.

96

00:05:06,800 --> 00:05:09,800

Well, the laptop's not going anywhere at all.

97

00:05:09,800 --> 00:05:10,800

Doesn't seem like it's any lighter.

98

00:05:10,800 --> 00:05:12,800

No, not so much.

99

00:05:13,800 --> 00:05:18,800

Despite the same glue and twice the number of bees, the guys aren't getting the coverage

100

00:05:18,800 --> 00:05:20,800

for this myth to take wing.

101

00:05:20,800 --> 00:05:24,800

But rest assured, the mythbusters have a plan B.

102

00:05:24,800 --> 00:05:27,800

We're going to increase our chance for success in this test in three ways.

103

00:05:27,800 --> 00:05:33,800

First, we're going to mix the glue and the honey together to make a tasty adhesive.

104

00:05:33,800 --> 00:05:37,800

And sweet, gluey honey, or honey gluey.

105

00:05:37,800 --> 00:05:39,800

Second, we're going to give them another reason to stick around.

106

00:05:39,800 --> 00:05:42,800

Yeah, this queen right here, we're going to put this in the middle of the laptop

107

00:05:42,800 --> 00:05:46,800

because bees are genetically programmed to stay around the queen.

108

00:05:46,800 --> 00:05:49,800

Hopefully, that'll keep them around long enough to get stuck.

109

00:05:49,800 --> 00:05:52,800

Third, instead of one frame of bees like we saw in the video.

110

00:05:52,800 --> 00:05:54,800

Whoa, whoa, nice.

111

00:05:56,800 --> 00:05:57,800

Oh, dude.

112

00:05:57,800 --> 00:06:00,800

We're going to shake three full frames of bees on this sucker.

113

00:06:00,800 --> 00:06:03,800

And if that doesn't work, wow, so well done.

114

00:06:03,800 --> 00:06:06,800

I was distracted by the fact that I hate being around bees.

115

00:06:06,800 --> 00:06:07,800

That's coverage.

116

00:06:07,800 --> 00:06:08,800

That's beautiful.

117

00:06:08,800 --> 00:06:09,800

Up we go.

118

00:06:09,800 --> 00:06:12,800

I think we need a couple more frames. Come on.

119

00:06:14,800 --> 00:06:15,800

Ah, damn.

120

00:06:15,800 --> 00:06:17,800

That's a lot of bees.

121

00:06:17,800 --> 00:06:19,800

Wow.

122

00:06:19,800 --> 00:06:22,800

Calm, calm, calm thoughts, calm thoughts.

123

00:06:22,800 --> 00:06:24,800

Not calm feelings, calm thoughts.

124

00:06:24,800 --> 00:06:26,800

What's matter?

125

00:06:26,800 --> 00:06:34,800

The number of bees may be disturbing for Adam, but this test is finally starting to look like the viral video.

126

00:06:34,800 --> 00:06:36,800

The coverage is great.

127

00:06:36,800 --> 00:06:39,800

There have to be thousands of bees on there right now.

128

00:06:41,800 --> 00:06:43,800

That is a hum of activity.

129

00:06:43,800 --> 00:06:47,800

But although it looks like the video, there is one key difference.

130

00:06:47,800 --> 00:06:49,800

What do you think? Is the laptop getting lighter?

131

00:06:49,800 --> 00:06:51,800

I think it's actually getting heavier.

132

00:06:53,800 --> 00:06:55,800

Well, dude, I don't think it's happening.

133

00:06:55,800 --> 00:07:00,800

You've got the queen in the middle, the special adhesive, five frames worth of bees, like several thousand of them.

134

00:07:00,800 --> 00:07:03,800

And the laptop is honestly, I think, heavier than when we started.

135

00:07:03,800 --> 00:07:05,800

Yeah, I don't think it's going to fly.

136

00:07:05,800 --> 00:07:10,800

No, if you'll excuse me now, I'm going to go off into a corner and let go of all my heebie-jeebies at once.

137

00:07:13,800 --> 00:07:18,800

I think you'll have to agree that we've done everything we can, and it's not just looking terrible for the myth.

138

00:07:18,800 --> 00:07:20,800

It's looking awful.

139

00:07:20,800 --> 00:07:23,800

I mean, it's nowhere close to happening.

140

00:07:23,800 --> 00:07:28,800

I feel like I want to go back to the shop and start teasing apart the components of this story to find out why.

141

00:07:36,800 --> 00:07:39,800

Okay, so first up, the myth that water repels flies.

142

00:07:39,800 --> 00:07:43,800

Oh, finally we're testing this one. I mean, this one's been going berserk on the fansite forever.

143

00:07:43,800 --> 00:07:48,800

The myth being that if you want to repel flies from your property, you just hang a bunch of clear bags of water.

144

00:07:48,800 --> 00:07:51,800

Clear bags of water? No additives? Nothing else?

145

00:07:51,800 --> 00:07:53,800

Nope, just water.

146

00:07:53,800 --> 00:07:54,800

That's insane.

147

00:07:54,800 --> 00:07:56,800

Tell that to the flies.

148

00:07:57,800 --> 00:08:02,800

According to the fans, this is a no-fuss, no-buzz solution.

149

00:08:02,800 --> 00:08:06,800

Decking your house with bags of water will keep flies away.

150

00:08:06,800 --> 00:08:11,800

But could H₂O alone really create a no-fly zone?

151

00:08:11,800 --> 00:08:13,800

Alright, well this seems pretty straightforward to test.

152

00:08:13,800 --> 00:08:17,800

We get a room full of flies, we take two pieces of meat, put them on either sides of the room,

153

00:08:17,800 --> 00:08:21,800

hang a bag of water over one piece of meat, and see which ones the flies go to.

154

00:08:21,800 --> 00:08:24,800

Okay, well I have two questions. First of all, how many flies should we use?

155

00:08:24,800 --> 00:08:27,800

We need a pretty big sample size. Let's start with 5,000.

156

00:08:27,800 --> 00:08:30,800

Okay, here's a better question then. How are we going to count them?

157

00:08:30,800 --> 00:08:34,800

You know what, flies don't live that long. We could just let them die naturally and then count them in.

158

00:08:34,800 --> 00:08:35,800

Perfect.

159

00:08:35,800 --> 00:08:36,800

Okay.

160

00:08:36,800 --> 00:08:44,800

So to answer the fan-fuehrer, Tori creates a home for the flies, while Carrie explains just why this idea might work.

161

00:08:44,800 --> 00:08:49,800

Now flies have prismatic vision, and since a bag of water is going to reflect and refract light,

162

00:08:49,800 --> 00:08:54,800

it will create a field of high-optic flow, which is going to tell the fly that there's something in its way.

163

00:08:54,800 --> 00:08:59,800

Essentially, creating a bug lighthouse, warning it away from the rocky shores.

164

00:09:00,800 --> 00:09:04,800

Flies have compound eyes, consisting of thousands of lenses,

165

00:09:04,800 --> 00:09:08,800

which means they see a mosaic image of their surroundings.

166

00:09:08,800 --> 00:09:15,800

So the theory is, the light refracted through the water is amplified, and this deters the flies.

167

00:09:17,800 --> 00:09:22,800

Now this fly box is made up of three equal compartments, sectioned off by trap doors.

168

00:09:22,800 --> 00:09:25,800

Now in the middle section, that's where we're going to be holding our flies,

169

00:09:25,800 --> 00:09:28,800

and on the end sections, they're both going to have a piece of meat.

170

00:09:28,800 --> 00:09:31,800

However, one of the sections is going to have a bag of water.

171

00:09:31,800 --> 00:09:36,800

Then what we're going to do is open up our trap doors and see which piece of meat the flies go to.

172

00:09:36,800 --> 00:09:38,800

The one with the bag, or the one without.

173

00:09:38,800 --> 00:09:44,800

Yep, it's a simple plan, and with Tori's fly box complete, now all they need is...

174

00:09:44,800 --> 00:09:48,800

So to put this myth to the test, we need flies, and a lot of them.

175

00:09:48,800 --> 00:09:49,800

Look, Maggie!

176

00:09:49,800 --> 00:09:52,800

Oh, God! That's crazy!

177

00:09:52,800 --> 00:09:54,800

That's had nightmares like this.

178

00:09:54,800 --> 00:09:56,800

Now the flies that we've chosen are common house flies.

179

00:09:56,800 --> 00:09:57,800

Why have we chosen them?

180

00:09:57,800 --> 00:10:01,800

Well, we know that they're attracted to rotting things, particularly rotting meat.

181

00:10:01,800 --> 00:10:02,800

Smell this.

182

00:10:02,800 --> 00:10:03,800

Yeah, it's bad.

183

00:10:03,800 --> 00:10:06,800

Could it be like a buffet for bear grills?

184

00:10:07,800 --> 00:10:10,800

Alright, that's it. That's all the maggots. Let's close it up.

185

00:10:11,800 --> 00:10:19,800

And with that, it's just a matter of sitting back and waiting three days for the maggots to metamorphosize into flies.

186

00:10:20,800 --> 00:10:22,800

Come on, you filthy maggots! Get in there and grow!

187

00:10:23,800 --> 00:10:26,800

We need 5,000 healthy soldiers!

188

00:10:26,800 --> 00:10:27,800

Pronto!

189

00:10:28,800 --> 00:10:31,800

After the break, it's biker versus bug.

190

00:10:31,800 --> 00:10:34,800

All these years up in Santor, it wouldn't hurt a fly.

191

00:10:34,800 --> 00:10:35,800

And later...

192

00:10:35,800 --> 00:10:36,800

Look at that!

193

00:10:42,800 --> 00:10:47,800

Next up for the Bug Special is an uneasy rider myth.

194

00:10:49,800 --> 00:10:51,800

Alright, so what do we got?

195

00:10:51,800 --> 00:10:52,800

Either of you ride motorcycles?

196

00:10:52,800 --> 00:10:53,800

Yeah.

197

00:10:53,800 --> 00:10:55,800

Okay, well this next myth might bug you.

198

00:10:55,800 --> 00:11:00,800

The idea is that while riding a motorcycle, a collision with an insect could be fatal.

199

00:11:00,800 --> 00:11:03,800

Like it flies in your eye and then you swerve out of control and crash?

200

00:11:03,800 --> 00:11:08,800

Nothing that obvious. It's that the impact itself kills you instantly. You're gone before you

crash.

201

00:11:08,800 --> 00:11:12,800

Really? I guess. I mean, I've seen some pretty big insects.

202

00:11:12,800 --> 00:11:14,800

Well, you need a better hobby.

203

00:11:14,800 --> 00:11:16,800

Ooh, like building robots.

204

00:11:17,800 --> 00:11:22,800

The story goes that this speeding biker was taken out by a bug strike.

205

00:11:22,800 --> 00:11:25,800

But does that fly in the face of physics?

206

00:11:25,800 --> 00:11:28,800

Or could an insect impact really be deadly?

207

00:11:30,800 --> 00:11:33,800

You know, I gotta say right off the bat, I'm a little skeptical about this one.

208

00:11:33,800 --> 00:11:40,800

I mean, I get the whole bug crashes into your face, you get distracted, you crash scenario, but killing you on impact?

209

00:11:40,800 --> 00:11:42,800

Alright, well then let's start by talking to a trauma specialist.

210

00:11:42,800 --> 00:11:47,800

Maybe there's a pressure pointer or a weak spot like the windpipe or the sternum that could create that kind of fatal result.

211

00:11:47,800 --> 00:11:48,800

Alright, that's a good idea.

212

00:11:48,800 --> 00:11:52,800

And then we'll figure out a way to ride a motorcycle into insects.

213

00:11:52,800 --> 00:11:54,800

Okay, not it on the driving. Ew.

214

00:11:56,800 --> 00:12:00,800

First up, a second opinion from trauma expert Dr. Trollin.

215

00:12:01,800 --> 00:12:08,800

So Dr. Trollin, is there any area of the head or neck that is vulnerable to something like this?

216

00:12:08,800 --> 00:12:13,800

Well, there's maybe one spot. There was a study done where they did different pressures on those different parts of the body.

217

00:12:13,800 --> 00:12:15,800

The forehead, 2,000 pounds.

218

00:12:15,800 --> 00:12:19,800

The chest, 404,000 pounds, depending on how old the person was.

219

00:12:19,800 --> 00:12:22,800

But there's one spot that's a little vulnerable.

220

00:12:22,800 --> 00:12:26,800

Right here, the cricothyroid area, only 76 pounds of pressure.

221

00:12:26,800 --> 00:12:31,800

So let's say we do find a bug that could cause this kind of force. How does that lead to death?

222

00:12:31,800 --> 00:12:34,800

It's not the crush itself, it's the swelling afterwards.

223

00:12:34,800 --> 00:12:41,800

What happens is the swelling in the area of the throat closes off the air pipe, the trachea, and that's what causes you to die.

224

00:12:42,800 --> 00:12:47,800

Right, so that weak spot means there could be something to this myth after all.

225

00:12:48,800 --> 00:12:51,800

Alright, so now we have all the information we need to go full scale.

226

00:12:51,800 --> 00:12:53,800

So now we're going to need a motorcycle.

227

00:12:54,800 --> 00:12:57,800

And since we don't want to injure our motorcyclists, we'll get a sidecar.

228

00:12:59,800 --> 00:13:00,800

We'll get a force plate.

229

00:13:01,800 --> 00:13:02,800

And some bugs.

230

00:13:03,800 --> 00:13:08,800

So, the first insect we're going to try is a common housefly.

231

00:13:08,800 --> 00:13:11,800

Now if this doesn't work, we're going to move on to this big guy.

232

00:13:11,800 --> 00:13:13,800

This is a cicada.

233

00:13:13,800 --> 00:13:16,800

Now this guy should definitely do some damage.

234

00:13:17,800 --> 00:13:20,800

To measure that damage, Grant's using the force.

235

00:13:21,800 --> 00:13:23,800

So how do we know if our bug strike is fatal or not?

236

00:13:23,800 --> 00:13:27,800

Well, with the force plate that I'm building, here's how it works.

237

00:13:27,800 --> 00:13:28,800

This is a force sensor.

238

00:13:28,800 --> 00:13:31,800

When it gets compressed, it registers on the computer.

239

00:13:31,800 --> 00:13:34,800

There'll be one of these in each corner of the plate.

240

00:13:35,800 --> 00:13:37,800

When a bug comes along and hits the plate,

241

00:13:40,800 --> 00:13:45,800

and based on that information, we'll know if the bug was a deadly bug or if it just bounced off.

242

00:13:46,800 --> 00:13:47,800

This is our motorcyclist.

243

00:13:47,800 --> 00:13:49,800

This is the guy who's going to be crashing into our insects.

244

00:13:49,800 --> 00:13:51,800

First thing I need to do is cut his head off.

245

00:13:54,800 --> 00:13:56,800

That way we can attach our force plate where the head is.

246

00:13:57,800 --> 00:14:03,800

With the force plate attached, the headless rider is complete, and it's time to hit the road.

247

00:14:05,800 --> 00:14:08,800

Let's find out if these bugs are really lethal or not.

248

00:14:09,800 --> 00:14:10,800

So this is the plan.

249

00:14:10,800 --> 00:14:11,800

We have the motorcycle.

250

00:14:11,800 --> 00:14:13,800

The human simulate is inside the side car.

251

00:14:15,800 --> 00:14:20,800

Now all I need to do is drive the motorcycle and run the human simulate into the fly.

252

00:14:20,800 --> 00:14:25,800

Then we'll find out, does a fly have enough force to crush a human being's windpipe?

253

00:14:26,800 --> 00:14:29,800

And because, let's face it, this seems like a long shot.

254

00:14:29,800 --> 00:14:33,800

Tori will drive the bike at its top speed of 85 miles an hour.

255

00:14:33,800 --> 00:14:34,800

That's good right there.

256

00:14:34,800 --> 00:14:40,800

His target, the fly, will be held in place by a string of spaghetti to combat the breeze.

257

00:14:40,800 --> 00:14:42,800

Okay Tori, stand by. Here we go.

258

00:14:43,800 --> 00:14:47,800

In three, two, one, go.

259

00:14:51,800 --> 00:14:52,800

Looks like he's going fast.

260

00:14:53,800 --> 00:14:55,800

He's right on target, 85 miles an hour.

261

00:14:57,800 --> 00:14:58,800

Whoa!

262

00:15:00,800 --> 00:15:02,800

85 miles an hour and it looked like he's creamed that fly.

263

00:15:02,800 --> 00:15:05,800

Yeah, that was a good hit.

264

00:15:05,800 --> 00:15:09,800

It's no surprise to anyone that the impact obliterated the fly.

265

00:15:10,800 --> 00:15:12,800

Did I hit it? You nailed it.

266

00:15:12,800 --> 00:15:15,800

All these years I've been saying Tori wouldn't hurt a fly.

267

00:15:16,800 --> 00:15:22,800

But the astounding thing is just how much force the split second fly spot imparted.

268

00:15:23,800 --> 00:15:24,800

Look at that.

269

00:15:24,800 --> 00:15:26,800

We have ten pounds.

270

00:15:26,800 --> 00:15:28,800

That is incredible.

271

00:15:28,800 --> 00:15:30,800

I mean, I didn't even think it was going to register on the force plate.

272

00:15:30,800 --> 00:15:34,800

I didn't think this myth had a chance at all, but that's an incredible result.

273

00:15:34,800 --> 00:15:41,800

Yeah, it's nowhere near what we need for actual fracture of the cartilage in the neck, but it's a start.

274

00:15:44,800 --> 00:15:48,800

Next up, the bees start throwing their weight around.

275

00:15:48,800 --> 00:15:51,800

Dude! She took off from the whole set.

276

00:15:53,800 --> 00:15:58,800

Alright, let's recap what we learned out there.

277

00:15:58,800 --> 00:16:00,800

The glue that they said they used in the video works great.

278

00:16:00,800 --> 00:16:04,800

The honey that they said they used to attract the bees attracted the bees.

279

00:16:04,800 --> 00:16:06,800

We got a thousand bees on that laptop.

280

00:16:06,800 --> 00:16:11,800

Every parameter that they laid out in the video worked for us except we got no lift off.

281

00:16:11,800 --> 00:16:18,800

I think clearly that means we need to break this down, take a single bee, and figure out that bee's lifting capacity.

282

00:16:18,800 --> 00:16:20,800

Like a bee Olympics.

283

00:16:20,800 --> 00:16:22,800

Weren't you part of the first bee Olympics?

284

00:16:25,800 --> 00:16:31,800

Well, first up for Janie is a trip to the roof at our bee Olympics athletes village.

285

00:16:31,800 --> 00:16:34,800

Let's see how we're doing this morning.

286

00:16:36,800 --> 00:16:38,800

Oh yeah, come to papa.

287

00:16:39,800 --> 00:16:43,800

With the bees on loan from the apiary, Janie carefully selects a contender.

288

00:16:43,800 --> 00:16:45,800

Got her.

289

00:16:46,800 --> 00:16:48,800

And then gives her a time out.

290

00:16:48,800 --> 00:16:52,800

Just going to leave her in there for a little while and cool her down.

291

00:16:52,800 --> 00:16:55,800

They won't hurt her, but it will slow her down, make her sleepy.

292

00:16:55,800 --> 00:16:58,800

That way when she's cool we can handle her safely.

293

00:16:58,800 --> 00:17:02,800

And then when we're ready to start the experiment, we'll warm her up.

294

00:17:02,800 --> 00:17:06,800

And while our bee relaxes, Adam makes the arena.

295

00:17:06,800 --> 00:17:10,800

In determining the lifting capacity of flying insects, we are not working completely in the dark.

296

00:17:10,800 --> 00:17:16,800

It has been tried before scientifically many different ways allow me to demonstrate the methodology

we'll be using.

297

00:17:16,800 --> 00:17:23,800

Our honey bee represented by this little plastic bee right here will have around her midsection tied a little thread.

298

00:17:23,800 --> 00:17:28,800

That thread will have tied on it at regular intervals weights, in this case, beads.

299

00:17:28,800 --> 00:17:35,800

As she takes off, she will be lifting these beads until she reaches the limit of her lifting capacity.

300

00:17:35,800 --> 00:17:43,800

At that point, we will count the number of beads that have become airborne and we will know just how strong this little cookie is.

301

00:17:44,800 --> 00:17:52,800

And once they know how strong one bee is, they'll be able to extrapolate just how many it would take to lift a laptop.

302

00:17:54,800 --> 00:17:56,800

I think we're ready.

303

00:17:56,800 --> 00:17:59,800

But first, to harness up their bee bodybuilder.

304

00:17:59,800 --> 00:18:06,800

It's a delicate operation to tie the beads on loosely enough not to hurt our little contender.

305

00:18:07,800 --> 00:18:08,800

I think she's ready.

306

00:18:08,800 --> 00:18:11,800

You want to warm her up in the palm of your hand?

307

00:18:12,800 --> 00:18:16,800

I never imagined I'd feel such feelings of affection for a honey bee.

308

00:18:16,800 --> 00:18:18,800

Wow, she's already flying.

309

00:18:18,800 --> 00:18:19,800

I know.

310

00:18:19,800 --> 00:18:26,800

Attracted to the UV light overhead, the worker bee starts a few warm-up flights, but she's still too tired to compete.

311

00:18:26,800 --> 00:18:29,800

It's kind of like an upside-down kite.

312

00:18:32,800 --> 00:18:35,800

Okay, I'll let you sit down and walk right towards the honey.

313

00:18:35,800 --> 00:18:38,800

She's looking it up. I can see her little tongue.

314

00:18:38,800 --> 00:18:41,800

Look at that. She's having a meal.

315

00:18:42,800 --> 00:18:47,800

After her recharge on honey, a slightly more lively bee begins her flight tests.

316

00:18:47,800 --> 00:18:49,800

There you go.

317

00:18:49,800 --> 00:18:51,800

She flew above my fingers.

318

00:18:51,800 --> 00:18:56,800

With a bit of encouragement, it's a good girl.

319

00:18:56,800 --> 00:18:58,800

She's a little weightlifter.

320

00:18:58,800 --> 00:19:00,800

Oh, good.

321

00:19:00,800 --> 00:19:02,800

Dude, that was a solid bore.

322

00:19:02,800 --> 00:19:04,800

I think she's getting stronger.

323

00:19:05,800 --> 00:19:08,800

Suddenly, our bee is throwing her weights around.

324

00:19:08,800 --> 00:19:13,800

Oh, dude, she took off with the whole set.

325

00:19:13,800 --> 00:19:15,800

She did.

326

00:19:18,800 --> 00:19:19,800

Wow.

327

00:19:19,800 --> 00:19:20,800

That was a good one.

328

00:19:20,800 --> 00:19:22,800

That was a very, very good one.

329

00:19:22,800 --> 00:19:25,800

See? Very powerful.

330

00:19:25,800 --> 00:19:30,800

And the high speed confirms just what a bruiser our bee turned out to be.

331

00:19:30,800 --> 00:19:31,800

There we go.

332

00:19:31,800 --> 00:19:35,800

One, two, three, four, five, six, seven, eight beads.

333

00:19:35,800 --> 00:19:37,800

She's like a bodybuilder.

334

00:19:37,800 --> 00:19:39,800

Let's weigh them.

335

00:19:39,800 --> 00:19:42,800

Six, seven, eight beads. They're all there.

336

00:19:42,800 --> 00:19:44,800

96 milligrams.

337

00:19:44,800 --> 00:19:47,800

That is really significant.

338

00:19:47,800 --> 00:19:51,800

This little worker bee lifted eight beads, which weighed 96 milligrams.

339

00:19:51,800 --> 00:19:59,800

She herself weighs 118 milligrams, so that means she was capable of lifting 81% of her own weight.

340

00:19:59,800 --> 00:20:05,800

That's pretty impressive, but what does that mean when it comes to lifting a laptop?

341

00:20:05,800 --> 00:20:08,800

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

342

00:20:08,800 --> 00:20:11,800

Let's weigh this, baby.

343

00:20:11,800 --> 00:20:14,800

2216 grams.

344

00:20:14,800 --> 00:20:15,800

OK.

345

00:20:15,800 --> 00:20:17,800

Now it's just a matter of some math.

346

00:20:17,800 --> 00:20:18,800

I'm going to crunch the numbers.

347

00:20:18,800 --> 00:20:22,800

2,200,000,000 by 96.

348

00:20:22,800 --> 00:20:26,800

So, it would take somewhere in the neighborhood of 23,000 honey bees

349

00:20:26,800 --> 00:20:31,800

to lift our laptop far more than the 1,000 claimed by the clip.

350

00:20:31,800 --> 00:20:37,800

But my question is, is there even enough square footage on the laptop to fit 23,000 bees?

351

00:20:37,800 --> 00:20:39,800

That's the next thing I'm going to find out.

352

00:20:39,800 --> 00:20:44,800

We know the laptop has a surface area of 234 square inches.

353

00:20:44,800 --> 00:20:48,800

So now, to find the bees per square inch.

354

00:20:48,800 --> 00:20:52,800

I've got here a piece of paper with a hole that's exactly two inches by two inches.

355

00:20:52,800 --> 00:20:54,800

That's four square inches.

356

00:20:54,800 --> 00:20:58,800

I'm thinking, I hold this over my bee frame.

357

00:20:58,800 --> 00:21:03,800

I count how many bees is in here, and I get an average bees per square inch distribution.

358

00:21:03,800 --> 00:21:04,800

Here we go.

359

00:21:04,800 --> 00:21:09,800

2, 4, 6, 8, 10, 12, 14, 16, 18, 20.

360

00:21:09,800 --> 00:21:11,800

They keep moving.

361

00:21:11,800 --> 00:21:13,800

Let me try this again.

362

00:21:13,800 --> 00:21:18,800

With his bee average, now for the calculating.

363

00:21:18,800 --> 00:21:21,800

I'm coming up with an average distribution of about 40 bees.

364

00:21:21,800 --> 00:21:23,800

That's 10 bees per square inch.

365

00:21:23,800 --> 00:21:28,800

10 bees per square inch means that this laptop can support 10 times as many bees as the square inches of the laptop,

366

00:21:28,800 --> 00:21:34,800

which is 2,340 bees on laptop.

367

00:21:34,800 --> 00:21:36,800

Yep, and numbers don't lie.

368

00:21:36,800 --> 00:21:39,800

So what does that mean for the myth?

369

00:21:39,800 --> 00:21:41,800

What'd you figure out?

370

00:21:41,800 --> 00:21:47,800

Well, I conclude that it takes 23,000 bees to lift our laptop.

371

00:21:47,800 --> 00:21:56,800

More than that, the laptop can only support a total population of 2,300 bees, roughly one-tenth of the number it needs to get airborne.

372

00:21:56,800 --> 00:21:58,800

This thing's totally busted on the math alone.

373

00:21:58,800 --> 00:22:00,800

Well, you know what?

374

00:22:00,800 --> 00:22:02,800

I don't think that's the only reason it's busted.

375

00:22:06,800 --> 00:22:07,800

What could he mean?

376

00:22:07,800 --> 00:22:10,800

Coming up, the exterminator rides again.

377

00:22:10,800 --> 00:22:15,800

And can H₂O alone create a no-fly zone?

378

00:22:15,800 --> 00:22:17,800

Pretty disgusting.

379

00:22:24,800 --> 00:22:30,800

The team is testing the tail of a motorcyclist who got slugged by a bug and bit the big one.

380

00:22:30,800 --> 00:22:32,800

We just ran our first test.

381

00:22:32,800 --> 00:22:34,800

We hit the fly at 85 miles an hour.

382

00:22:37,800 --> 00:22:40,800

It registered on the force plate, giving us 10 pounds of force,

383

00:22:40,800 --> 00:22:43,800

but that's not enough to crush a windpipe and kill a human being.

384

00:22:43,800 --> 00:22:47,800

You need somewhere around 76 pounds of pressure to do that.

385

00:22:47,800 --> 00:22:49,800

Now we're going to move on to the cicada.

386

00:22:49,800 --> 00:22:55,800

Now this could potentially give us that 76 pounds of pressure that we're looking for to make this lethal.

387

00:22:55,800 --> 00:23:02,800

Weighing around 100 times more than the fly, they should get more bang for their bug.

388

00:23:07,800 --> 00:23:12,800

To find out, the exterminator guns the bike to 85 miles per hour.

389

00:23:12,800 --> 00:23:13,800

The 85.

390

00:23:13,800 --> 00:23:15,800

Right on target.

391

00:23:15,800 --> 00:23:18,800

And that's past the la vista baby.

392

00:23:23,800 --> 00:23:26,800

I think I got some cicada in my mouth.

393

00:23:27,800 --> 00:23:32,800

The force of impact vaporized the cicada, spraying bug bits everywhere.

394

00:23:32,800 --> 00:23:35,800

But was it a lethal bug strike?

395

00:23:38,800 --> 00:23:39,800

Okay, what's the result?

396

00:23:39,800 --> 00:23:40,800

37 pounds.

397

00:23:40,800 --> 00:23:41,800

What?

398

00:23:41,800 --> 00:23:43,800

Wow, that's a lot of force.

399

00:23:43,800 --> 00:23:44,800

Yep.

400

00:23:44,800 --> 00:23:45,800

But it's not enough to kill you.

401

00:23:45,800 --> 00:23:46,800

But it's halfway there.

402

00:23:46,800 --> 00:23:48,800

That's incredible from a bug.

403

00:23:48,800 --> 00:23:50,800

Incredible is right.

404

00:23:50,800 --> 00:23:54,800

I never really expected this cicada to be a fatal collision.

405

00:23:54,800 --> 00:23:57,800

The 37 pounds is really, really surprising.

406

00:23:57,800 --> 00:24:02,800

I mean, that's halfway to the minimum dynamic fracture load that it would take to crush a windpipe.

407

00:24:02,800 --> 00:24:09,800

So if a 10 gram bug got 37 pounds of force, then to get the deadly 76 pounds,

408

00:24:09,800 --> 00:24:11,800

they're going to need a bigger bug.

409

00:24:11,800 --> 00:24:12,800

Look at this thing.

410

00:24:12,800 --> 00:24:13,800

Raaah!

411

00:24:13,800 --> 00:24:16,800

Luckily, they prepared one of those earlier.

412

00:24:16,800 --> 00:24:18,800

The Goliath beetle.

413

00:24:18,800 --> 00:24:23,800

One of the largest insects on the face of the earth in terms of its bulk and its weight.

414

00:24:23,800 --> 00:24:27,800

They average about four inches long and can weigh up to 100 grams.

415

00:24:27,800 --> 00:24:33,800

They're indigenous to Africa, and if you're wondering, yes, they do in fact fly.

416

00:24:33,800 --> 00:24:35,800

But you can't import these things live.

417

00:24:35,800 --> 00:24:37,800

They come all dried out.

418

00:24:37,800 --> 00:24:45,800

I'm recreating our Goliath so that it has an exoskeleton, the right mass, and a nice gooey center so we get a splat.

419

00:24:45,800 --> 00:24:49,800

For that, Carrie took a mold of the Goliath beetle.

420

00:24:49,800 --> 00:24:52,800

I feel like I'm unearthing some sort of ancient dinosaur.

421

00:24:52,800 --> 00:24:57,800

And then using a polyurethane resin, replicated its outer shell.

422

00:24:57,800 --> 00:25:02,800

Nice. Perfect exoskeleton.

423

00:25:02,800 --> 00:25:06,800

Then the final step was to give the model some pudding guts.

424

00:25:08,800 --> 00:25:10,800

That's bug guts.

425

00:25:10,800 --> 00:25:12,800

I actually do know what this tastes like.

426

00:25:12,800 --> 00:25:14,800

Thanks to Mythbusters.

427

00:25:18,800 --> 00:25:24,800

Right now, my dried out Goliath beetle and the shell that we're using as a simulation have the same weight.

428

00:25:24,800 --> 00:25:26,800

They're both about 12-13 grams.

429

00:25:26,800 --> 00:25:31,800

We want these bugs to be live, so I'm adding guts to create the mass, the weight.

430

00:25:31,800 --> 00:25:35,800

We're going to get 60 grams of bug guts into this guy.

431

00:25:35,800 --> 00:25:38,800

How weird is this?

432

00:25:38,800 --> 00:25:39,800

Weird indeed.

433

00:25:39,800 --> 00:25:46,800

But since it's six times the mass of the cicada, perhaps the Goliath Goliath will prove fatal.

434

00:25:49,800 --> 00:25:51,800

You might say that it's crunch time.

435

00:25:51,800 --> 00:25:53,800

One, two, one, go!

436

00:25:54,800 --> 00:25:59,800

One giant beetle versus a motorcyclist at 85 miles per hour.

437

00:25:59,800 --> 00:26:01,800

Here it comes.

438

00:26:02,800 --> 00:26:04,800

Right on target.

439

00:26:04,800 --> 00:26:06,800

Yeah, 85 holding and...

440

00:26:12,800 --> 00:26:15,800

Did you hear the sound it made?

441

00:26:15,800 --> 00:26:18,800

Yeah, I think that could have been a kill. It went...

442

00:26:20,800 --> 00:26:24,800

Covered in bug simulation.

443

00:26:25,800 --> 00:26:27,800

This is pudding.

444

00:26:27,800 --> 00:26:28,800

It's tasty.

445

00:26:28,800 --> 00:26:30,800

Ooh, it's really old pudding.

446

00:26:30,800 --> 00:26:33,800

There's no doubt that the beetle hit with a thwack.

447

00:26:33,800 --> 00:26:35,800

That's a cartoon splat!

448

00:26:35,800 --> 00:26:37,800

That is a bug splatter.

449

00:26:37,800 --> 00:26:41,800

But was that splat in the deadly force range?

450

00:26:43,800 --> 00:26:45,800

The body just explodes.

451

00:26:45,800 --> 00:26:48,800

That's over 100 pounds of force.

452

00:26:48,800 --> 00:26:50,800

Well, that's a lethal blow right there if it hit your windpipe.

453

00:26:50,800 --> 00:26:54,800

After three bugs with three different masses,

454

00:26:54,800 --> 00:26:59,800

they've finally gotten the deadly impact of the myth at 85 miles per hour.

455

00:26:59,800 --> 00:27:02,800

But it's a million to one impact.

456

00:27:02,800 --> 00:27:05,800

After the mythbusters, those odds are too high.

457

00:27:05,800 --> 00:27:07,800

This myth is really starting to look plausible.

458

00:27:07,800 --> 00:27:13,800

But what we really need to find out now is since we could get our 100 pound payload from this,

459

00:27:13,800 --> 00:27:15,800

what if we had higher speeds?

460

00:27:15,800 --> 00:27:17,800

What if the beetle hit somewhere else?

461

00:27:17,800 --> 00:27:19,800

I mean, it's more likely to hit your head or your chest.

462

00:27:19,800 --> 00:27:22,800

So can we cause instant death with a more likely scenario?

463

00:27:22,800 --> 00:27:26,800

To test that, I think what we're going to have to do is go to a much higher speed.

464

00:27:26,800 --> 00:27:31,800

Certainly much higher than we can get on the sidecar rig that we have right now.

465

00:27:31,800 --> 00:27:36,800

But before the guys get up to speed, there's a swarm of flies to deal with.

466

00:27:40,800 --> 00:27:47,800

They're irritating, infuriating, and downright annoying.

467

00:27:47,800 --> 00:27:51,800

But can you repel flies with a bag of water?

468

00:27:53,800 --> 00:27:56,800

So as you can see, our 5,000 flies have finally hatched.

469

00:27:56,800 --> 00:27:58,800

We have our very own swarm.

470

00:27:58,800 --> 00:28:00,800

And now it's time for our final experiment.

471

00:28:00,800 --> 00:28:01,800

Here's how it's going to work.

472

00:28:01,800 --> 00:28:07,800

Box number one and box number three will each have a chunk of rotten meat in it to attract the flies.

473

00:28:07,800 --> 00:28:11,800

But only box number one will have a plastic bag filled with water.

474

00:28:11,800 --> 00:28:16,800

We'll open up the doors, let them go for an hour, then close them and count the flies.

475

00:28:16,800 --> 00:28:19,800

Ding, ding, ding, ding, ding, child time!

476

00:28:20,800 --> 00:28:22,800

It smells so bad!

477

00:28:22,800 --> 00:28:30,800

This putrid meat has been fermenting for 10 days, and with an identical amount in each chamber, it'll certainly attract the flies.

478

00:28:30,800 --> 00:28:33,800

I can see if this thing repels the flies.

479

00:28:35,800 --> 00:28:37,800

They're sealed in.

480

00:28:37,800 --> 00:28:40,800

Okay, 60 minutes with the doors open. Go!

481

00:28:41,800 --> 00:28:46,800

Remember, because fly eyes consist of thousands of tiny lenses,

482

00:28:46,800 --> 00:28:53,800

supposedly the refraction of light through the water bag will be amplified and create a confusing obstacle.

483

00:28:55,800 --> 00:28:58,800

So we just opened the trap doors inside the fly box to release the flies.

484

00:28:58,800 --> 00:29:00,800

Now what do I think is going to happen?

485

00:29:00,800 --> 00:29:03,800

I have a feeling once those flies smell that rotting meat, they're going to go straight for it,

486

00:29:03,800 --> 00:29:06,800

and that bag of water is going to do nothing to deter them.

487

00:29:06,800 --> 00:29:07,800

Tori could be right.

488

00:29:07,800 --> 00:29:12,800

So far the water bag is doing nothing to deter the flies from their feted feast.

489

00:29:12,800 --> 00:29:18,800

We do a lot of exciting things on this show, explosions, guns, sharks, but believe it or not,

490

00:29:18,800 --> 00:29:21,800

will a bag of water repel flies?

491

00:29:21,800 --> 00:29:25,800

Is the most demanded myth on our website right now.

492

00:29:26,800 --> 00:29:28,800

You asked for it, and here it is.

493

00:29:28,800 --> 00:29:31,800

But halfway through, it's looking dubious.

494

00:29:32,800 --> 00:29:36,800

Look at that, apparently bags of water attract flies.

495

00:29:38,800 --> 00:29:43,800

A quick time lapse, and 30 minutes later, the free range feasting is up.

496

00:29:46,800 --> 00:29:48,800

Now we can start counting flies.

497

00:29:48,800 --> 00:29:51,800

Well actually, not quite yet.

498

00:29:52,800 --> 00:29:56,800

They have to wait a week for the flies to, uh, drop like flies.

499

00:29:58,800 --> 00:30:00,800

God, that's a lot of flies.

500

00:30:00,800 --> 00:30:03,800

Alright, let's clean them up and weigh them.

501

00:30:05,800 --> 00:30:07,800

Here's a dirty job for you.

502

00:30:08,800 --> 00:30:10,800

This is pretty disgusting.

503

00:30:10,800 --> 00:30:12,800

With both sets of flies collected,

504

00:30:12,800 --> 00:30:14,800

Time to get counted in the name of science.

505

00:30:15,800 --> 00:30:18,800

It's time to weigh in on the water bag theory.

506

00:30:18,800 --> 00:30:24,800

Alright, so these are the flies from the compartment without water, and they weigh 20 grams.

507

00:30:24,800 --> 00:30:25,800

Alright.

508

00:30:25,800 --> 00:30:28,800

Well these are the flies from the compartment,

509

00:30:28,800 --> 00:30:31,800

They supposedly fly repelling a water bag.

510

00:30:31,800 --> 00:30:33,800

Alright, ready for a moment of truth?

511

00:30:33,800 --> 00:30:34,800

Yep.

512

00:30:35,800 --> 00:30:36,800

Oh!

513

00:30:36,800 --> 00:30:39,800

35 grams.

514

00:30:39,800 --> 00:30:40,800

This one's busted.

515

00:30:40,800 --> 00:30:42,800

It's only busted, it's ridiculous.

516

00:30:42,800 --> 00:30:45,800

Yep, looks like a bag of water does not work as a bug repellent.

517

00:30:45,800 --> 00:30:47,800

Tell that to the fan site.

518

00:30:50,800 --> 00:30:52,800

Next, the guys get to the chopper.

519

00:30:53,800 --> 00:30:55,800

To test the physics of flight.

520

00:30:56,800 --> 00:30:58,800

That's pretty definitive, man.

521

00:31:10,800 --> 00:31:13,800

Hollywood bugs may be a force to be reckoned with.

522

00:31:16,800 --> 00:31:17,800

It's lifted.

523

00:31:17,800 --> 00:31:19,800

But in the case of this B movie,

524

00:31:19,800 --> 00:31:22,800

Well the bees don't have the pulling power.

525

00:31:22,800 --> 00:31:24,800

Look, the numbers here just don't add up.

526

00:31:24,800 --> 00:31:27,800

It would take 23,000 bees to lift that laptop

527

00:31:27,800 --> 00:31:29,800

And they could never fit within that surface area.

528

00:31:29,800 --> 00:31:31,800

This thing is totally busted.

529

00:31:31,800 --> 00:31:34,800

Well not only that, but the laws of physics won't allow it.

530

00:31:34,800 --> 00:31:36,800

And you know what? I can prove it.

531

00:31:36,800 --> 00:31:37,800

Cool.

532

00:31:37,800 --> 00:31:42,800

There's a really basic problem inherent to this whole idea of having bees lift a laptop.

533

00:31:42,800 --> 00:31:44,800

And that is that, say, this is the bee,

534

00:31:44,800 --> 00:31:47,800

And it's attached to a large flat surface like my hand.

535

00:31:47,800 --> 00:31:49,800

When it blows air down,

536

00:31:49,800 --> 00:31:52,800

The air is going to hit that surface that it's trying to lift.

537

00:31:52,800 --> 00:31:55,800

It doesn't have any choice but to go off sideways.

538

00:31:55,800 --> 00:31:58,800

It needs to go down past the object to actually be able to lift it.

539

00:31:58,800 --> 00:32:02,800

It's kind of like being in a cartoon and you're in a sailboat

540

00:32:02,800 --> 00:32:05,800

Blowing on the sail and off goes the boat with you in it.

541

00:32:05,800 --> 00:32:06,800

It doesn't work that way.

542

00:32:06,800 --> 00:32:09,800

And I think we can prove it with this little guy.

543

00:32:11,800 --> 00:32:15,800

Yep, these tiny helicopters are just right to test Jamie's theory.

544

00:32:18,800 --> 00:32:23,800

Right in the face.

545

00:32:23,800 --> 00:32:26,800

Not only are they more cooperative than bees,

546

00:32:26,800 --> 00:32:29,800

Oh, come on, into the shark's mouth.

547

00:32:33,800 --> 00:32:36,800

There's also no sting in their tail.

548

00:32:38,800 --> 00:32:40,800

Shall we figure out how much these puppies can lift?

549

00:32:40,800 --> 00:32:41,800

Sure.

550

00:32:41,800 --> 00:32:44,800

I broke out one of my weight sets.

551

00:32:44,800 --> 00:32:49,800

What I'm thinking is that we replicate the experiment we used on the bees

552

00:32:49,800 --> 00:32:51,800

and see how much it can lift here.

553

00:32:51,800 --> 00:32:52,800

Great idea.

554

00:32:52,800 --> 00:32:55,800

Adam starts with a weight of two grams on the string.

555

00:32:55,800 --> 00:32:59,800

And then it's over to the helicopter to start its weight training.

556

00:32:59,800 --> 00:33:03,800

Well, two grams.

557

00:33:03,800 --> 00:33:05,800

Okay, that's a good test.

558

00:33:05,800 --> 00:33:08,800

One more gram is added to the mini chopper payload.

559

00:33:09,800 --> 00:33:11,800

I think that's our limit.

560

00:33:11,800 --> 00:33:12,800

I mean, it was literally like...

561

00:33:12,800 --> 00:33:13,800

Yeah.

562

00:33:13,800 --> 00:33:17,800

So I think three grams per helicopter is our weight limit.

563

00:33:17,800 --> 00:33:20,800

How many helicopters do you want to use?

564

00:33:21,800 --> 00:33:22,800

Six.

565

00:33:22,800 --> 00:33:23,800

Okay.

566

00:33:23,800 --> 00:33:24,800

18 grams it is.

567

00:33:26,800 --> 00:33:29,800

With the lifting capacity of the teeny heli sorted,

568

00:33:29,800 --> 00:33:34,800

Jamie whips up a 10 gram frame for the first part of this experiment.

569

00:33:34,800 --> 00:33:35,800

That ought to do it.

570

00:33:35,800 --> 00:33:37,800

I think we're ready to fly.

571

00:33:37,800 --> 00:33:38,800

So if you do the math,

572

00:33:38,800 --> 00:33:42,800

six of these little guys should easily be able to lift this frame.

573

00:33:42,800 --> 00:33:45,800

And as it turns out, Jamie's right.

574

00:33:45,800 --> 00:33:46,800

Yes!

575

00:33:51,800 --> 00:33:54,800

Six mini choppers can definitely lift the frame.

576

00:33:57,800 --> 00:33:58,800

That's quite...

577

00:33:58,800 --> 00:33:59,800

So what's next?

578

00:34:01,800 --> 00:34:04,800

All right, now, if your theory is correct

579

00:34:04,800 --> 00:34:06,800

and we add a film under here,

580

00:34:06,800 --> 00:34:08,800

they won't take off at all.

581

00:34:08,800 --> 00:34:09,800

Not going anywhere.

582

00:34:09,800 --> 00:34:10,800

Let's do it.

583

00:34:10,800 --> 00:34:11,800

All right.

584

00:34:11,800 --> 00:34:15,800

Jamie tweaks his frame by skin in the bottom with tape.

585

00:34:15,800 --> 00:34:17,800

So I've removed these things

586

00:34:17,800 --> 00:34:20,800

and I'm replacing them with tape.

587

00:34:20,800 --> 00:34:24,800

At 10 grams, it weighs exactly what it did before.

588

00:34:24,800 --> 00:34:27,800

But now air can't pass through the frame.

589

00:34:27,800 --> 00:34:28,800

Oh, it's ready.

590

00:34:28,800 --> 00:34:29,800

It's ready.

591

00:34:29,800 --> 00:34:30,800

Awesome.

592

00:34:32,800 --> 00:34:34,800

That's not flying.

593

00:34:34,800 --> 00:34:36,800

She's a vibrato a little bit,

594

00:34:36,800 --> 00:34:37,800

but she's a no-fly.

595

00:34:37,800 --> 00:34:38,800

No flying.

596

00:34:38,800 --> 00:34:39,800

I love it.

597

00:34:39,800 --> 00:34:41,800

That's pretty definitive, man.

598

00:34:41,800 --> 00:34:42,800

Yep.

599

00:34:42,800 --> 00:34:45,800

Definitive and down-to-flight physics.

600

00:34:46,800 --> 00:34:49,800

The chopper blades not only create lift,

601

00:34:49,800 --> 00:34:53,800

but they also force air down on the surface of the frame.

602

00:34:53,800 --> 00:34:56,800

Meaning that any lift is counteracted

603

00:34:56,800 --> 00:34:59,800

by the downward pressure of the air on the frame.

604

00:35:00,800 --> 00:35:03,800

So how does all this relate to bees lifting a laptop?

605

00:35:03,800 --> 00:35:05,800

Well, assuming you had enough bees

606

00:35:05,800 --> 00:35:08,800

and enough lift from them to do the job,

607

00:35:08,800 --> 00:35:11,800

the physics and the geometry of the situation

608

00:35:11,800 --> 00:35:13,800

just isn't going to let it happen.

609

00:35:13,800 --> 00:35:16,800

Stay tuned for the Bug Special Finale.

610

00:35:16,800 --> 00:35:18,800

Oh, it's a cute little bug.

611

00:35:18,800 --> 00:35:19,800

Of death.

612

00:35:20,800 --> 00:35:22,800

And there's a sting in the tail.

613

00:35:22,800 --> 00:35:23,800

Look at that.

614

00:35:23,800 --> 00:35:25,800

It's totally lifting off.

615

00:35:31,800 --> 00:35:33,800

When it comes to a biker versus a bug,

616

00:35:33,800 --> 00:35:35,800

most people would back the biker.

617

00:35:35,800 --> 00:35:37,800

However...

618

00:35:37,800 --> 00:35:39,800

We found out at the Alameda runway with our motorcycle

619

00:35:39,800 --> 00:35:42,800

that if you hit one of these Goliath beetles going 85 miles an hour

620

00:35:42,800 --> 00:35:45,800

and it happened to hit you in this tiny little spot right here...

621

00:35:45,800 --> 00:35:47,800

That's over 100 pounds of force.

622

00:35:47,800 --> 00:35:50,800

Well, that's a lethal hit right there if it hit your windpipe.

623

00:35:50,800 --> 00:35:53,800

But you're more likely to hit the head or the chest,

624

00:35:53,800 --> 00:35:54,800

some area like that.

625

00:35:54,800 --> 00:35:56,800

Now, what would it take to make that lethal?

626

00:35:56,800 --> 00:35:58,800

Well, we're going to do some experiments

627

00:35:58,800 --> 00:36:01,800

using much, much higher speeds to find out if that's a possibility.

628

00:36:01,800 --> 00:36:04,800

Now, for that, we're going to need to build an air cannon.

629

00:36:04,800 --> 00:36:06,800

Perfect.

630

00:36:06,800 --> 00:36:07,800

You ready?

631

00:36:07,800 --> 00:36:08,800

I'm ready.

632

00:36:08,800 --> 00:36:09,800

Let's do it.

633

00:36:19,800 --> 00:36:20,800

Alright.

634

00:36:20,800 --> 00:36:23,800

Now armed with the Bug Zooka.

635

00:36:28,800 --> 00:36:32,800

It's the final showdown for the biker versus bug.

636

00:36:33,800 --> 00:36:37,800

Oh, it's a cute little bug of death.

637

00:36:37,800 --> 00:36:40,800

For the first test at 120 miles per hour,

638

00:36:40,800 --> 00:36:44,800

Cary loads the Goliath Beetle inside a sabo

639

00:36:44,800 --> 00:36:47,800

to make sure he makes it out alive.

640

00:36:47,800 --> 00:36:49,800

Six and a half PSI. We are ready to fire.

641

00:36:49,800 --> 00:36:51,800

And remember...

642

00:36:51,800 --> 00:36:53,800

The forehead, 2,000 pounds.

643

00:36:53,800 --> 00:36:57,800

The chest, 404,000 pounds.

644

00:36:57,800 --> 00:37:00,800

So that's the deadly range they're looking for.

645

00:37:00,800 --> 00:37:03,800

In three, two, one.

646

00:37:06,800 --> 00:37:08,800

Now that was a slap.

647

00:37:08,800 --> 00:37:11,800

Was that a lethal hit or what?

648

00:37:11,800 --> 00:37:14,800

Yeah, it sounded pretty, pretty crazy.

649

00:37:14,800 --> 00:37:15,800

Ta-da!

650

00:37:15,800 --> 00:37:19,800

Our 60 gram Goliath Beetle hits the force plate

651

00:37:19,800 --> 00:37:21,800

at 120 miles per hour.

652

00:37:21,800 --> 00:37:23,800

But was it a deadly strike?

653

00:37:23,800 --> 00:37:26,800

285 pounds of force on that one.

654

00:37:26,800 --> 00:37:28,800

So we just fired our bug out of our cannon

655

00:37:28,800 --> 00:37:31,800

at 120 miles an hour into our force meter.

656

00:37:31,800 --> 00:37:34,800

It gave us 285 pounds of force.

657

00:37:34,800 --> 00:37:36,800

Now we know that would be a lethal hit

658

00:37:36,800 --> 00:37:37,800

if it hit you in the throat.

659

00:37:37,800 --> 00:37:40,800

However, it would not be lethal if it hit you in the head

660

00:37:40,800 --> 00:37:41,800

or the chest.

661

00:37:41,800 --> 00:37:44,800

So now it's time to move on to the ridiculous.

662

00:37:44,800 --> 00:37:46,800

We're going to fire our bug at 200 miles an hour.

663

00:37:46,800 --> 00:37:49,800

That is the fastest known motorcycle ever ticketed.

664

00:37:49,800 --> 00:37:52,800

Let's see if that is enough to kill you.

665

00:37:52,800 --> 00:37:54,800

Ridiculous is right.

666

00:37:54,800 --> 00:37:56,800

And depending on how you look at it,

667

00:37:56,800 --> 00:37:59,800

this is either a best or a worst case scenario.

668

00:37:59,800 --> 00:38:01,800

Ready to fire at 10 psi.

669

00:38:01,800 --> 00:38:04,800

At 200 miles an hour, the fastest recorded speed

670

00:38:04,800 --> 00:38:07,800

that anyone's gotten a ticket on a motorcycle.

671

00:38:07,800 --> 00:38:10,800

Three, two, one.

672

00:38:13,800 --> 00:38:14,800

Wow!

673

00:38:14,800 --> 00:38:16,800

Oh my god!

674

00:38:16,800 --> 00:38:17,800

Wow!

675

00:38:17,800 --> 00:38:18,800

Look at that splash!

676

00:38:18,800 --> 00:38:20,800

I don't know about you guys.

677

00:38:20,800 --> 00:38:22,800

That might have been lethal.

678

00:38:22,800 --> 00:38:29,800

It's an incredible impact at an incredible speed.

679

00:38:29,800 --> 00:38:32,800

But can we call this souped up bug deadly?

680

00:38:32,800 --> 00:38:35,800

So at 200 miles per hour, direct hit,

681

00:38:35,800 --> 00:38:38,800

558 pounds of force.

682

00:38:38,800 --> 00:38:41,800

I mean that sounds like a lot, but it's really not.

683

00:38:41,800 --> 00:38:43,800

I mean your chest can take so much more.

684

00:38:43,800 --> 00:38:45,800

That is the worst case scenario.

685

00:38:45,800 --> 00:38:47,800

Bottom, bottom number is 400.

686

00:38:47,800 --> 00:38:49,800

So this is really unlikely.

687

00:38:49,800 --> 00:38:51,800

Yeah, and we are giving this myth the best possible chance.

688

00:38:51,800 --> 00:38:54,800

And it's still coming up barely plausible.

689

00:38:54,800 --> 00:38:56,800

But I think we need to call it plausible

690

00:38:56,800 --> 00:38:58,800

because if it did hit you in the throat, it could kill you.

691

00:38:58,800 --> 00:39:00,800

I mean that's what all the best myths are based on.

692

00:39:00,800 --> 00:39:02,800

Really unlikely circumstances.

693

00:39:02,800 --> 00:39:05,800

All aligning perfectly to create a really good story.

694

00:39:05,800 --> 00:39:07,800

So plausible.

695

00:39:12,800 --> 00:39:14,800

Mythbusters is all about experimentation.

696

00:39:14,800 --> 00:39:16,800

But that means that there are a lot of things

697

00:39:16,800 --> 00:39:18,800

that don't make it on air.

698

00:39:18,800 --> 00:39:20,800

So if you want to see some of that stuff,

699

00:39:20,800 --> 00:39:23,800

log on to [discovery.com slash mythbusters](http://discovery.com/slash/mythbusters).

700

00:39:25,800 --> 00:39:27,800

That's a lot of bees.

701

00:39:27,800 --> 00:39:30,800

Adam and Jamie have proved that bees can't lift a laptop.

702

00:39:30,800 --> 00:39:32,800

Come on bees, go.

703

00:39:32,800 --> 00:39:34,800

You need too many bees.

704

00:39:34,800 --> 00:39:37,800

23,000 honey bees.

705

00:39:37,800 --> 00:39:40,800

On too little surface and the physics just doesn't work.

706

00:39:40,800 --> 00:39:42,800

That's pretty definitive man.

707

00:39:42,800 --> 00:39:45,800

This myth is triple busted.

708

00:39:45,800 --> 00:39:47,800

Oh, look at that!

709

00:39:47,800 --> 00:39:49,800

It's totally lifting off.

710

00:39:49,800 --> 00:39:52,800

Ah, this myth is triple busted.

711

00:39:52,800 --> 00:39:54,800

Wow!

712

00:39:54,800 --> 00:39:56,800

They are totally flying this laptop.

713

00:39:56,800 --> 00:39:59,800

So how did that just happen?

714

00:40:02,800 --> 00:40:06,800

We've come back to the bee farm to get this laptop to fly.

715

00:40:06,800 --> 00:40:09,800

Except this time, instead of relying on the bees to lift it,

716

00:40:09,800 --> 00:40:12,800

we are going to rely on our experience in special effects.

717

00:40:12,800 --> 00:40:15,800

For while this barrel and this laptop look exactly the same

718

00:40:15,800 --> 00:40:17,800

as they did the first time we tried this,

719

00:40:17,800 --> 00:40:19,800

there's a critical difference.

720

00:40:19,800 --> 00:40:21,800

And that difference is this.

721

00:40:21,800 --> 00:40:23,800

High strength fishing line,

722

00:40:23,800 --> 00:40:25,800

monofilament strung between the laptop

723

00:40:25,800 --> 00:40:28,800

and this overhead popping ring.

724

00:40:28,800 --> 00:40:32,800

Yes, so that when we have this laptop properly covered with bees,

725

00:40:32,800 --> 00:40:35,800

we will pop it up into the air lifted by the invisible monofilament

726

00:40:35,800 --> 00:40:39,800

and it will look hopefully just like the video.

727

00:40:39,800 --> 00:40:42,800

That's movie magic in action.

728

00:40:42,800 --> 00:40:44,800

Once again, Adam preps the laptop.

729

00:40:44,800 --> 00:40:46,800

We're not even going to use glue in this test,

730

00:40:46,800 --> 00:40:48,800

we're just going to use honey.

731

00:40:48,800 --> 00:40:51,800

I'm going to coat this laptop and they're going to lap it up.

732

00:40:51,800 --> 00:40:53,800

That's the theory anyway.

733

00:40:53,800 --> 00:40:56,800

Now to bring on the bees.

734

00:40:56,800 --> 00:40:59,800

And strangely, Adam is volunteering.

735

00:40:59,800 --> 00:41:03,800

It strikes me that you're getting a little more comfortable around bees.

736

00:41:03,800 --> 00:41:05,800

More than that, I think by the end of this episode,

737

00:41:05,800 --> 00:41:07,800

I'll be totally over my phobia.

738

00:41:07,800 --> 00:41:09,800

First frame of bees.

739

00:41:09,800 --> 00:41:11,800

Here we go.

740

00:41:13,800 --> 00:41:15,800

Oh, perfect!

741

00:41:15,800 --> 00:41:17,800

That is beautiful.

742

00:41:17,800 --> 00:41:20,800

The bees are in place and then miraculously,

743

00:41:20,800 --> 00:41:22,800

Oh, look at that!

744

00:41:22,800 --> 00:41:24,800

the laptop starts to fly.

745

00:41:24,800 --> 00:41:26,800

Wow! That is amazing!

746

00:41:26,800 --> 00:41:29,800

Look at that!

747

00:41:29,800 --> 00:41:31,800

Look, I can raise it and they fly even higher.

748

00:41:31,800 --> 00:41:36,800

Look, oh, that is movie magic.

749

00:41:39,800 --> 00:41:44,800

And just like the viral video, it's all done with strings.

750

00:41:44,800 --> 00:41:48,800

Look, it's easy to see why this video is so popular and compelling.

751

00:41:48,800 --> 00:41:52,800

It makes a great story and you want to believe it.

752

00:41:52,800 --> 00:41:56,800

Strong bees, strong like bull.

753

00:41:56,800 --> 00:41:59,800

Unfortunately, that desire doesn't make it so.

754

00:41:59,800 --> 00:42:02,800

The laws of physics dictate that it is not possible

755

00:42:02,800 --> 00:42:05,800

and we have proven that and we've proven how they actually did it.

756

00:42:05,800 --> 00:42:09,800

There it is! It is totally flying!

757

00:42:09,800 --> 00:42:12,800

Oh, they're getting tired.

758

00:42:12,800 --> 00:42:14,800

So, let's chop one up for critical thinking.

759

00:42:14,800 --> 00:42:16,800

I think we put this one to bed.

760

00:42:16,800 --> 00:42:19,800

That looked just like what we saw in the video.

761

00:42:19,800 --> 00:42:22,800

It did. I think that's exactly how they did it.

762

00:42:22,800 --> 00:42:24,800

Well, it just goes to show.

763

00:42:24,800 --> 00:42:26,800

Don't believe everything you see, huh?

764

00:42:26,800 --> 00:42:28,800

Exactly.

765

00:42:28,800 --> 00:42:31,800

Did you know that mead is made out of honey?

766

00:42:31,800 --> 00:42:33,800

I did not. I've never tried it.

767

00:42:33,800 --> 00:42:36,800

You should. You'll get a little buzz off of it.

768

00:42:36,800 --> 00:42:38,800

Ha ha ha!