1

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

Please, don't try anything that you're about to see us do at home. Ever.

2

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

Oh, learning every minute.

3

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

That you can't make a concrete glider fly.

4

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

This thing was done.

5

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

Who are the Myth Busters?

6

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

Adam Savage.

7

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

Answer all over my head, man.

8

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

And Jamie Heidemann.

9

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

Between them more than 30 years of special effects experience.

10

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

That was heavy.

11

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

Joining them, Grant Imahara.

12

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

Go get him, boy.

13

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

Tori Belachie.

14

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

Somebody order some exploding pants.

15

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

And Carrie Byron.

16

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

They don't just tell the myths.

17

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

They put them to the test.

18

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

So, Grant, you take the train a lot.

19

00:01:24,000 --> 00:01:26,000

Which is kind of weird because most people drive or take planes.

20

00:01:26,000 --> 00:01:28,000

I like the train.

21

00:01:28,000 --> 00:01:30,000

That's cool.

22

00:01:30,000 --> 00:01:36,000

But, you know, there's this one myth, though, that if you stand too close to a passing train, it can create suction and pull you into the train.

23

00:01:36,000 --> 00:01:38,000

There is a yellow line to help protect you.

24

00:01:38,000 --> 00:01:40,000

So maybe that has something to do with it.

25

00:01:42,000 --> 00:01:46,000

This urban folklore conjures up every commuter's worst nightmare.

26

00:01:46,000 --> 00:01:54,000

Can the air pressure caused by a fast-moving train actually suck a person right off the platform and onto the rails?

27

00:01:56,000 --> 00:02:00,000

I have an original idea. Let's start in the small scale.

28

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

Let's go find a model train and build a wind tunnel and do some testing to see if you actually even have any suction.

29

00:02:05,000 --> 00:02:11,000

The first order of business is to set up a wind tunnel and blow some smoke across a model train.

30

00:02:11,000 --> 00:02:18,000

So while Grant huffs and puffs putting the wind tunnel together, Tori and Carrie get to go model shopping.

31

00:02:19,000 --> 00:02:29,000

At San Antonio Hobby, Frank the train man has everything the guys need and he's got some positive news for the myth.

32

00:02:29,000 --> 00:02:36,000

If you stand too close to a train and it's going fast enough, it can suck you under.

33

00:02:36,000 --> 00:02:42,000

There's no better way of finding your inner child than stalking the aisles of a hobby store.

34

00:02:42,000 --> 00:02:47,000

Let go of the trains. Let go of the trains, honey.

35

00:02:47,000 --> 00:02:51,000

Remember the golden rule. What's that? You never have too many trains.

36

00:02:51,000 --> 00:03:02,000

Before the guys derail this sequence completely, a timely phone call from station master Grant gets everything back on track.

37

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

Hello. Hey, Grant, what's going on?

38

00:03:06,000 --> 00:03:11,000

Hey, I've been reading up on the research and I have some new information for you.

39

00:03:11,000 --> 00:03:16,000

A freight train, it's got a much rougher aerodynamic profile than a passenger train.

40

00:03:16,000 --> 00:03:24,000

A passenger train is pretty smooth and that can generate a higher slipstream at half the speed of a passenger train.

41

00:03:24,000 --> 00:03:29,000

So according to Grant, odd shaped freight cars might be the best bet.

42

00:03:29,000 --> 00:03:35,000

But as the myth is all about an unsuspecting commuter, they take home a passenger train as well.

43

00:03:35,000 --> 00:03:39,000

Man down. Man down.

44

00:03:39,000 --> 00:03:45,000

Back at Grant Central Station, our station master is busy making a wind tunnel.

45

00:03:45,000 --> 00:03:49,000

And using a NASA inspired idea, it's a breeze.

46

00:03:49,000 --> 00:03:54,000

What they use in regular commercial wind tunnels is a honeycomb.

47

00:03:54,000 --> 00:03:58,000

It's many densely packed small holes.

48

00:03:58,000 --> 00:04:03,000

These holes reduce turbulence from the wind source and smooth out the airflow.

49

00:04:03,000 --> 00:04:10,000

And check out the big brain on Grant because he's found a cut price substitute for high-tech honeycomb.

50

00:04:10,000 --> 00:04:14,000

Drinking straws, 47,000 of them.

51

00:04:14,000 --> 00:04:18,000

And with the wind tunnel ready to blow, it's time to get set for the test.

52

00:04:18,000 --> 00:04:21,000

But what are they looking for?

53

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

There are three areas that we're going to be looking at.

54

00:04:24,000 --> 00:04:27,000

There's a high pressure zone right in front of the train at the nose,

55

00:04:27,000 --> 00:04:31,000

the slipstream which is a thin layer of air going over the sides,

56

00:04:31,000 --> 00:04:35,000

and then right at the back of the train, a low pressure area called the wake.

57

00:04:35,000 --> 00:04:39,000

Hopefully with this, we'll be able to see smoke swirling around at the back

58

00:04:39,000 --> 00:04:43,000

which would tell us that it's getting sucked into there.

59

00:04:43,000 --> 00:04:46,000

So Grant thinks the wake is the key to this myth.

60

00:04:46,000 --> 00:04:51,000

Could this swirling ultra low pressure vortex, kind of a mini tornado,

61

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

be powerful enough to pull someone off their feet and onto the rail?

62

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

Tori, for this first test, do you want to turn the wind on?

63

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

And Grant, you could be the scout.

64

00:05:02,000 --> 00:05:04,000

I'll turn on the smoke.

65

00:05:04,000 --> 00:05:08,000

The team's wind tunnel works a treat, so testing proceeds.

66

00:05:08,000 --> 00:05:11,000

First, with a passenger car.

67

00:05:11,000 --> 00:05:13,000

Right there! Little cyclone!

68

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

That's good. See the little vortex.

69

00:05:15,000 --> 00:05:21,000

And then the odd shaped freight cars, which, like Grant suggested, appear to cause more turbulence.

70

00:05:21,000 --> 00:05:24,000

We're getting a lot of vortex at the end here.

71

00:05:24,000 --> 00:05:28,000

It's tough to see it in real time, but the high speed camera confirms

72

00:05:28,000 --> 00:05:31,000

what our three sets of eagle eyes suspected.

73

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

The small scale trains really do suck.

74

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

You still have a little collection of smoke right behind the train.

75

00:05:38,000 --> 00:05:40,000

And that's exactly what we're looking for.

76

00:05:40,000 --> 00:05:41,000

Yeah.

77

00:05:41,000 --> 00:05:44,000

That's a green light to proceed to the next station.

78

00:05:44,000 --> 00:05:46,000

And Carrie for one is excited.

79

00:05:46,000 --> 00:05:52,000

We need full scales, full winds, full sized people getting sucked into the train.

80

00:05:52,000 --> 00:05:54,000

That's going to be so cool!

81

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

Concrete glider.

82

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

The classic engineering school challenge.

83

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

You can't make a lead balloon.

84

00:06:10,000 --> 00:06:12,000

You cannot make a glider out of concrete.

85

00:06:12,000 --> 00:06:16,000

That's it. Somehow we've got to build a glider out of concrete.

86

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

Adam and Jamie are on familiar ground

87

00:06:19,000 --> 00:06:23,000

when it comes to taking off with crazy contraptions.

88

00:06:23,000 --> 00:06:25,000

Pile of debaucherd, pile of debaucherd, do you read over?

89

00:06:25,000 --> 00:06:29,000

The Mythbusters have attempted to get airborne with a jet pack.

90

00:06:29,000 --> 00:06:31,000

It really is ridiculous.

91

00:06:31,000 --> 00:06:35,000

Launch Jade the Simulate into the bay with bottle rockets.

92

00:06:35,000 --> 00:06:38,000

Three, two, one!

93

00:06:40,000 --> 00:06:44,000

And take Adam on a helium life raft ride.

94

00:06:44,000 --> 00:06:48,000

Oh, it's very satisfying.

95

00:06:48,000 --> 00:06:50,000

I shouldn't do that.

96

00:06:50,000 --> 00:06:53,000

But this time, its mission seemingly impossible.

97

00:06:53,000 --> 00:06:58,000

Can our intrepid duo conquer the skies with a concrete glider?

98

00:06:58,000 --> 00:07:02,000

How are we going to get around the fact that concrete, to my knowledge,

99

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

always has rocks and gravel in it that's going to make it really hard to make a glider out of?

100

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

Well, the key component in concrete is Portland cement.

101

00:07:11,000 --> 00:07:15,000

The gravel and sand and things like that can be substituted for other things

102

00:07:15,000 --> 00:07:18,000

and some of them are a lot lighter weight.

103

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

So, I mean, we should actually just do a bunch of testing first of all,

104

00:07:21,000 --> 00:07:24,000

mix up some concrete mixes that use lighter weight aggregates

105

00:07:24,000 --> 00:07:28,000

and see if we can actually lose a lot of that heavy weight.

106

00:07:28,000 --> 00:07:34,000

So first off, they're going to learn how to lighten up their heavy weight building material.

107

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

This is a standard concrete mix.

108

00:07:37,000 --> 00:07:42,000

It's one part cement, two parts sand and three parts gravel.

109

00:07:42,000 --> 00:07:48,000

In addition to the standard mix, Jamie makes up three more with various lightweight aggregates.

110

00:07:48,000 --> 00:07:52,000

Beanbag foam beads, pumice,

111

00:07:52,000 --> 00:07:59,000

and lastly, a material made up of tiny glass beads called micro balloons.

112

00:07:59,000 --> 00:08:01,000

Now they just have to let it sit.

113

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

And because watching concrete dry ain't exactly Emmy award-winning material,

114

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

let's come back when that's done.

115

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

After the break, Jamie and Adam meet up right spark from NASA

116

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

and he fires them up with some good news.

117

00:08:16,000 --> 00:08:18,000

I'll bet you can make a concrete glider.

118

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

Fly.

119

00:08:27,000 --> 00:08:28,000

Concrete.

120

00:08:28,000 --> 00:08:31,000

With six billion cubic meters made every year,

121

00:08:31,000 --> 00:08:35,000

it's the most common man-made substance on the planet.

122

00:08:35,000 --> 00:08:40,000

Buildings, bridges, and freeways are all made of this ubiquitous material.

123

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

But the question is, can you use it to make a glider?

124

00:08:43,000 --> 00:08:45,000

And will it fly?

125

00:08:45,000 --> 00:08:51,000

For answers, Adam and Jamie have come to Moffitt Field NASA Ames Research Center

126

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

for a crash course in aerodynamics.

127

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

And glider guru Dr. Steve Smith has some good news.

128

00:08:58,000 --> 00:09:01,000

I'll bet you can make a concrete glider.

129

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

The whole question is wait.

130

00:09:03,000 --> 00:09:07,000

So if you build a concrete glider with some reinforcing structure inside

131

00:09:07,000 --> 00:09:11,000

and a lot of filler so that the concrete plus all the other stuff is still pretty light,

132

00:09:11,000 --> 00:09:16,000

then of course the speed required to fly to make enough lift to support its weight will come down.

133

00:09:16,000 --> 00:09:20,000

And you may get down slow into the typical range that modern sailplanes fly.

134

00:09:20,000 --> 00:09:23,000

Have you ever heard of a glider being made out of concrete?

135

00:09:23,000 --> 00:09:28,000

So actually, yeah, the Germans experimented with a concrete winged glider in World War II

136

00:09:28,000 --> 00:09:30,000

to be used as a glide bomb.

137

00:09:30,000 --> 00:09:35,000

I think it had some kind of a steel core, steel structure inside for structural strength,

138

00:09:35,000 --> 00:09:39,000

but they basically used concrete as a very cheap, quick way to form a wing shape around it.

139

00:09:39,000 --> 00:09:44,000

There is definitely a lot of food for thought that we got from Dr. Smith here.

140

00:09:44,000 --> 00:09:51,000

I thought this was totally ridiculous, and I thought maybe we'd get something that would fall less hard.

141

00:09:51,000 --> 00:09:58,000

But the information we got here says that we ought to be able to make something that's actually fairly respectable

142

00:09:58,000 --> 00:10:02,000

as aerodynamic and made out of concrete.

143

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

Back at the shop, and the concrete is ready for the weigh-in.

144

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

And no one is surprised when the standard concrete, the one with the rocks in it,

145

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

is heavier than the alternative aggregate.

146

00:10:14,000 --> 00:10:18,000

Based on this first test, there's some pretty impressive variances in the weight.

147

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

Everything from foam beads at 68 pounds up to concrete at 115.

148

00:10:22,000 --> 00:10:26,000

It looks like we'll be able to come up with a mixture that might be light enough.

149

00:10:26,000 --> 00:10:30,000

The question is, can it stand up to the type of pressures we're going to put it under?

150

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

We're going to have to do some strength testing.

151

00:10:33,000 --> 00:10:38,000

In other words, they need to beef up their lightweight concrete recipe with some muscle.

152

00:10:38,000 --> 00:10:42,000

The single biggest problem with the concrete glider is the concrete.

153

00:10:42,000 --> 00:10:47,000

Concrete has compressive strength, but no tensile strength,

154

00:10:47,000 --> 00:10:50,000

which means you can put a block of it down on the ground.

155

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

You can sit hundreds of thousands of pounds on that block, and it won't crush.

156

00:10:54,000 --> 00:10:58,000

But you can make a thin sheet of it, push it through with your finger, and it'll crack.

157

00:10:58,000 --> 00:11:02,000

So we're going to need to look at ways to strengthen the concrete.

158

00:11:02,000 --> 00:11:06,000

And one of the ways is with an additive material

159

00:11:06,000 --> 00:11:10,000

that adds a structure inside the concrete that makes it more flexible

160

00:11:10,000 --> 00:11:14,000

and more prone to bending without breaking.

161

00:11:14,000 --> 00:11:20,000

So Adam and Jamie need to know which concrete reinforcers work best in thin slabs.

162

00:11:20,000 --> 00:11:26,000

And they cast up several, including carbon fiber mesh and pre-stressed cables.

163

00:11:26,000 --> 00:11:33,000

After leaving them to cure, Jamie is ready to test their tensile strength with his trusty force gauge.

164

00:11:33,000 --> 00:11:37,000

Okay, so this is cable reinforcement.

165

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

Ooh, very significant.

166

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

We tested four different types of reinforcements.

167

00:11:44,000 --> 00:11:49,000

Each of those increased the strength to some degree on the concrete samples.

168

00:11:49,000 --> 00:11:53,000

The standout was the cable reinforcement.

169

00:11:53,000 --> 00:11:57,000

So Adam and Jamie have some concrete information,

170

00:11:57,000 --> 00:12:01,000

and they've passed Aerodynamics 101 with flying colors.

171

00:12:01,000 --> 00:12:04,000

It's time to get started on the build.

172

00:12:04,000 --> 00:12:07,000

So I don't know if you've heard, but we're going to do this as a build-off.

173

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

I hate build-offs.

174

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

I know you hate the build-offs, but look at it this way.

175

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

While we might be able to make a more successful concrete glider working together,

176

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

working separately, we're going to illustrate two completely different ways of solving the problem

177

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

and cover a lot more ground.

178

00:12:22,000 --> 00:12:24,000

Whatever.

179

00:12:24,000 --> 00:12:31,000

Ah, the pointless competition, sold up by fans, so hated by the Mythbusters.

180

00:12:31,000 --> 00:12:34,000

Adam hates losing, which happens a lot.

181

00:12:34,000 --> 00:12:36,000

I'm going to kick your goldfish ass.

182

00:12:36,000 --> 00:12:42,000

And Jamie, well, there's nothing about these head-to-head contests he enjoys, except the cheating.

183

00:12:42,000 --> 00:12:48,000

Which is why Adam is insisting on guidelines set in, well, set in concrete.

184

00:12:48,000 --> 00:12:51,000

There must be total secrecy.

185

00:12:51,000 --> 00:12:54,000

The glider can be built to any scale.

186

00:12:54,000 --> 00:12:59,000

And the winner will be determined by who achieves the longest relative flight.

187

00:12:59,000 --> 00:13:03,000

So let's hear from competition scrooge Jamie, who he thinks will win.

188

00:13:03,000 --> 00:13:06,000

I have no idea who's going to win, and I don't care.

189

00:13:06,000 --> 00:13:08,000

Bah, humbug.

190

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

Coming up, the train suction story puts Tori in the firing line.

191

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

Ha, ha, ha, ha, ha.

192

00:13:15,000 --> 00:13:19,000

And Jamie and Adam continue their crash course in gliding.

193

00:13:28,000 --> 00:13:35,000

We're back on track with the tall tale that a passing train could make your day really suck.

194

00:13:36,000 --> 00:13:42,000

The story so far has seen Carrie Grant and Tori testing toy trains in a wind tunnel.

195

00:13:42,000 --> 00:13:45,000

And the results mean they can move on to the next chapter.

196

00:13:45,000 --> 00:13:47,000

Well, that was really interesting.

197

00:13:47,000 --> 00:13:49,000

It looks like we do have some suction.

198

00:13:49,000 --> 00:13:53,000

The small scale test definitely showed some smoke vortex at the end of the model trains.

199

00:13:53,000 --> 00:13:59,000

I guess the real question now is, is that enough suction to pull you off into the tracks?

200

00:13:59,000 --> 00:14:04,000

Well, I mean, now we need to go to full scale, and we still haven't found anybody who's willing to let us use their train.

201

00:14:04,000 --> 00:14:07,000

So any ideas how we're going to test this one?

202

00:14:07,000 --> 00:14:08,000

I got an idea.

203

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

I think we should get out the chicken cannon and set that up and choose one of us as a test subject.

204

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

Not it.

205

00:14:15,000 --> 00:14:16,000

Period, random, not it.

206

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

And then see what effect the increased wind speed has on our bodies.

207

00:14:24,000 --> 00:14:28,000

So let's dust off the Mythbusters favorite.

208

00:14:28,000 --> 00:14:30,000

Why do you have the chicken cannon out?

209

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

Because we're going to start shooting each other with it.

210

00:14:33,000 --> 00:14:39,000

It was first used to test if a stray, high flying bird could crash through an airplane canopy.

211

00:14:39,000 --> 00:14:42,000

It's a frozen chicken.

212

00:14:42,000 --> 00:14:44,000

And this is no toy.

213

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

You're watching frozen poultry propelled at 121 miles per hour.

214

00:14:52,000 --> 00:14:53,000

Wow!

215

00:14:53,000 --> 00:14:59,000

But on this test, the only chicken inside is nervously shuffling his feet at the business end of the barrel.

216

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

I don't think it's going to push me over, but then I've been wrong before.

217

00:15:05,000 --> 00:15:08,000

Now remember, they're not just doing this for fun.

218

00:15:08,000 --> 00:15:13,000

If they can work out what kind of wind speed and air pressure knocks Tori off his feet,

219

00:15:13,000 --> 00:15:18,000

they'll have some data to crunch when they get to play with a full-sized train.

220

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

We're just going to send Tori just straight into the fence behind us.

221

00:15:21,000 --> 00:15:23,000

That'd be cool.

222

00:15:23,000 --> 00:15:25,000

You're the crash-ass dummy after Buster.

223

00:15:26,000 --> 00:15:33,000

Because he's not as easy to repair as Buster, on their first test, they're starting at just 30 psi.

224

00:15:33,000 --> 00:15:38,000

And to measure the wind speed, Grant has a handy little device called an anomometer.

225

00:15:38,000 --> 00:15:45,000

What we're going to do is set Tori up just as if he were standing on a railway platform waiting for a train.

226

00:15:45,000 --> 00:15:48,000

So in other words, he's not going to be braced and ready to be hit.

227

00:15:48,000 --> 00:15:52,000

He's just going to be standing on his feet just like anyone would be standing.

228

00:15:53,000 --> 00:15:58,000

Tori plucks up all his courage, checks the newspaper for great deals on health insurance,

229

00:15:58,000 --> 00:16:01,000

and tries not to brace for the blast.

230

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

I hear funny noises. It must be the train.

231

00:16:13,000 --> 00:16:20,000

The 30 psi gust rustles up a wind speed of 24 miles per hour, and Tori is slightly unbalanced.

232

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

Now the guys want to ramp it up and see what it takes to suck you off the platform.

233

00:16:32,000 --> 00:16:39,000

Adam and Jamie are not only taking on the myth that you can't make a glider out of concrete, they're flying solo.

234

00:16:40,000 --> 00:16:49,000

So what I'm going to do is buy a model glider kit, and I'm going to add weight to it until it just barely achieves what I need it to achieve.

235

00:16:49,000 --> 00:16:55,000

And then I will use that kit either as a mold or a guide for creating a concrete airplane.

236

00:16:56,000 --> 00:16:59,000

Remember the real state they can build on any scale.

237

00:17:00,000 --> 00:17:04,000

So Jamie goes shopping for a toy glider to use as a mold.

238

00:17:04,000 --> 00:17:10,000

This type of airplane right here has the most exceptional lift to it, much stronger material.

239

00:17:10,000 --> 00:17:18,000

Jamie selects two to test with. The first is a stealth bomber model that has excellent lift, but is extremely unstable.

240

00:17:19,000 --> 00:17:28,000

And the second is a U2 spy plane, which with its glider like wings also has great lift, but is less sensitive.

241

00:17:28,000 --> 00:17:37,000

Back at M5 and while Jamie is using pragmatic shortcuts, Adam is taking a more intuitive approach. Basically, he's going to wing it.

242

00:17:37,000 --> 00:17:43,000

Trying to come up with a visceral understanding of exactly what it takes to make something fly.

243

00:17:43,000 --> 00:17:49,000

I don't just want to follow someone else's design and then have it screw up on me because while I just followed someone else's design.

244

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

Incredibly, Adam's make it up as you go along approach seems to be working.

245

00:17:54,000 --> 00:17:57,000

That's cool. Right there. That's cool.

246

00:17:57,000 --> 00:18:07,000

I'm going to do some actual like almost kite tests with this just to try and figure out how this kind of size of glider might work.

247

00:18:07,000 --> 00:18:11,000

I'm trying to learn all about everything I need to know within a day.

248

00:18:13,000 --> 00:18:19,000

Okay. Learning every minute.

249

00:18:19,000 --> 00:18:26,000

It's a learning curve of precipitous proportions, but the addition of a tail fin provides some stability.

250

00:18:26,000 --> 00:18:28,000

Addy seems pretty happy.

251

00:18:31,000 --> 00:18:33,000

That's good. That's a good test.

252

00:18:33,000 --> 00:18:36,000

Which means it's time to move on.

253

00:18:36,000 --> 00:18:41,000

I want to do a little more research. I might want to rebuild this thing in wood just to try the design out.

254

00:18:41,000 --> 00:18:45,000

Still not quite as heavy as the concrete.

255

00:18:45,000 --> 00:18:50,000

But if the wood flies, then I don't see any reason why the concrete shouldn't be able to.

256

00:18:53,000 --> 00:18:57,000

Now that looks like a crash and burn.

257

00:18:57,000 --> 00:18:59,000

That was about a one to one glide ratio.

258

00:18:59,000 --> 00:19:05,000

Like it fell about, it looks about 25 feet away.

259

00:19:05,000 --> 00:19:07,000

It's about how high I am.

260

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

And that was still a little bit lighter than the concrete will be.

261

00:19:11,000 --> 00:19:18,000

And with take two no better, it looks like it's time for the Mythbuster patented Plan B.

262

00:19:18,000 --> 00:19:24,000

So if I had built a concrete airplane this size, I mean it would be known as a rock.

263

00:19:24,000 --> 00:19:30,000

I'm going to need to scale back. Back. Smaller.

264

00:19:30,000 --> 00:19:32,000

To try and get something successful.

265

00:19:33,000 --> 00:19:38,000

Meanwhile, Jamie has spent an hour rigorously testing his shop bought model gliders.

266

00:19:38,000 --> 00:19:40,000

Okay, that was a good test.

267

00:19:40,000 --> 00:19:48,000

And he's pretty sure a hybrid of the stealth bomber wing with the fuselage of the U2 bomber is the best flyer.

268

00:19:48,000 --> 00:19:53,000

Well, it looks like this wing design is the winner.

269

00:19:53,000 --> 00:19:57,000

Next, Jamie weighs down the model to see what the maximum payload is.

270

00:19:58,000 --> 00:20:04,000

Well, based on this test, I believe this is about the maximum that I could go.

271

00:20:04,000 --> 00:20:09,000

I think I should be under this, but definitely no more than this.

272

00:20:09,000 --> 00:20:17,000

I'm going to go ahead and weigh this now and we'll see what kind of volume of concrete that translates to.

273

00:20:17,000 --> 00:20:23,000

So according to Jamie, if he can make this glider out of concrete and keep it to less than 800 grams,

274

00:20:24,000 --> 00:20:27,000

he might just get this myth off the ground.

275

00:20:27,000 --> 00:20:33,000

Up next, Karrion Grant find another dummy for their train suction tests.

276

00:20:33,000 --> 00:20:38,000

And our concrete aviators get a heavy reality check.

277

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

This thing weighs a ton.

278

00:20:45,000 --> 00:20:50,000

Hey, don't try what you're about to see at home. We're what you call experts.

279

00:20:50,000 --> 00:20:52,000

That's right. We do this for a living.

280

00:20:54,000 --> 00:21:00,000

Millions of us commute by train every day.

281

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

So is it possible we're just one step away from disaster?

282

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

And if a fast moving train can really suck you off the platform,

283

00:21:09,000 --> 00:21:16,000

the next generation of super trains traveling at 223 miles per hour could be lethal.

284

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

Putting his body on the line for the myth, Tari has discovered a blast of air at 30 psi,

285

00:21:23,000 --> 00:21:29,000

which generates a wind speed of 24 miles per hour, won't knock you off your feet.

286

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

Oh, nothing. Let's do 100 psi.

287

00:21:34,000 --> 00:21:36,000

Tari, how about 50 psi?

288

00:21:37,000 --> 00:21:38,000

We'll feed you.

289

00:21:41,000 --> 00:21:42,000

Oh dang.

290

00:21:42,000 --> 00:21:47,000

It blew my cover off.

291

00:21:47,000 --> 00:21:50,000

Whoa, that was sweet.

292

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

Tari's still standing, but only just.

293

00:21:54,000 --> 00:21:56,000

It didn't knock you over on your butt though.

294

00:21:56,000 --> 00:21:58,000

No, but it definitely knocked me back.

295

00:21:58,000 --> 00:22:03,000

That 50 psi shot of air notched up a wind speed of 46 miles per hour,

296

00:22:03,000 --> 00:22:06,000

and Tari struggled to stay standing.

297

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

It looks like the team have their knockout numbers.

298

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

So really the indication, if your paper shreds when the train passes,

299

00:22:15,000 --> 00:22:17,000

you're standing too close.

300

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

But the big question is yet to be answered.

301

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

Can a full scale train generate that kind of wind speed in reverse?

302

00:22:27,000 --> 00:22:32,000

Will the wake at the rear of the train suck at 46 miles per hour?

303

00:22:34,000 --> 00:22:38,000

Fortunately for Tari, he won't be the one standing on the platform to find out.

304

00:22:40,000 --> 00:22:44,000

That job goes to Buster's Ballistics Gel Brother, Ted.

305

00:22:44,000 --> 00:22:47,000

Our fall guy needs to be as life-like as possible.

306

00:22:47,000 --> 00:22:51,000

That means building a rigid frame to support the legs,

307

00:22:51,000 --> 00:22:54,000

and gel coated ropes to bolster the arms.

308

00:22:55,000 --> 00:22:59,000

This is the ballistic material, and I've coated a piece of rope.

309

00:22:59,000 --> 00:23:04,000

And this is just so that when we pull it out, the arms don't just rip off the body.

310

00:23:04,000 --> 00:23:09,000

Once Ted pulls himself together, he gets filled up from the neck down.

311

00:23:09,000 --> 00:23:16,000

Tari pours in enough Ballistics Gel to fatten up our mannequin to a healthy 200 pounds.

312

00:23:16,000 --> 00:23:22,000

Big enough to prove almost anyone could be sucked off a railway platform to a grisly death.

313

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

Yeah, that's kind of weird-looking, huh?

314

00:23:25,000 --> 00:23:28,000

The way in confirms he's in fighting shape.

315

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

207 pounds, he's a big boy.

316

00:23:31,000 --> 00:23:32,000

It's all muscle.

317

00:23:32,000 --> 00:23:33,000

Yeah.

318

00:23:33,000 --> 00:23:34,000

Okay.

319

00:23:34,000 --> 00:23:37,000

Now all Ted needs is to get ahead.

320

00:23:43,000 --> 00:23:47,000

Modern gliders or sail planes make it look so easy.

321

00:23:47,000 --> 00:23:55,000

Their state-of-the-art designs and space-age materials contribute to incredible glide ratios of over 40 to 1.

322

00:23:55,000 --> 00:24:00,000

That's 40 miles of travel to one mile of vertical drop.

323

00:24:01,000 --> 00:24:08,000

Adam and Jamie have got the tough job of trying to recreate that effortless flight with a glider made of concrete.

324

00:24:08,000 --> 00:24:11,000

So far, Jamie's having some success.

325

00:24:11,000 --> 00:24:20,000

He's made a mold from his toy glider and carefully mixed cement, sand, fiberglass, and water into paper-thin wing sections.

326

00:24:21,000 --> 00:24:25,000

And the fresh concrete mix is almost ready for curing.

327

00:24:25,000 --> 00:24:27,000

Jamie may be up, up and away.

328

00:24:27,000 --> 00:24:29,000

I don't know how to build airplanes.

329

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

But Adam is still grounded.

330

00:24:31,000 --> 00:24:42,000

So I looked into the origins of the glider and I come across Kaley and his proto-original coachman carrying glider.

331

00:24:42,000 --> 00:24:46,000

Kaley was an amazing aeronautical experimentalist.

332

00:24:46,000 --> 00:24:54,000

He died, I think, in the mid-1850s, years before the Wright Brothers' first flight with a powered airplane.

333

00:24:54,000 --> 00:24:56,000

So Adam finally has a design.

334

00:24:56,000 --> 00:24:58,000

Now he's got some catching up to do.

335

00:24:58,000 --> 00:25:05,000

Well, now I've got to draw out the pattern on this foam and then I've got to start sanding and sculpting it.

336

00:25:05,000 --> 00:25:10,000

With the mold ready to go, Adam lays out carbon fiber mesh for strength.

337

00:25:11,000 --> 00:25:16,000

And then he casts his lightweight concrete mix onto the foam mold.

338

00:25:17,000 --> 00:25:21,000

And like Jamie, it's just a question of getting his concrete glider to cure.

339

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

But this being Mythbusters, time is of the essence.

340

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

I am prepping my mold to hopefully set faster than 28 days, which is the recommended setting time for this concrete.

341

00:25:36,000 --> 00:25:42,000

Keeping the concrete moist in a warm environment is as much as they can do to encourage the curing process.

342

00:25:42,000 --> 00:25:48,000

Concrete sets in hours, but curing is a chemical process that takes weeks.

343

00:25:49,000 --> 00:25:53,000

Jamie is first to find out if their accelerated curing technique has worked.

344

00:25:53,000 --> 00:25:56,000

That's got to be about the thinnest piece of concrete you ever saw.

345

00:25:57,000 --> 00:26:05,000

So far, so good. But as he assembles the wing sections, Jamie finds he has a weightier problem than the curing process.

346

00:26:05,000 --> 00:26:09,000

His maximum weight of 800 grams has been busted.

347

00:26:09,000 --> 00:26:20,000

Right now it weighs about 1300 grams, which is about twice what it needs to weigh for it to be in the worst case scenario where it just barely is flying.

348

00:26:20,000 --> 00:26:27,000

This was originally just the bottom section, not a very structural part of the original wing.

349

00:26:27,000 --> 00:26:32,000

But seeing as how it was so overweight, now this becomes the actual wing itself.

350

00:26:32,000 --> 00:26:36,000

By putting a little bend in it, I think we'll get to the same place.

351

00:26:37,000 --> 00:26:41,000

With the weight problem taken care of, assembly begins.

352

00:26:41,000 --> 00:26:47,000

With Jamie on the runway and ready for takeoff, let's find out how his wingman Adam is doing.

353

00:26:47,000 --> 00:26:50,000

That's good. I've got some hopes for this.

354

00:26:50,000 --> 00:26:54,000

With the Cayley glider set, it's time to release it from the mold.

355

00:26:54,000 --> 00:26:59,000

And using an old model maker's trick, Adam dissolves the foam with acetone.

356

00:26:59,000 --> 00:27:02,000

But now he's got an issue with excess baggage.

357

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

This thing weighs a ton.

358

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

I don't have a target weight. Just super crazy light was what I was hoping for.

359

00:27:11,000 --> 00:27:17,000

I got a bit of work pulling out as much weight as I can.

360

00:27:17,000 --> 00:27:25,000

So to get the Cayley glider down to a reasonable flying weight, Adam and his angle grinder have got a long day ahead.

361

00:27:25,000 --> 00:27:30,000

After the break, find out if Ted takes a tumble onto the train tracks.

362

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

That was awesome!

363

00:27:32,000 --> 00:27:36,000

Then Adam and Jamie square up for a showdown.

364

00:27:36,000 --> 00:27:39,000

This thing is going to drop like a stone when he lets it go.

365

00:27:41,000 --> 00:27:47,000

Our team of train spotters have tested toy trains for turbulence.

366

00:27:47,000 --> 00:27:53,000

They've toppled Torrey with a tug of war and turned him into chicken cannon fodder.

367

00:27:53,000 --> 00:27:58,000

It's time to take this test to the full scale.

368

00:27:58,000 --> 00:28:03,000

After months of searching, our researchers have found a railroad in Albuquerque, New Mexico

369

00:28:03,000 --> 00:28:06,000

that's willing to give it up for science.

370

00:28:06,000 --> 00:28:13,000

I was very pessimistic about this myth until I saw the size of this train. It's huge.

371

00:28:13,000 --> 00:28:16,000

I can't believe anybody's going to give us something this big to play with.

372

00:28:16,000 --> 00:28:19,000

I could see this actually being true.

373

00:28:19,000 --> 00:28:24,000

If Ted could speak, he'd probably be screaming, why me?

374

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

But Misery truly does love company and he won't be alone out there.

375

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

Something else we'd like to try today.

376

00:28:30,000 --> 00:28:32,000

We brought a baby stroller with us.

377

00:28:32,000 --> 00:28:37,000

It's not part of the myth, but train-travelling parents often have their stroller with them.

378

00:28:37,000 --> 00:28:43,000

And because it's on wheels, the guys think it will help illustrate the suction effect.

379

00:28:43,000 --> 00:28:50,000

The stroller may get pulled off the platform, even if Ted and his 200 pounds are unmoved.

380

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

Now his back wants to be to the train. It's like he's got a headphone on.

381

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

He's listening to music. He doesn't know the train's coming. Okay.

382

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

The expression of the train is a little bit different.

383

00:28:59,000 --> 00:29:01,000

He doesn't know the train's coming. Okay.

384

00:29:01,000 --> 00:29:05,000

The expression says it all. Ted ain't exactly confident,

385

00:29:05,000 --> 00:29:08,000

but Tari thinks his chances of survival are good.

386

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

My feeling is the train is going to go through. There's probably going to be a lot of rumbling.

387

00:29:12,000 --> 00:29:18,000

It might knock the dummy over, but I don't think the suction is actually going to be strong enough to pull the dummy in.

388

00:29:18,000 --> 00:29:25,000

The last thing to do before the potentially lethal drive-by is to set up Grant's wind speed gauges.

389

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

With that done, it's time to set this test in motion.

390

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

Three miles away, Robert set his train a rolling,

391

00:29:33,000 --> 00:29:38,000

slowly building up to the legal speed limit of 79 miles per hour.

392

00:29:38,000 --> 00:29:40,000

Should be here any second.

393

00:29:40,000 --> 00:29:46,000

Music

394

00:29:46,000 --> 00:29:54,000

Music

395

00:29:54,000 --> 00:29:57,000

That was awesome!

396

00:29:57,000 --> 00:30:02,000

That was intense. Ted's been tipped sideways, and the strollers snapped its line.

397

00:30:02,000 --> 00:30:05,000

In fact, it's taken out a camera.

398

00:30:05,000 --> 00:30:11,000

So the stroller, the line snapped. It got pushed so hard.

399

00:30:11,000 --> 00:30:13,000

Are you serious? That way.

400

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

Oh, jeez.

401

00:30:15,000 --> 00:30:20,000

So any mom that has her stroller that close to the train?

402

00:30:20,000 --> 00:30:24,000

Was it suction or was it more just the gust of air that pushed him over?

403

00:30:24,000 --> 00:30:28,000

With so much happening so quickly, it's difficult to tell what's going on,

404

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

but the replay seems to indicate the stroller being blown along the platform.

405

00:30:33,000 --> 00:30:37,000

And there's no sign of Ted getting sucked onto the tracks.

406

00:30:37,000 --> 00:30:41,000

Music

407

00:30:41,000 --> 00:30:48,000

The myth of the concrete glider has brought Adam and Jamie head-to-head in an aviation dogfight.

408

00:30:48,000 --> 00:30:52,000

And to find out who's going to be top gun and who's going to be the goose,

409

00:30:52,000 --> 00:30:56,000

it's time to get a visual on the enemy bogey.

410

00:30:56,000 --> 00:30:58,000

Ta-da!

411

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

Well, it looks like something right out of Leonardo's day.

412

00:31:02,000 --> 00:31:05,000

It's actually modeled on Caylee's glider.

413

00:31:05,000 --> 00:31:10,000

It is, in fact, his most successful glider that carried a person,

414

00:31:10,000 --> 00:31:13,000

and it weighs a bloody ton.

415

00:31:13,000 --> 00:31:16,000

Music

416

00:31:16,000 --> 00:31:19,000

Yup, his thing is going to drop like a stone when he lets it go.

417

00:31:19,000 --> 00:31:24,000

I mean, you can see by the shape, it's not got very much lift involved.

418

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

You know, I'm guessing that it barely has any more lift than mine does.

419

00:31:29,000 --> 00:31:34,000

But yet it weighs several times as much, so I don't have a whole lot of hopes for it.

420

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

Let's see your fragile, wilting bird of a plane.

421

00:31:37,000 --> 00:31:38,000

Okay.

422

00:31:38,000 --> 00:31:40,000

It looks like a glider.

423

00:31:40,000 --> 00:31:44,000

I did testing on something that was a foam version of this.

424

00:31:44,000 --> 00:31:45,000

Yeah.

425

00:31:45,000 --> 00:31:51,000

And this is under the weight that I tested and still considered it to sail.

426

00:31:51,000 --> 00:31:52,000

And the weigh-in...

427

00:31:52,000 --> 00:31:55,000

In this corner, weighing in it.

428

00:31:55,000 --> 00:31:58,000

The scales confirm Adam's worst fears.

429

00:31:58,000 --> 00:32:03,000

At just over 600 grams, Jamie's wilting bird is a featherweight.

430

00:32:03,000 --> 00:32:05,000

This is basically concrete with a few pieces of string,

431

00:32:05,000 --> 00:32:10,000

and I think it's a fantastic attempt at foiling the myth

432

00:32:10,000 --> 00:32:13,000

that you can't make a glider out of concrete.

433

00:32:13,000 --> 00:32:17,000

Adam is next, and with over two kilos of Caylee glider,

434

00:32:17,000 --> 00:32:19,000

he's definitely in the heavyweight division.

435

00:32:19,000 --> 00:32:24,000

So with a heavy heart and glider, Adam has defeat firmly in his grasp.

436

00:32:24,000 --> 00:32:27,000

Let's set up a wind tunnel test so we can figure out how many different ways

437

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

you've probably beaten me in this contest.

438

00:32:30,000 --> 00:32:31,000

Okay.

439

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

Using Grant's drinking straw technique, Adam breezily whips up a wind tunnel.

440

00:32:38,000 --> 00:32:41,000

With the makeshift wind tunnel up and running,

441

00:32:41,000 --> 00:32:45,000

Adam and Jamie can measure their gliders lift-to-weight ratio.

442

00:32:45,000 --> 00:32:49,000

They'll do this by weighing the glider in front of the fan.

443

00:32:50,000 --> 00:32:54,000

Any lift their glider achieves will result in a weight reduction.

444

00:32:54,000 --> 00:32:59,000

Yeah, I'm seeing, on average, probably about, yeah,

445

00:32:59,000 --> 00:33:02,000

just about a max of 200 grams of lift there.

446

00:33:02,000 --> 00:33:09,000

By my best guess, my glider was receiving about 38% of its total weight in lift.

447

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

38% is impressive, with a decent launch speed that will increase,

448

00:33:14,000 --> 00:33:16,000

and it may just be enough.

449

00:33:17,000 --> 00:33:20,000

Next up is Adam's Kaylee glider.

450

00:33:20,000 --> 00:33:24,000

Well, it's nice that I can feel some lift, but this thing is heavy.

451

00:33:24,000 --> 00:33:27,000

His lift-to-weight ratio is well down on Jamie's.

452

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

It's only generating half as much lift.

453

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

Yeah, it spikes up to 350.

454

00:33:33,000 --> 00:33:37,000

My glider did not seem to perform as well as Jamie's.

455

00:33:37,000 --> 00:33:38,000

Actually, about half as well.

456

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

At this stage, Adam is thinking his heavyweight contender

457

00:33:42,000 --> 00:33:46,000

won't stand a chance against Jamie's featherweight champion.

458

00:33:46,000 --> 00:33:49,000

But with both fighters ready to rumble,

459

00:33:49,000 --> 00:33:52,000

it's time to pack up and head back to NASA

460

00:33:52,000 --> 00:33:55,000

to let these concrete creations fly.

461

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

Next, stand by for some more train track turbulence.

462

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

And Jamie and Adam are all set up for countdown.

463

00:34:04,000 --> 00:34:06,000

Oh, buddy.

464

00:34:12,000 --> 00:34:18,000

Carrie, Grant, Tori, and Ted have survived a train track flyby

465

00:34:18,000 --> 00:34:22,000

with no sign of the mythical suction on the first run.

466

00:34:22,000 --> 00:34:24,000

It's take two.

467

00:34:24,000 --> 00:34:28,000

But this time, the train will be going backwards

468

00:34:28,000 --> 00:34:32,000

with the blunt end leading and the aerodynamic engine at the rear.

469

00:34:37,000 --> 00:34:39,000

Yeah!

470

00:34:39,000 --> 00:34:41,000

Dang!

471

00:34:41,000 --> 00:34:43,000

Dude, look at the stroller.

472

00:34:43,000 --> 00:34:44,000

Oh, my God!

473

00:34:44,000 --> 00:34:45,000

Look at the stroller.

474

00:34:45,000 --> 00:34:48,000

He got thrown off the platform.

475

00:34:48,000 --> 00:34:49,000

What?!

476

00:34:49,000 --> 00:34:52,000

Incredibly, Ted is still standing.

477

00:34:52,000 --> 00:34:54,000

He wasn't even blown back.

478

00:34:54,000 --> 00:34:58,000

But Grant's battery of wind gauges has its own tale to tell.

479

00:34:58,000 --> 00:35:02,000

On our first run with the train coming this way

480

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

and the aerodynamic tip leading,

481

00:35:05,000 --> 00:35:10,000

we had parallel to the train wind speed of 49.9.

482

00:35:10,000 --> 00:35:14,000

The second run with the flat end leading coming this way,

483

00:35:14,000 --> 00:35:18,000

we had on this one 26.8.

484

00:35:18,000 --> 00:35:21,000

So the wind speed on that run was actually less.

485

00:35:21,000 --> 00:35:25,000

So according to the figures from the chicken cannon tests,

486

00:35:25,000 --> 00:35:29,000

both runs generated enough wind to make a typical guy stumble.

487

00:35:29,000 --> 00:35:34,000

But it's all blowing straight out or parallel to the track.

488

00:35:34,000 --> 00:35:37,000

It looks like the turbulence moving with the train

489

00:35:37,000 --> 00:35:41,000

and away from the track trumps any wake effect there may be

490

00:35:41,000 --> 00:35:43,000

following the train.

491

00:35:43,000 --> 00:35:47,000

Once again, Robert the driver winds his engine up to full speed.

492

00:35:52,000 --> 00:35:55,000

Ted finds himself face down on the platform

493

00:35:55,000 --> 00:35:57,000

and the stroller's missing in action.

494

00:35:57,000 --> 00:36:01,000

So no one was sucked onto the train tracks for a dice with death.

495

00:36:01,000 --> 00:36:04,000

And with no obvious results, it's back to the shop

496

00:36:04,000 --> 00:36:08,000

to study the high speed camera and piece together the data.

497

00:36:08,000 --> 00:36:11,000

Looks like all the wind is running parallel to the train.

498

00:36:11,000 --> 00:36:14,000

Yeah, I'm definitely not seeing any suction.

499

00:36:14,000 --> 00:36:17,000

The first and third runs had the most violent effects,

500

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

but there was no sign of any suction.

501

00:36:20,000 --> 00:36:23,000

The winds blasting outwards and sideways

502

00:36:23,000 --> 00:36:28,000

were far stronger than any vortex that may have been created behind.

503

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

If Ted had felt any suction,

504

00:36:30,000 --> 00:36:33,000

that tie rope would be as taut as fencing wire.

505

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

So what do we come to for conclusion for train section?

506

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

Oh, it's busted. Totally busted.

507

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

But still really, really dangerous to stand that close.

508

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

You don't want to stand very close to the train.

509

00:36:42,000 --> 00:36:44,000

You do not want to be there.

510

00:36:44,000 --> 00:36:46,000

It's your psycho.

511

00:36:53,000 --> 00:36:54,000

Ow!

512

00:36:54,000 --> 00:36:56,000

Well, Adam, what are you doing?

513

00:36:56,000 --> 00:36:58,000

It's time to test these things.

514

00:36:58,000 --> 00:36:59,000

Are you ready?

515

00:36:59,000 --> 00:37:00,000

Ready as I'll ever be.

516

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

Me too.

517

00:37:01,000 --> 00:37:03,000

Okay, let's go.

518

00:37:03,000 --> 00:37:07,000

It's launch day and in search of perfect test conditions,

519

00:37:07,000 --> 00:37:12,000

our pioneering pilots touch down back at the NASA Ames Research Center.

520

00:37:12,000 --> 00:37:14,000

We're back at Muffin Fields,

521

00:37:14,000 --> 00:37:16,000

hanging number two where we shot helium football

522

00:37:16,000 --> 00:37:19,000

and it's ideal for the concrete glider tests

523

00:37:19,000 --> 00:37:21,000

for the same reasons it was ideal for helium football.

524

00:37:21,000 --> 00:37:25,000

We can close the doors of this huge space and eliminate any wind.

525

00:37:25,000 --> 00:37:29,000

Dr. Steve Smith, MythBusters font of all flying facts,

526

00:37:29,000 --> 00:37:34,000

is there to check out the designs and offer some last-minute advice.

527

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

A crucial question on this one is going to be where the center of gravity is

528

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

so that it trims.

529

00:37:38,000 --> 00:37:40,000

Well, where should it be?

530

00:37:40,000 --> 00:37:43,000

Somewhere between 25 and 30% of the length, maybe.

531

00:37:43,000 --> 00:37:45,000

About right here.

532

00:37:45,000 --> 00:37:48,000

Next, Jamie presents his featherweight wilting bird.

533

00:37:48,000 --> 00:37:52,000

But does Dr. Smith think it'll fly more like a paperweight?

534

00:37:52,000 --> 00:37:54,000

Yeah, that's impressive. That's beautiful.

535

00:37:54,000 --> 00:37:57,000

Cables stay bracing and everything. Look at that.

536

00:37:57,000 --> 00:37:59,000

It's paper.

537

00:37:59,000 --> 00:38:01,000

Wow.

538

00:38:01,000 --> 00:38:07,000

Dr. Smith's upbeat reaction to their designs has fueled their enthusiasm.

539

00:38:07,000 --> 00:38:13,000

But his advice means Adam and Jamie have some tweaking, trimming and testing to do.

540

00:38:13,000 --> 00:38:17,000

To get the balance right, Adam is stealing another of George Cayley's

541

00:38:17,000 --> 00:38:19,000

desired ideas and adding a gondola.

542

00:38:19,000 --> 00:38:23,000

The weight beneath the wing can be adjusted to move the center of gravity.

543

00:38:23,000 --> 00:38:27,000

Plus, it should stabilize the glider in flight.

544

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

Jamie has also been busy shifting his glider's center of gravity further forward.

545

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

It looks stupid, but we don't care about that right now.

546

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

It's a concrete airplane. What are you going to do?

547

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

It may have been called big nose at glider school, but it's ready to fly.

548

00:38:43,000 --> 00:38:48,000

And while Jamie has been picking his glider's nose, Adam's been getting some launch advice.

549

00:38:48,000 --> 00:38:52,000

I figured out, with Dr. Smith's help, actually, Dr. Smith figured out

550

00:38:52,000 --> 00:38:55,000

with my help. And by help, I mean I supplied him with measurements.

551

00:38:55,000 --> 00:39:02,000

He was able to calculate that it should fly at around 20 to 22 miles per hour,

552

00:39:02,000 --> 00:39:08,000

about 30 feet per second, if it is to hit its ideal speed to glide ratio.

553

00:39:08,000 --> 00:39:13,000

And because his throwing arm won't manage two miles an hour, never mind 22,

554

00:39:13,000 --> 00:39:19,000

he's got a cutting plan. He's going to use a zipline, tow line and quick release.

555

00:39:19,000 --> 00:39:26,000

That mark is where the pin gets pulled out and my glider starts flying on its own.

556

00:39:26,000 --> 00:39:31,000

Adam then optimistically marks out a target distance of 50 feet.

557

00:39:31,000 --> 00:39:33,000

That's how far I want to travel.

558

00:39:33,000 --> 00:39:35,000

Now, I'm about to let go of this. You got the hook?

559

00:39:35,000 --> 00:39:36,000

Yep.

560

00:39:36,000 --> 00:39:38,000

Oh, buddy.

561

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

Okay.

562

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

Everything's in place. I'm going to go down there and grab the tow line.

563

00:39:41,000 --> 00:39:45,000

Last call for the departure of Concrete Airways, flight 101.

564

00:39:45,000 --> 00:39:49,000

Three, two, one, go.

565

00:39:55,000 --> 00:40:01,000

Well, the launch was successful and Adam's Cayley glider has survived relatively intact.

566

00:40:01,000 --> 00:40:03,000

But how far did it glide?

567

00:40:03,000 --> 00:40:07,000

Well, let's see where I... Oh, there's my 50 foot mark, 55 feet.

568

00:40:07,000 --> 00:40:09,000

So I didn't make that.

569

00:40:09,000 --> 00:40:14,000

Looks kind of like I hit maybe at like 20 feet.

570

00:40:15,000 --> 00:40:22,000

So I didn't get my... I didn't get my glide ratio I was hoping for.

571

00:40:22,000 --> 00:40:24,000

But hold on. There's a catch.

572

00:40:24,000 --> 00:40:30,000

Adam thinks his glider released from the zipline and began flying on its own at a height of 20 feet

573

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

before gliding a distance of 20 feet.

574

00:40:33,000 --> 00:40:35,000

But there's been a recount.

575

00:40:35,000 --> 00:40:43,000

My glider released from its catch off of its guideline at about nine feet off the ground.

576

00:40:43,000 --> 00:40:50,000

It then flew close to 34 feet before hitting the ground.

577

00:40:50,000 --> 00:40:53,000

Now four times nine is 36.

578

00:40:53,000 --> 00:41:00,000

So 34 feet means I came devilishly close to a four to one glide ratio.

579

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

I'm stunned actually. I could not be more pleased with these results.

580

00:41:05,000 --> 00:41:12,000

I know I was shooting for 55 feet, but really I was hoping for anything over a solid drop

581

00:41:12,000 --> 00:41:14,000

into the ground.

582

00:41:14,000 --> 00:41:18,000

Incredibly, Adam has gone from underdog to top cat.

583

00:41:18,000 --> 00:41:24,000

Jamie steps up to the plate, but he's stubbornly sticking to a manual launch from the stairwell,

584

00:41:24,000 --> 00:41:27,000

despite Adam's successful flight.

585

00:41:27,000 --> 00:41:32,000

I don't want to screw around and, you know, get some kind of, you know, line, zipline going

586

00:41:32,000 --> 00:41:35,000

and all this kind of stuff. I'm just going to throw it and see what it does.

587

00:41:35,000 --> 00:41:42,000

Okay. In three, two, one.

588

00:41:46,000 --> 00:41:48,000

Well, there you go.

589

00:41:48,000 --> 00:41:52,000

Jamie's wilting bird took flight and then took a nose dive.

590

00:41:52,000 --> 00:41:58,000

In other words, his concrete glider was all concrete and no glide.

591

00:41:58,000 --> 00:42:00,000

Congratulations, you won.

592

00:42:01,000 --> 00:42:06,000

I'm going to enjoy this for the short while that it lasts.

593

00:42:06,000 --> 00:42:13,000

Jamie's one to one glide ratio was not even close to matching Adam's soaring achievement of four to one.

594

00:42:13,000 --> 00:42:17,000

And, you know, it's possible Adam will let Jamie forget about this.

595

00:42:17,000 --> 00:42:23,000

It's not really about who wins or loses. It's really just about illustrating the concept.

596

00:42:25,000 --> 00:42:26,000

But I won.

597

00:42:26,000 --> 00:42:31,000

But unlikely. All gloating aside, what about the myth?

598

00:42:31,000 --> 00:42:36,000

Did the guys prove anything about the concept of a concrete glider?

599

00:42:36,000 --> 00:42:41,000

Aerodynamics of planes don't scale up very easily from small to human size.

600

00:42:41,000 --> 00:42:51,000

But that being said, I think there is actually a tiny chance that one could build a human-sized concrete glider.

601

00:42:51,000 --> 00:42:55,000

I'm not sure that I would get into it, but it's certainly give Buster a ride.

602

00:42:55,000 --> 00:43:03,000

Well, Adam, I don't think either of us were really that happy with the gliders, but we did prove that it can be done.

603

00:43:03,000 --> 00:43:07,000

I'd call it plausible, but not recommended.

604

00:43:07,000 --> 00:43:12,000

Yeah, you know, the big thing for me is that you only got one shot at it.

605

00:43:12,000 --> 00:43:15,000

You know, it's brittle if you crash with the things, it's over.

606

00:43:15,000 --> 00:43:22,000

But, you know, I think we also proved that if you really think through your launch and you do it correctly, that you can actually get some gliding done.

607

00:43:22,000 --> 00:43:25,000

We're strutting a little bit, are we?

608

00:43:25,000 --> 00:43:26,000

Sure.

609

00:43:26,000 --> 00:43:27,000

Okay, well.

610

00:43:27,000 --> 00:43:29,000

I'll enjoy it while I can.

611

00:43:29,000 --> 00:43:30,000

So we're plausible.

612

00:43:30,000 --> 00:43:31,000

Plausible.

613

00:43:31,000 --> 00:43:32,000

But not recommended.

614

00:43:32,000 --> 00:43:33,000

Exactly.