1

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

On this episode of Mythbusters...

2

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

Adam and Janie go green for science.

3

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

I'm actually kind of excited about this.

4

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

And kick their engineering expertise into a full throttle.

5

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

When I was a kid I would have killed one of these.

6

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

Were you ever a kid?

7

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

No.

8

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

As they pit bike against car for the ultimate eco challenge.

9

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

We're just getting started too.

10

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

The Austin!

11

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

Meanwhile...

12

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

Carried Torian Grant...

13

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

I'm here often.

14

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

Raid the arsenal for an explosive filmic fable.

15

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

Good job, Melkabitch. You don't get any hair.

16

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

And unleash the first RPG in Mythbusters history.

17

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

To find out if a bullet can beat a rocket-propelled grenade.

18

00:00:49,000 --> 00:00:59,000

Who are the Mythbusters?

19

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

Adam Savage...

20

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

Working on these decisions, great for my dad.

21

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

And Janie Heineman...

22

00:01:05,000 --> 00:01:07,000

Are you done screwing around?

23

00:01:07,000 --> 00:01:11,000

Between them more than 30 years of special effects experience...

24

00:01:11,000 --> 00:01:13,000

Together with Carrie Byron...

25

00:01:13,000 --> 00:01:14,000

Maaaar!

26

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

Tori Bellaci...

27

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

You ready to get your head cut off?

28

00:01:17,000 --> 00:01:19,000

And Brandi Mahara...

29

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

Save yourselves!

30

00:01:20,000 --> 00:01:22,000

They don't just tell the Myths...

31

00:01:22,000 --> 00:01:25,000

They put them to the check.

32

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

Jamie, you're a fan of motorcycles, right?

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00:01:38,000 --> 00:01:39,000

Ever since I was 16.

34

00:01:39,000 --> 00:01:42,000

Really? They've had motorcycles that long?

35

00:01:42,000 --> 00:01:43,000

Here we go.

36

00:01:43,000 --> 00:01:48,000

Okay. There is a trend, apparently, going on where people, including fans of Mythbusters,

37

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

are trading in their cars and driving motorcycles instead because they believe

38

00:01:52,000 --> 00:01:54,000

that's the more environmentally friendly choice.

39

00:01:54,000 --> 00:01:55,000

What's their logic?

40

00:01:55,000 --> 00:01:59,000

Their logic is simply that because motorcycles are generally more fuel efficient than cars,

41

00:01:59,000 --> 00:02:02,000

they burn less gas and thus they must be better for the environment.

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

Sounds sensible.

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

But there are people that say not only is that not true,

44

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

they claim that motorcycles pollute far worse than cars.

45

00:02:09,000 --> 00:02:12,000

Well, that sounds like something we need to investigate.

46

00:02:12,000 --> 00:02:14,000

I totally agree.

47

00:02:14,000 --> 00:02:20,000

There's no doubt both cars and bikes produce gases that can be harmful to the environment.

48

00:02:20,000 --> 00:02:26,000

And supposedly being smaller and using less fuel means that bikes produce less.

49

00:02:26,000 --> 00:02:28,000

So is there fuel to this fire?

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00:02:28,000 --> 00:02:33,000

Are motorcycles a greener machine than cars?

51

00:02:33,000 --> 00:02:37,000

Well, clearly this involves getting a bunch of different cars and motorcycles,

52

00:02:37,000 --> 00:02:39,000

testing them and comparing the results, right?

53

00:02:39,000 --> 00:02:40,000

Right, but which ones?

54

00:02:40,000 --> 00:02:43,000

I mean, there's tens of thousands of makes and models of each.

55

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

What do we choose?

56

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

Well, why don't we get some of the most popular models of the last three decades?

57

00:02:48,000 --> 00:02:49,000

A representative sample, right?

58

00:02:49,000 --> 00:02:52,000

Some cars and bikes from the 80s, the 90s and the naughties.

59

00:02:52,000 --> 00:02:55,000

The naughties are 2000 till 2010.

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00:02:55,000 --> 00:02:57,000

That sounds like a perfect way to do this.

61

00:02:57,000 --> 00:02:58,000

Well, let's get our hands dirty.

62

00:02:58,000 --> 00:02:59,000

Okay.

63

00:02:59,000 --> 00:03:01,000

Whoa, where are we?

64

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

This will be our base of operations.

65

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

Let's walk you through the particulars.

66

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

These are our test cars.

67

00:03:11,000 --> 00:03:15,000

We've got a car from the 80s, a car from the 90s and a car from the naughties.

68

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

We've also got some motorcycles.

69

00:03:16,000 --> 00:03:21,000

We've got one from the 80s, one from the 90s, one from the naughties.

70

00:03:21,000 --> 00:03:26,000

We've chosen them based on their popularity within their respective decades.

71

00:03:26,000 --> 00:03:30,000

There is literally nothing fancy about the route we'll be driving today.

72

00:03:30,000 --> 00:03:33,000

No tricky maneuvers, no extreme road conditions.

73

00:03:33,000 --> 00:03:36,000

It is simply a 30-minute drive spread out over 20 miles

74

00:03:36,000 --> 00:03:41,000

and split 75% freeway driving and 25% city driving.

75

00:03:41,000 --> 00:03:43,000

So how are we going to measure our emissions?

76

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

Well, that's where these guys come in.

77

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

They're from the Clean Air Technologies Division of Global MRV

78

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

and they've brought with them something called the PEMS,

79

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

a portable emissions measuring system.

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

And basically, you know when you take your car in to get it smogged?

81

00:03:57,000 --> 00:04:02,000

Well, that's what the PEMS does, except it's more accurate in its real world

82

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

because you put it in the vehicle, you stick a probe in the exhaust,

83

00:04:05,000 --> 00:04:09,000

you hook it up to the engine and you drive the car or the motorcycle around for a while

84

00:04:09,000 --> 00:04:11,000

and voila, instant data.

85

00:04:11,000 --> 00:04:14,000

The numbers we get should be precise enough to allow us to call

86

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

whether the motorcycles or the cars are better for the environment.

87

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

And with six vehicles, it's a lot of driving.

88

00:04:21,000 --> 00:04:22,000

I'm ready.

89

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

All right, let's do this.

90

00:04:23,000 --> 00:04:24,000

All right, here we go.

91

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

But thanks to the wonders of nonlinear editing.

92

00:04:27,000 --> 00:04:30,000

Okay, this is Mike versus Carr.

93

00:04:30,000 --> 00:04:32,000

The 30-minute test for the 80s.

94

00:04:32,000 --> 00:04:33,000

80s.

95

00:04:33,000 --> 00:04:36,000

Pollution test in three.

96

00:04:36,000 --> 00:04:37,000

90s.

97

00:04:37,000 --> 00:04:38,000

Two.

98

00:04:38,000 --> 00:04:39,000

And naughties.

99

00:04:39,000 --> 00:04:40,000

One, go.

100

00:04:40,000 --> 00:04:42,000

Can take place simultaneously.

101

00:04:42,000 --> 00:04:44,000

And we're off.

102

00:04:44,000 --> 00:04:46,000

Da-da-da-da-da-da.

103

00:04:46,000 --> 00:04:50,000

A left turn takes us into the neighborhood.

104

00:04:50,000 --> 00:04:53,000

Don't worry if we can do some city driving.

105

00:04:53,000 --> 00:04:54,000

Jamie's keeping up nicely.

106

00:04:54,000 --> 00:04:56,000

Everyone's going roughly the same speed.

107

00:04:56,000 --> 00:04:58,000

Test is going perfect.

108

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

Everything is going perfectly.

109

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

And Adam's running commentary gives us a very special insight.

110

00:05:04,000 --> 00:05:06,000

Oh, I just burped.

111

00:05:06,000 --> 00:05:08,000

It takes a little bit of my lunch.

112

00:05:08,000 --> 00:05:09,000

It's a lot of...

113

00:05:09,000 --> 00:05:12,000

As the guys gather their data.

114

00:05:12,000 --> 00:05:15,000

I must say I never quite understood the dogs and sweaters thing.

115

00:05:15,000 --> 00:05:19,000

I mean, they're cute as blazes, but I like petting my dog.

116

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

I don't like petting a sweater.

117

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

I'm really glad we had this time alone.

118

00:05:23,000 --> 00:05:25,000

We can talk.

119

00:05:25,000 --> 00:05:27,000

Ha ha ha ha.

120

00:05:28,000 --> 00:05:30,000

After a few minutes of city driving,

121

00:05:30,000 --> 00:05:33,000

the freeway portion of the testing begins.

122

00:05:33,000 --> 00:05:41,000

I am driving for scientific testing on the freeway in Northern California.

123

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

I'm followed by Jamie and following Apple e-skirts.

124

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

Gathered by pollution days are hard.

125

00:05:51,000 --> 00:05:53,000

Eventually after 30 minutes of each vehicle,

126

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

the testing comes to a close.

127

00:05:55,000 --> 00:05:58,000

And Adam finishes how he began.

128

00:05:58,000 --> 00:06:02,000

We've been driving on the freeway,

129

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

testing our emissions

130

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

in motorcycles and the car.

131

00:06:25,000 --> 00:06:27,000

Today!

132

00:06:27,000 --> 00:06:30,000

Thank you. Thank you very much.

133

00:06:30,000 --> 00:06:32,000

After a full day of driving,

134

00:06:32,000 --> 00:06:34,000

we've done three runs with six vehicles

135

00:06:34,000 --> 00:06:37,000

and collected 24 separate points of data.

136

00:06:37,000 --> 00:06:39,000

Home sweet home.

137

00:06:39,000 --> 00:06:41,000

There we go.

138

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

So that's it.

139

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

Yep.

140

00:06:43,000 --> 00:06:46,000

It's time to head back to the shop and see what it means.

141

00:06:46,000 --> 00:06:56,000

Next up, the guys are seeing red with an explosive myth.

142

00:06:56,000 --> 00:06:58,000

You're gonna love this.

143

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

Why?

144

00:06:59,000 --> 00:07:01,000

Because after 180 or so episodes,

145

00:07:01,000 --> 00:07:05,000

we finally found an excuse to use a rocket launcher.

146

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

Yes! What are we testing?

147

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

This one comes from the movie Red,

148

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

retired and extremely dangerous.

149

00:07:10,000 --> 00:07:11,000

Okay, here's the scene.

150

00:07:11,000 --> 00:07:12,000

There's a standoff.

151

00:07:12,000 --> 00:07:13,000

Our hero has a revolver

152

00:07:13,000 --> 00:07:16,000

and our villain has a rocket-propelled grenade.

153

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

They both fire.

154

00:07:18,000 --> 00:07:20,000

The bullet and the RPG heat in midair.

155

00:07:20,000 --> 00:07:23,000

The bullet triggers the RPG, causing a huge explosion,

156

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

killing the villain, and the hero walks away unscathed.

157

00:07:26,000 --> 00:07:30,000

So that's two rocket-propelled grenade myths for the price of one.

158

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

Will a bullet trigger the warhead?

159

00:07:32,000 --> 00:07:36,000

And when it explodes, would it really be 5i rocket-tier

160

00:07:36,000 --> 00:07:39,000

with only the bad gal going up in flames?

161

00:07:39,000 --> 00:07:41,000

So, where to start?

162

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

Alright, two myths, one scene.

163

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

Now the first one is, can you set off a round from an RPG using a bullet?

164

00:07:47,000 --> 00:07:49,000

Well, to begin with, I think we need to match both the gun

165

00:07:49,000 --> 00:07:51,000

and the rocket launcher from the movie.

166

00:07:51,000 --> 00:07:54,000

Then we point them at each other and fire.

167

00:07:54,000 --> 00:07:55,000

Simple, right?

168

00:07:55,000 --> 00:07:57,000

Okay, besides being a logistical nightmare,

169

00:07:57,000 --> 00:08:00,000

you can't shoot a rocket launcher in California.

170

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

But, I know a place we can.

171

00:08:03,000 --> 00:08:07,000

Luckily, the team have friends in high, explosive places,

172

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

so they head to the Mythbusters' rocketeering HQ.

173

00:08:12,000 --> 00:08:15,000

To test the myth of our RPG handgun face-off,

174

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

we've come to one of our favorite places.

175

00:08:17,000 --> 00:08:20,000

It makes a good attack, so it feels like a second home.

176

00:08:20,000 --> 00:08:22,000

Why do we love this place so much?

177

00:08:26,000 --> 00:08:29,000

We have 40 square miles of testing facility,

178

00:08:29,000 --> 00:08:32,000

where they have gun ranges and bomb sites.

179

00:08:32,000 --> 00:08:34,000

How can you get any better than that?

180

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

Well, by throwing in a license to fire these.

181

00:08:38,000 --> 00:08:41,000

So, for this myth, we have three questions we need to ask.

182

00:08:41,000 --> 00:08:44,000

One, how does an RPG work?

183

00:08:44,000 --> 00:08:46,000

Which end is the rocket going?

184

00:08:46,000 --> 00:08:50,000

Two, what happens when an RPG and a bullet meet midair?

185

00:08:50,000 --> 00:08:53,000

And three, when they do meet and the explosion goes off,

186

00:08:53,000 --> 00:08:55,000

who survives?

187

00:08:55,000 --> 00:08:57,000

And question one, how does it work?

188

00:08:57,000 --> 00:09:01,000

Calls for a little RPG 101 with John Merkel.

189

00:09:02,000 --> 00:09:05,000

John, we've fired a lot of guns on the show, but never an RPG.

190

00:09:05,000 --> 00:09:07,000

Could you fill me in on the basic components?

191

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

Okay, this is the launcher. It's pretty simple.

192

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

It's basically a bunch of metal tubes welded together.

193

00:09:11,000 --> 00:09:13,000

And this is the rocket.

194

00:09:13,000 --> 00:09:15,000

It's when it fires, it kicks the RPG out of the tube

195

00:09:15,000 --> 00:09:18,000

and part-weights the rocket motor lights and makes it accelerate.

196

00:09:18,000 --> 00:09:20,000

And what actually causes the fuse to arm?

197

00:09:20,000 --> 00:09:21,000

A setback.

198

00:09:21,000 --> 00:09:23,000

G-forces, when it comes out of the tube,

199

00:09:23,000 --> 00:09:25,000

it goes from zero to 140 meters per second

200

00:09:25,000 --> 00:09:28,000

in about six milliseconds, so it's experiencing a lot of Gs.

201

00:09:29,000 --> 00:09:33,000

It's time for the practical demo of exactly how the RPG works.

202

00:09:35,000 --> 00:09:38,000

You guys realize this is the first time in the history of mythbusters

203

00:09:38,000 --> 00:09:40,000

that we've ever shot an RPG?

204

00:09:41,000 --> 00:09:45,000

Alright, this is RPG versus trailer, just to see what it does.

205

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

Five, four, three, two, one.

206

00:09:55,000 --> 00:09:57,000

It's gone. The trailer is completely gone.

207

00:09:57,000 --> 00:09:58,000

It's gone. It's gone. It's gone.

208

00:09:58,000 --> 00:09:59,000

It's gone. It's gone. It's gone.

209

00:09:59,000 --> 00:10:00,000

It's gone. It's gone. It's gone.

210

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

It's gone. It's gone. It's gone.

211

00:10:01,000 --> 00:10:02,000

It's gone. It's gone.

212

00:10:02,000 --> 00:10:03,000

It's gone. It's gone.

213

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

That didn't look anything like you see in the movies.

214

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

No, it was like bang bang.

215

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

Let's check the records.

216

00:10:12,000 --> 00:10:13,000

She held right.

217

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

Outside, they find a trail of RPG devastation.

218

00:10:19,000 --> 00:10:23,000

Or should that be an RPG devastated trailer?

219

00:10:23,000 --> 00:10:27,000

Wow, that is a scary amount of destructive force right there.

220

00:10:27,000 --> 00:10:29,000

Well, now we know how an RPG works.

221

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

Yep, they couldn't have asked for a better demonstration.

222

00:10:34,000 --> 00:10:36,000

After looking at the high speed of the trailer,

223

00:10:36,000 --> 00:10:38,000

we noticed one thing after the trailer exploded.

224

00:10:38,000 --> 00:10:41,000

We saw hot molten copper continue on

225

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

and actually burn holes into the steel armor behind it.

226

00:10:44,000 --> 00:10:48,000

The reason being is because an RPG isn't like a typical grenade

227

00:10:48,000 --> 00:10:50,000

that has an explosive charge that throws shrapnel.

228

00:10:50,000 --> 00:10:53,000

It actually has an inverted copper cone

229

00:10:53,000 --> 00:10:55,000

that is surrounded by a shape charge.

230

00:10:55,000 --> 00:10:58,000

And when that hits the target, the charge goes off

231

00:10:58,000 --> 00:11:03,000

and actually pushes that copper out into a hot molten slug of copper

232

00:11:03,000 --> 00:11:05,000

that burns through steel.

233

00:11:05,000 --> 00:11:09,000

So not only is the RPG explosion nothing like the movie,

234

00:11:09,000 --> 00:11:12,000

it also throws forward a molten copper surprise,

235

00:11:12,000 --> 00:11:15,000

which doesn't bode well for the hero.

236

00:11:15,000 --> 00:11:18,000

Now we need to see what happens when a bullet needs an RPG.

237

00:11:18,000 --> 00:11:20,000

The hard part is going to be getting those two to match up.

238

00:11:20,000 --> 00:11:21,000

Let's get to work.

239

00:11:21,000 --> 00:11:23,000

That was incredible.

240

00:11:58,000 --> 00:12:00,000

Finally, the data is in.

241

00:12:01,000 --> 00:12:05,000

So after some swift consulting, equating, and calculating,

242

00:12:05,000 --> 00:12:08,000

the guys have the emissions verdict.

243

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

After running the numbers and looking at the outputs of pollutant gases

244

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

from all the vehicles and getting some expert analysis

245

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

from Professor Kent Johnson of the University of California Riverside,

246

00:12:19,000 --> 00:12:21,000

we came up with some surprising results.

247

00:12:21,000 --> 00:12:26,000

First up in the Mythbusters motorcycle versus car data crunch is fuel efficiency.

248

00:12:26,000 --> 00:12:29,000

Across all of the vehicles, the results were consistent.

249

00:12:29,000 --> 00:12:32,000

Motorcycles use less fuel than cars.

250

00:12:32,000 --> 00:12:34,000

Which makes sense. Motorcycles are lighter than cars,

251

00:12:34,000 --> 00:12:37,000

and thus they require less energy to push themselves forward.

252

00:12:37,000 --> 00:12:41,000

And you'd think that using less fuel would make them better for the environment.

253

00:12:41,000 --> 00:12:42,000

But you'd be wrong.

254

00:12:42,000 --> 00:12:46,000

From an emissions standpoint, let's take a look at the most populous of the gases

255

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

that these vehicles put out, carbon dioxide.

256

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

It's nasty. It's a greenhouse gas, so it contributes to global warming.

257

00:12:52,000 --> 00:12:56,000

And it makes up 90% of the emissions of an internal combustion engine.

258

00:12:56,000 --> 00:13:01,000

And because it's a direct byproduct of burning fuel, motorcycles,

259

00:13:01,000 --> 00:13:05,000

which burn less fuel, consistently produce less carbon dioxide than cars.

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00:13:05,000 --> 00:13:09,000

But the other pollutant gases we measure tell a totally different story.

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00:13:09,000 --> 00:13:14,000

Hydrocarbons, for example, cause smog, cancer, asthma, emphysema,

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

and a host of other nasties, and motorcycles produce far more than cars.

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

Oxides of nitrogen, responsible for smog, lung ailments, and acid rain.

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00:13:23,000 --> 00:13:27,000

Motorcycles produce up to 3200% more than cars.

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00:13:27,000 --> 00:13:31,000

And carbon monoxide is an air pollutant and poisonous for animals to breathe.

266

00:13:31,000 --> 00:13:36,000

Well, motorcycles produce up to 8000% more than cars.

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00:13:36,000 --> 00:13:40,000

In summary, while we found that motorcycles were more fuel efficient than cars

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00:13:40,000 --> 00:13:44,000

and put out a lot less carbon dioxide, the amount of polluting gases they put out

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

was vastly worse.

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

This myth is about someone that traded the car for a motorcycle

271

00:13:48,000 --> 00:13:51,000

because they believed it was better for the environment.

272

00:13:51,000 --> 00:13:54,000

And they were wrong. At best, it's a wash.

273

00:13:54,000 --> 00:13:56,000

Motorcycles are just as bad for the environment as cars.

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00:13:56,000 --> 00:13:58,000

At worse, they're far worse.

275

00:13:58,000 --> 00:14:02,000

Yep, the data doesn't lie. The cars aren't cleaner.

276

00:14:02,000 --> 00:14:06,000

But bikes and mythbusters go way back, and they're not done yet.

277

00:14:06,000 --> 00:14:13,000

By combining Heinemann Ingenuity with Savage Savvy, they're taking this myth to the max.

278

00:14:13,000 --> 00:14:15,000

Now that is a cool looking design.

279

00:14:15,000 --> 00:14:21,000

Can they put bikes back on track by creating the ultimate clean green machine?

280

00:14:21,000 --> 00:14:23,000

It's starting to look sexy.

281

00:14:28,000 --> 00:14:31,000

ATG are taking on an RPG.

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00:14:34,000 --> 00:14:36,000

And it's got nothing to do with role-playing.

283

00:14:37,000 --> 00:14:42,000

In this movie myth, the villain is taken out by their own rocket-propelled grenade.

284

00:14:42,000 --> 00:14:45,000

All because of a well-timed bullet.

285

00:14:45,000 --> 00:14:49,000

So far we've seen what happens when an RPG hits a trailer.

286

00:14:49,000 --> 00:14:51,000

And it turns out it's not looking so good for the myth.

287

00:14:51,000 --> 00:14:58,000

Because once an RPG detonates, it fires a stream of molten copper through and beyond the target.

288

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

But you know what? This is mythbusters.

289

00:15:01,000 --> 00:15:02,000

We can't give up here.

290

00:15:02,000 --> 00:15:06,000

What we want to look at next is what happens when a bullet meets an RPG.

291

00:15:06,000 --> 00:15:08,000

Can it even trigger?

292

00:15:08,000 --> 00:15:09,000

Indeed.

293

00:15:09,000 --> 00:15:13,000

But getting a tiny bullet to hit the warhead on the head is tricky.

294

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

Luckily by joining forces with NMT, they've come up with a solution.

295

00:15:18,000 --> 00:15:20,000

All right, Leonard, you've built this system. Tell me a little bit about it.

296

00:15:20,000 --> 00:15:24,000

Well, this was actually designed, Tori, from Friends of ours up in Huntsville, Alabama, Arctic.

297

00:15:24,000 --> 00:15:26,000

And they call it Rocket on a Rope.

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00:15:26,000 --> 00:15:28,000

So it's kind of like soap on a rope, but a little bit more dangerous.

299

00:15:28,000 --> 00:15:30,000

Yeah, a lot more power.

300

00:15:30,000 --> 00:15:31,000

More powerful.

301

00:15:31,000 --> 00:15:32,000

And more deadly.

302

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

And here's why.

303

00:15:34,000 --> 00:15:38,000

Now, obviously, this isn't a real RPG. This isn't a NERT one because we're not crazy.

304

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

Right here is our launcher. It's a steel tube.

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00:15:40,000 --> 00:15:42,000

The RPG will go into that.

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00:15:42,000 --> 00:15:44,000

Right here is where our firing pin will be.

307

00:15:44,000 --> 00:15:53,000

Once that starts, pressure will build up inside this pipe and it will push our rocket on the sled down these lines towards our gun.

308

00:15:53,000 --> 00:16:00,000

That quick change in acceleration arms the warhead and it travels down this line, which is tensioned at 3,000 pounds.

309

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

We handle the rocket and keep it on a level and straight path.

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

When that's a stainer motor kicks in, that's when we really start cooking.

311

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

Now, at some point along the line, the RPG will actually hit a tripwire that will activate our gun.

312

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

Now, I know this doesn't look like the gun in the movie, but it does exactly the same thing.

313

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

And the bullet, which is the same caliber as in the movie, will come firing out of here right into the tip of the RPG.

314

00:16:22,000 --> 00:16:26,000

Then we'll finally find out what happens when bullet meets RPG.

315

00:16:27,000 --> 00:16:34,000

With their ingenious rocket on a rope rig primed and the gun loaded, it's time to hunker in the bunker.

316

00:16:36,000 --> 00:16:38,000

Okay, RPG versus bullet.

317

00:16:38,000 --> 00:16:44,000

It's a launch. Alright, here we go. In five, four, three, two, one.

318

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

Whoa!

319

00:16:49,000 --> 00:16:51,000

Do you think maybe the bullet disabled it?

320

00:16:51,000 --> 00:16:53,000

I don't know. High speed. Let's check the high speed.

321

00:16:53,000 --> 00:16:54,000

Let's check the high speed.

322

00:16:54,000 --> 00:16:57,000

It all happened in the blink of an eye.

323

00:16:57,000 --> 00:17:01,000

But it does seem like there was a trip up with the tripwire.

324

00:17:06,000 --> 00:17:09,000

Through our first test, we were not able to hit the RPG with the bullet.

325

00:17:09,000 --> 00:17:11,000

And there was a couple of reasons for that.

326

00:17:11,000 --> 00:17:13,000

One, the lines were not tight enough.

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

So as the rocket came down the line, it was bouncing around.

328

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

By the time it got to the bullet, it was actually out of line with the barrel of the gun.

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

Not only that, the bullet didn't even fire. The trigger was not sensitive enough.

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00:17:25,000 --> 00:17:28,000

So we made some adjustments. We put more tension on the line.

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00:17:28,000 --> 00:17:32,000

That way that will keep that rocket stable and we have a more sensitive trigger.

332

00:17:32,000 --> 00:17:36,000

So that way by the time the rocket gets to the barrel, the gun will fire.

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00:17:36,000 --> 00:17:40,000

And then finally we'll find out, will an RPG get set off by a bullet?

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00:17:40,000 --> 00:17:45,000

With the rig adjusted and a new warhead loaded, it's back underground for round two.

335

00:17:46,000 --> 00:17:48,000

I think it's time for another shot.

336

00:17:48,000 --> 00:17:54,000

Alright, here we go. 5, 4, 3, 2, 1.

337

00:17:58,000 --> 00:18:01,000

Wow, it definitely exploded. I don't know if it was because of the bullet.

338

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

Hard to tell.

339

00:18:06,000 --> 00:18:07,000

Let's look at the high speed.

340

00:18:07,000 --> 00:18:08,000

Oh, this is crazy.

341

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

Crazy with a capital C.

342

00:18:13,000 --> 00:18:17,000

And it looks like they've gotten bullet versus RPG success.

343

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

It's a trip wire.

344

00:18:19,000 --> 00:18:20,000

Triple A.

345

00:18:20,000 --> 00:18:21,000

It worked!

346

00:18:23,000 --> 00:18:25,000

The bullet can set up an RPG.

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00:18:25,000 --> 00:18:27,000

Dude, that's amazing.

348

00:18:28,000 --> 00:18:30,000

Alright, so that part of the myth is confirmed.

349

00:18:30,000 --> 00:18:35,000

Amazing and confirmed, add all down to an incredible rig.

350

00:18:37,000 --> 00:18:41,000

Now to nail down who actually lives and who dies in this myth, we've got to do a few things.

351

00:18:41,000 --> 00:18:46,000

We've got to find out how fast the bullet travels, how fast the RPG travels,

352

00:18:46,000 --> 00:18:50,000

and then we can figure out where in the 80 feet between the good guy and the bad guy they meet.

353

00:18:50,000 --> 00:18:55,000

So that means we need to get some bullets, we need to get some RPGs, we can go shooting.

354

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

So for the oxides of nitrogen, the hydrocarbons and the carbon monoxide,

355

00:19:02,000 --> 00:19:07,000

the bike's put out more pollution in the cars, but somehow I don't feel like you're done with this story.

356

00:19:07,000 --> 00:19:09,000

No, I'm not. And here's why.

357

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

Ultimately, the amount of pollution that comes out of a bike has to be related to the amount of fuel that goes into it.

358

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

And while it's true that bikes are lighter and smaller than cars and so they use less fuel,

359

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

they'd use even less if they were more aerodynamic.

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00:19:22,000 --> 00:19:25,000

Right, the fact is that bikes are totally aerodynamically inefficient.

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

That upright rider presents a huge block to the wind.

362

00:19:28,000 --> 00:19:31,000

They're not designed like cars to slip through the air.

363

00:19:31,000 --> 00:19:36,000

Exactly, and so what I'm wondering is if we made a bike super streamlined,

364

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

could we reduce its fuel usage to such a degree that it would actually beat the fuel pollution standards of cars?

365

00:19:42,000 --> 00:19:45,000

You want to build a super streamlined bike and put it to the test?

366

00:19:45,000 --> 00:19:46,000

I do.

367

00:19:46,000 --> 00:19:48,000

I love it, let's do it.

368

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

The plan is to create an aerodynamically efficient bike.

369

00:19:52,000 --> 00:19:58,000

And for that, the Mythbusters fire up the old gray cells for one heck of a brainstorm.

370

00:19:59,000 --> 00:20:04,000

So, making one of those super aerodynamically efficient, how do we do it?

371

00:20:04,000 --> 00:20:06,000

Well, it's got to be some kind of a shell.

372

00:20:07,000 --> 00:20:12,000

And it's got to be lightweight and pretty much, I've got to cover the whole thing.

373

00:20:12,000 --> 00:20:14,000

In this concept cyclone,

374

00:20:14,000 --> 00:20:17,000

something like a teardrop with a bike in the middle.

375

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

A whole load of ideas are thrown up in the air.

376

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

I was thinking more like a tuner where the tip can be a little bit more pointed.

377

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

It's kind of like an igloo.

378

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

What if this thing was like a big sphere?

379

00:20:30,000 --> 00:20:35,000

And just like lightning, one idea strikes them as the best way to go.

380

00:20:35,000 --> 00:20:41,000

If these are steel, like ribs, yeah, secure it, and then you cut out an access port sized door,

381

00:20:41,000 --> 00:20:43,000

these would be covered by heat shrink.

382

00:20:43,000 --> 00:20:46,000

And have not just a design, but a plan too.

383

00:20:46,000 --> 00:20:48,000

Now that is a cool looking design.

384

00:20:48,000 --> 00:20:50,000

I've never seen anything like that before.

385

00:20:50,000 --> 00:20:55,000

If we did this and we did this in a tubular steel, it's a really nice divide in comfort design.

386

00:20:55,000 --> 00:20:56,000

I love it.

387

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

Let's do it.

388

00:20:57,000 --> 00:20:58,000

Okay.

389

00:20:59,000 --> 00:21:02,000

After a tremendous amount of back and forth, we have a plan.

390

00:21:02,000 --> 00:21:04,000

And that is it.

391

00:21:04,000 --> 00:21:09,000

With a little bit of bent tube steel, some heat shrink plastic, and a couple of dozen hours,

392

00:21:09,000 --> 00:21:11,000

I think we'll have our bike fairing.

393

00:21:11,000 --> 00:21:12,000

Later.

394

00:21:12,000 --> 00:21:13,000

Whoa!

395

00:21:14,000 --> 00:21:15,000

That was intense.

396

00:21:15,000 --> 00:21:16,000

But first...

397

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

I've followed my Jamie and following a police car together by pollution.

398

00:21:30,000 --> 00:21:35,000

It seems that cars have the edge on bikes when it comes to being green.

399

00:21:35,000 --> 00:21:40,000

We found that motorcycles were more fuel efficient than cars and put out a lot less carbon dioxide.

400

00:21:40,000 --> 00:21:44,000

The amount of polluting gas as they put out was vastly worse.

401

00:21:44,000 --> 00:21:52,000

So now the guys are creating a super streamlined motorcycle to increase its fuel efficiency and minimize its emissions.

402

00:21:52,000 --> 00:21:58,000

Now, a lot of bikes normally have fairings on them, which are plastic callings that cover the front portion of the bike

403

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

to reduce wind resistance.

404

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

In our case, we're going to get considerably more involved, however,

405

00:22:03,000 --> 00:22:08,000

and we're going to build a fairing that covers the entire bike, its passenger included.

406

00:22:08,000 --> 00:22:10,000

A little more crouchy than that.

407

00:22:10,000 --> 00:22:17,000

This device will cocoon the cyclist inside, making it more aerodynamic, greener, and eco-competition for the car.

408

00:22:17,000 --> 00:22:23,000

This is our stripped down bike, and very soon a bunch of steel like this is going to make the frame for our fairing.

409

00:22:23,000 --> 00:22:25,000

And the frame is going to be comprised of two parts.

410

00:22:25,000 --> 00:22:32,000

There's a large overarching circle, which Jamie is going to ring roll, and a bunch of horizontal ellipses,

411

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

which I'm going to hand bend with a conduit vendor.

412

00:22:35,000 --> 00:22:42,000

Getting the steel frame perfect is crucial, as the design literally hangs off of it.

413

00:22:42,000 --> 00:22:45,000

I love bending metal.

414

00:22:45,000 --> 00:22:54,000

Soon what starts out as a series of bent steel rods is welded together to become one half of the fairing.

415

00:22:55,000 --> 00:22:57,000

Wow.

416

00:22:58,000 --> 00:22:59,000

That is a pretty thing.

417

00:22:59,000 --> 00:23:01,000

It is, isn't it?

418

00:23:01,000 --> 00:23:04,000

I don't care what it's for, it's just plain lovely.

419

00:23:04,000 --> 00:23:06,000

Yeah, let's make a whole bunch of them.

420

00:23:06,000 --> 00:23:13,000

A little more measuring, welding, and bending, and they've got what looks like a giant hamster ball.

421

00:23:13,000 --> 00:23:15,000

That is freaking sexy.

422

00:23:15,000 --> 00:23:17,000

More surface area, but it's smoother.

423

00:23:17,000 --> 00:23:19,000

Oh yeah, totally.

424

00:23:20,000 --> 00:23:25,000

With the sphere complete, they cut out the part where the bike will go.

425

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

I like it.

426

00:23:28,000 --> 00:23:31,000

When I was a kid, I would have killed for one of these.

427

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

Were you ever a kid?

428

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

No.

429

00:23:33,000 --> 00:23:38,000

And since the bike fits snugly, it's time for the comet to get its tail.

430

00:23:40,000 --> 00:23:42,000

How about that?

431

00:23:42,000 --> 00:23:43,000

That is freaking awesome.

432

00:23:43,000 --> 00:23:45,000

It's starting to look sexy.

433

00:23:46,000 --> 00:23:48,000

It's kind of different, you know?

434

00:23:49,000 --> 00:23:54,000

A perfect teardrop, but there's just one more thing to complete their aerodynamic design.

435

00:23:54,000 --> 00:23:58,000

So this frame that we've spent all this time building isn't what makes this bike more aerodynamic.

436

00:23:58,000 --> 00:24:04,000

It's actually the skin we put on top of this frame that will do all of that work, and this is our skin.

437

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

It is a roughly clear plastic that shrinks when you heat it.

438

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

So we're going to put it all over this frame.

439

00:24:13,000 --> 00:24:18,000

Then we're going to heat it with a blowtorch until it's drum tight.

440

00:24:18,000 --> 00:24:22,000

And that ought to make this the aerodynamic fuel efficient bike of our dreams.

441

00:24:22,000 --> 00:24:28,000

An aerodynamic bike of their dreams, and all by reducing a little thing called drag.

442

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

Now we know that the motorcycle is less aerodynamic than a car, and that is because of drag.

443

00:24:34,000 --> 00:24:37,000

The best way to visualize drag is to take a look at this clip.

444

00:24:37,000 --> 00:24:39,000

You see the ink floating behind the vehicle?

445

00:24:39,000 --> 00:24:47,000

That is a low pressure bubble of air that the vehicle has to drag around because it's not properly aerodynamic.

446

00:24:47,000 --> 00:24:53,000

Our thinking is that the smooth front and sharp tail of our fairing will allow the motorcycle to slice through the air,

447

00:24:53,000 --> 00:24:56,000

spending less of its energy driving and saving fuel.

448

00:24:56,000 --> 00:25:01,000

If we're able to save enough fuel, the emissions might finally dip below that of the cars.

449

00:25:02,000 --> 00:25:04,000

That's looking great, isn't it?

450

00:25:04,000 --> 00:25:06,000

Yeah, it is. It's cooling down right now.

451

00:25:06,000 --> 00:25:08,000

That's when it shrinks, huh?

452

00:25:08,000 --> 00:25:09,000

Yeah.

453

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

And in no time at all, the fairing is skin.

454

00:25:16,000 --> 00:25:18,000

That is really, really pretty.

455

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

That just looks frickin' awesome.

456

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

That was worth the wait.

457

00:25:27,000 --> 00:25:34,000

The fairing is finally complete, and just as the guys anticipated, the bike looks like a teardrop crossed with a comet.

458

00:25:36,000 --> 00:25:38,000

It's like giving birth, but in reverse.

459

00:25:39,000 --> 00:25:41,000

Lowering the back hatch now.

460

00:25:41,000 --> 00:25:42,000

Okay.

461

00:25:43,000 --> 00:25:44,000

What do you think?

462

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

It's not at all uncomfortable once you're in here.

463

00:25:46,000 --> 00:25:47,000

That's great.

464

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

Not at all uncomfortable, but its real test will be on the road.

465

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

Coming right up.

466

00:25:55,000 --> 00:25:58,000

It crashed a trailer and obliterated a bullet.

467

00:25:58,000 --> 00:26:01,000

But how fast can an RPG fly?

468

00:26:01,000 --> 00:26:04,000

Wow, it totally penetrated. It went all the way through.

469

00:26:04,000 --> 00:26:06,000

That is crazy.

470

00:26:13,000 --> 00:26:19,000

It may seem unlikely, but the team has proved that a bullet can trigger an RPG.

471

00:26:20,000 --> 00:26:23,000

Now, they need to know where in the air they would meet.

472

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

Ready to do some science?

473

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

You know him.

474

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

Down at the gun range, first they need to find out the speed of the speeding bullet.

475

00:26:31,000 --> 00:26:38,000

So what we are trying to find out is where between the two dueling shooters, the bullet and the RPG meet.

476

00:26:38,000 --> 00:26:44,000

Now, we've set up a scale 80 feet long, just like two 40 foot truck containers, like the scene in the movie.

477

00:26:44,000 --> 00:26:54,000

So what we're going to do is shoot the gun and the RPG, measure how fast each of them are going, then we'll be able to calculate exactly what point the two meet and the explosion happens.

478

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

And just how far away that explosion is from the shooter and the rocketeer.

479

00:26:59,000 --> 00:27:07,000

So here's how the experiment is going to work. We're going to use the same gun they had in the movie, a Smith & Wesson 460, has a muzzle velocity of 2200 feet per second.

480

00:27:07,000 --> 00:27:11,000

We're going to fire it through this piece of foil, which will start the timer.

481

00:27:11,000 --> 00:27:16,000

The bullet will hit this plate, firing the switch and stopping the timing sequence.

482

00:27:16,000 --> 00:27:18,000

We're going to do it at 40 and 80 feet.

483

00:27:18,000 --> 00:27:22,000

And through that, we should be able to see where along the path the bullet and the RPG meet.

484

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

Keep going, stop.

485

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

So first up, Tori's packing the heat.

486

00:27:25,000 --> 00:27:28,000

This thing is so big, it looks like a cartoon gun.

487

00:27:28,000 --> 00:27:31,000

To find out the speed of the bullet at 40 feet.

488

00:27:31,000 --> 00:27:34,000

All right, this is the speed of the bullet from 40 feet.

489

00:27:39,000 --> 00:27:40,000

Good shot.

490

00:27:40,000 --> 00:27:41,000

Let's go see what you got.

491

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

All right, see how fast that went.

492

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

Pretty fast. 22 milliseconds to be precise.

493

00:27:48,000 --> 00:27:52,000

Next, it's Grant's turn to turn on the firepower.

494

00:27:53,000 --> 00:27:55,000

But I'm not going to do this one standing up.

495

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

I'm going to do this one on a rest, because not only am I not John Malkovich,

496

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

but I'm not retired and I'm only moderately dangerous.

497

00:28:03,000 --> 00:28:05,000

Okay, this is timing the bullet from 80 feet.

498

00:28:05,000 --> 00:28:06,000

Are you ready?

499

00:28:06,000 --> 00:28:07,000

Ready.

500

00:28:10,000 --> 00:28:11,000

Got it.

501

00:28:11,000 --> 00:28:13,000

See, you're not mildly dangerous.

502

00:28:13,000 --> 00:28:15,000

You're a bad man.

503

00:28:15,000 --> 00:28:17,000

All right, let's see how fast it took.

504

00:28:17,000 --> 00:28:18,000

What do we got?

505

00:28:18,000 --> 00:28:20,000

42 milliseconds.

506

00:28:20,000 --> 00:28:21,000

Perfect.

507

00:28:21,000 --> 00:28:22,000

That adds up.

508

00:28:22,000 --> 00:28:23,000

All right.

509

00:28:23,000 --> 00:28:26,000

After a hard day shooting, the guys have the bullet speed.

510

00:28:27,000 --> 00:28:31,000

Now, to the second part of the equation, the rocket-propelled grenade.

511

00:28:33,000 --> 00:28:35,000

It's a good day to be a myth buster.

512

00:28:35,000 --> 00:28:36,000

Got that right.

513

00:28:36,000 --> 00:28:38,000

So we know how fast the bullet flies.

514

00:28:38,000 --> 00:28:41,000

Now it's time for us to find out how fast the RPG goes.

515

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

We're going to take our RPG 7 launcher, set it up in the test stand,

516

00:28:44,000 --> 00:28:48,000

put our scales behind it, and plot the data points.

517

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

From that, we'll be able to find out where the bullet and the RPG are likely to be.

518

00:28:52,000 --> 00:28:56,000

And all that means is setting up the gauges just as before.

519

00:28:57,000 --> 00:29:00,000

The rocket is primed and it's firing time.

520

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

Okay, here we are.

521

00:29:02,000 --> 00:29:05,000

All right, now we can find out where the bullet and the rocket meet.

522

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

Okay, this is RPG speed test.

523

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

In five, four, three, two, one.

524

00:29:18,000 --> 00:29:19,000

You see, plant.

525

00:29:19,000 --> 00:29:20,000

Boom.

526

00:29:20,000 --> 00:29:21,000

You can't see it traveling.

527

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

You definitely need the high speed.

528

00:29:23,000 --> 00:29:25,000

Let's go do some calculations.

529

00:29:25,000 --> 00:29:26,000

Cool.

530

00:29:26,000 --> 00:29:27,000

Let's do some math.

531

00:29:27,000 --> 00:29:30,000

All right, well, let's use multiple data points because there's two stages.

532

00:29:30,000 --> 00:29:35,000

We reach 20 feet in 43 milliseconds, 40 feet in 83.6 milliseconds,

533

00:29:35,000 --> 00:29:41,000

60 feet at 125 milliseconds, and 80 feet at 161.3 milliseconds.

534

00:29:41,000 --> 00:29:46,000

Okay, so if we flip this around, we see the bullet and the RPG meet at 64 feet.

535

00:29:46,000 --> 00:29:50,000

So that's 64 feet from the bullet fire and 16 feet from the RPG fire.

536

00:29:50,000 --> 00:29:54,000

All right, so why don't we set up the RPG at that point between the two shooters

537

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

and see which one of them survives.

538

00:29:56,000 --> 00:29:57,000

If anybody.

539

00:29:57,000 --> 00:29:58,000

Go!

540

00:29:58,000 --> 00:29:59,000

Thanks.

541

00:29:59,000 --> 00:30:01,000

Adam and Jamie, take to the street.

542

00:30:01,000 --> 00:30:03,000

Hinderman crossing.

543

00:30:03,000 --> 00:30:07,000

But will their green bike get the green light?

544

00:30:08,000 --> 00:30:17,000

It's a given that if something's aerodynamic, it'll slice through the air better.

545

00:30:17,000 --> 00:30:25,000

But does making a bike more streamlined also mean it'll become greener than its four-wheel counterparts?

546

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

We've combed out the Alameda runway, and it is going to be our closed course for motorcycle testing today.

547

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

9.40.

548

00:30:32,000 --> 00:30:38,000

We're going to use it to replicate the exact same conditions of freeway and city driving we had for the first round of vehicle testing.

549

00:30:38,000 --> 00:30:43,000

Jamie's going to start out on the motorcycle and do seven laps all the way down to the end of the runway and back,

550

00:30:43,000 --> 00:30:47,000

which gives us 15 miles of freeway driving just like we want.

551

00:30:47,000 --> 00:30:53,000

This is both the start line and the finish line after a bunch of laps.

552

00:30:53,000 --> 00:30:56,000

Then I've marked out a little city course of some stop and go traffic,

553

00:30:56,000 --> 00:31:03,000

and that Jamie has to do 25 laps of to give us the 7.5 miles of city driving we need,

554

00:31:03,000 --> 00:31:06,000

and that should give us a set of comparable numbers.

555

00:31:06,000 --> 00:31:09,000

No city courses complete without signage.

556

00:31:09,000 --> 00:31:11,000

And we've got signage.

557

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

Hinderman crossing.

558

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

Yep, first is the baseline for the bike without its ferry.

559

00:31:17,000 --> 00:31:22,000

But before Jamie gets on his bike, why did he choose it for the beat the car test?

560

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

The name of the game here was to find a motorcycle that is as environmentally friendly as anything currently available on the market.

561

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

That means it needs to be a relatively small displacement, fuel injected, have a catalytic converter,

562

00:31:34,000 --> 00:31:39,000

and any other pollution controls available on motorcycles as of this day.

563

00:31:39,000 --> 00:31:41,000

So that's why we've selected this bike.

564

00:31:41,000 --> 00:31:48,000

It's a 250cc late model single cylinder motorcycle that meets all of those qualifications.

565

00:31:48,000 --> 00:31:53,000

And once again, the PEMS will sniff out all its emissions for this baseline test.

566

00:31:53,000 --> 00:31:54,000

Are you ready?

567

00:31:54,000 --> 00:31:55,000

I'm ready.

568

00:31:55,000 --> 00:32:00,000

Alright, remember, 7 big laps, 25 small ones, I'll be counting them down.

569

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

Here we go, late model, low displacement bike test, and 3, 2, 1, go!

570

00:32:10,000 --> 00:32:11,000

Oops.

571

00:32:11,000 --> 00:32:12,000

One more time.

572

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

In 3, 2, 1, go!

573

00:32:19,000 --> 00:32:20,000

And now we wait.

574

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

First off, Jamie goes round in circles at 50 miles per hour for 15 miles of freeway driving.

575

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

Now it's time for some city driving.

576

00:32:34,000 --> 00:32:37,000

Then he's in the loop for the city conditions.

577

00:32:37,000 --> 00:32:42,000

Complete with a stop sign and a 25 mile per hour speed limit.

578

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

Finally, after looping both loops for 30 minutes in the saddle,

579

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

now it's a finish line.

580

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

It's time to get a readout on the control data.

581

00:32:55,000 --> 00:32:56,000

The results are in.

582

00:32:56,000 --> 00:32:59,000

We have our baseline for our modern bike.

583

00:32:59,000 --> 00:33:03,000

The good news is that it's the most fuel efficient bike we've tested by far

584

00:33:03,000 --> 00:33:06,000

and gave the cars the best run for their money we've yet achieved.

585

00:33:06,000 --> 00:33:07,000

The bad news?

586

00:33:07,000 --> 00:33:11,000

Its dangerous emissions are still surprisingly high.

587

00:33:11,000 --> 00:33:14,000

Will our aerodynamic fairing increase the fuel efficiency?

588

00:33:14,000 --> 00:33:18,000

And will the increase in that fuel efficiency dilute the dangerous gases?

589

00:33:18,000 --> 00:33:19,000

I don't know.

590

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

But it's time to bring out the bubble.

591

00:33:23,000 --> 00:33:25,000

The prototype approaches.

592

00:33:29,000 --> 00:33:30,000

Are you ready for this?

593

00:33:30,000 --> 00:33:31,000

I am.

594

00:33:31,000 --> 00:33:32,000

All set.

595

00:33:32,000 --> 00:33:34,000

Alright, on the green flag.

596

00:33:34,000 --> 00:33:39,000

Bubble bike in 3, 2, 1, go!

597

00:33:40,000 --> 00:33:42,000

Ah, it's done.

598

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

Bubble bike in 3, 2, 1, go!

599

00:33:53,000 --> 00:33:56,000

That's the second time you pop the clutch on the starting line.

600

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

After an identical start, it's an identical course.

601

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

Starting with a pedal to the metal blast of freeway driving.

602

00:34:06,000 --> 00:34:08,000

Lap 1 is away.

603

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

You know those old films of people trying to take off clips and flying machines

604

00:34:15,000 --> 00:34:17,000

and they crash when they land?

605

00:34:17,000 --> 00:34:19,000

That's exactly what that thing looks like.

606

00:34:21,000 --> 00:34:23,000

I'm gonna like this.

607

00:34:23,000 --> 00:34:29,000

Then it's science fiction in motion as Jamie puts the bubble through its city driving paces.

608

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

It's getting kind of hot in here.

609

00:34:32,000 --> 00:34:35,000

Alright Jamie, this is your last lap. Last lap.

610

00:34:35,000 --> 00:34:38,000

And with that, Jamie's bubbly ride comes to an end.

611

00:34:45,000 --> 00:34:49,000

Nice work man. You are done. How'd that feel?

612

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

This thing is crazy, but I kinda like it.

613

00:34:52,000 --> 00:34:55,000

I'll tell you, it looks like a weird kind of primordial airplane

614

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

every time it takes off down the lane.

615

00:34:57,000 --> 00:34:58,000

It's gorgeous.

616

00:34:59,000 --> 00:35:04,000

Finally, it's down to the emissions data to either confirm or burst

617

00:35:04,000 --> 00:35:06,000

this eco bubble.

618

00:35:06,000 --> 00:35:10,000

I wish we had a second bike and we could ride the two of them off into the sunset, you know?

619

00:35:10,000 --> 00:35:12,000

Sure, why not?

620

00:35:14,000 --> 00:35:17,000

Like the sign says, it's crunch time. Let's have a look at the numbers.

621

00:35:17,000 --> 00:35:21,000

Alright, let's take a look and see how we did in the fuel economy category.

622

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

Well, the fairing bike did pretty well. It got 70.9 miles per gallon.

623

00:35:25,000 --> 00:35:27,000

It's the best across the board.

624

00:35:27,000 --> 00:35:31,000

Now, I would expect because of the increase in fuel efficiency to see a corresponding drop

625

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

in carbon dioxide emissions, let's call up the carbon dioxide chart and see how we did.

626

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

And there you go. 105 grams, that's a fraction of everything else on the chart.

627

00:35:40,000 --> 00:35:44,000

That is fantastic. Now I'd like to see how we did in all of the other emissions.

628

00:35:44,000 --> 00:35:46,000

Let's call up the last chart.

629

00:35:46,000 --> 00:35:48,000

Oh, not so good.

630

00:35:48,000 --> 00:35:52,000

It is solidly in the middle and the cars are still winning hands down.

631

00:35:52,000 --> 00:35:53,000

Yep.

632

00:35:53,000 --> 00:35:54,000

Where does that leave us?

633

00:35:54,000 --> 00:35:59,000

Well, you know it's tricky because if you look at CO2 alone, the bikes win by a large margin.

634

00:35:59,000 --> 00:36:03,000

But if you look at all the other pollutants, then the cars are far better for the environment.

635

00:36:03,000 --> 00:36:06,000

I think it's got to be busted. Here's why.

636

00:36:06,000 --> 00:36:10,000

Over time, cars have made a remarkable improvement, very steadily.

637

00:36:10,000 --> 00:36:15,000

And the bikes, well, the bikes have gotten better, but not near as much.

638

00:36:15,000 --> 00:36:21,000

Yep, I agree. At this point in time, it is not better for the environment to trade your car for a bike.

639

00:36:26,000 --> 00:36:27,000

Next up.

640

00:36:27,000 --> 00:36:29,000

I think everybody's dying.

641

00:36:29,000 --> 00:36:34,000

The finale of Bullet vs. RBG goes out with a bang.

642

00:36:39,000 --> 00:36:44,000

In the deserts of New Mexico, it's time to test the survivability of this.

643

00:36:49,000 --> 00:36:53,000

But before they bring in the dummies, there's just one problem.

644

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

I lost my hand.

645

00:36:54,000 --> 00:37:00,000

Okay, John, so based on our data, if an RPG shooter and a gun shooter are 80 feet apart,

646

00:37:00,000 --> 00:37:04,000

the RPG and the bullet will meet at 16 feet in front of the RPG shooter.

647

00:37:04,000 --> 00:37:05,000

What do you think about this?

648

00:37:05,000 --> 00:37:08,000

The biggest problem with that is that the RPG won't be armed at 16 feet.

649

00:37:08,000 --> 00:37:10,000

It takes a lot farther to get out.

650

00:37:10,000 --> 00:37:13,000

The RPG is just going to keep right on going like a really big bullet.

651

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

Yep, and that's all down to the two stages of the RPG's firing system.

652

00:37:20,000 --> 00:37:26,000

The first stage of ignition throws the grenade out of the launcher at around 384 feet per second.

653

00:37:26,000 --> 00:37:33,000

This sudden acceleration triggers stage two, activating the rocket propulsion and arming the warhead.

654

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

So unlike the movie, the rocket must be at least 60 feet from its target to arm.

655

00:37:38,000 --> 00:37:42,000

So it looks like the myth has pretty much busted out right, but what if it were a fluke?

656

00:37:42,000 --> 00:37:45,000

How could we still look at this explosion?

657

00:37:45,000 --> 00:37:49,000

We can do this by actually moving the target farther away from the RPG launcher to a range

658

00:37:49,000 --> 00:37:56,000

where it will actually be armed and positioning our dummies in the appropriate positions for the two individuals.

659

00:37:56,000 --> 00:37:58,000

Alright, can I fire the RPG?

660

00:37:58,000 --> 00:38:00,000

Ooh, we'll see.

661

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

Yes!

662

00:38:01,000 --> 00:38:03,000

Right, all is not lost.

663

00:38:03,000 --> 00:38:09,000

For the final parameter of survivability, they'll tweak the setup to simulate a faulty RPG.

664

00:38:09,000 --> 00:38:15,000

This time, the RPG will fire from 60 feet behind the stand-in rocketeer.

665

00:38:15,000 --> 00:38:19,000

I think we might have to increase our budget on mannequins. This is pretty ugly woman.

666

00:38:20,000 --> 00:38:21,000

Come here often.

667

00:38:21,000 --> 00:38:28,000

And just like the movie, 16 feet in front of her is where the now-armed warhead will trigger.

668

00:38:28,000 --> 00:38:30,000

But instead of a bullet...

669

00:38:30,000 --> 00:38:32,000

Now this piece of acrylic is representing our bullet.

670

00:38:32,000 --> 00:38:37,000

Now we know once the RPG is armed, it doesn't take much to set it off.

671

00:38:37,000 --> 00:38:42,000

And finally, 64 feet from that is where a gun-totan dummy will be positioned.

672

00:38:42,000 --> 00:38:46,000

Oh, wait a minute. You're John Malkovich. You don't get any hair.

673

00:38:46,000 --> 00:38:50,000

And for the lethality of the blast, well, each dummy will have two gauges.

674

00:38:50,000 --> 00:38:57,000

Alright, what I have here is a large piece of pork belly. This is going to act like our human flesh.

675

00:38:57,000 --> 00:38:59,000

That's good. I like that. It's a nice hat.

676

00:38:59,000 --> 00:39:02,000

Firstly, the gory low-tech version.

677

00:39:02,000 --> 00:39:04,000

Oh, God, it smells so bad.

678

00:39:04,000 --> 00:39:07,000

It's got muscle. It's got flesh. It's got fat.

679

00:39:07,000 --> 00:39:11,000

The shrapnel goes through this. We do the mannequin. We know that's a kill.

680

00:39:11,000 --> 00:39:15,000

And second, the excitingly named high-tech version.

681

00:39:15,000 --> 00:39:19,000

To measure the blast wave of the explosion, we're using this. It's a bikini gauge.

682

00:39:19,000 --> 00:39:22,000

You know, when you said bikini gauge, it had something totally different in mind.

683

00:39:22,000 --> 00:39:28,000

Now the way it works is that we have foils spread over holes that represent different tolerances for the overpressure.

684

00:39:28,000 --> 00:39:31,000

When the foil bursts, that will indicate our number.

685

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

Now, if this right here bursts, that's 20 to 25 PSI. That means that our shooters died from just the pressure wave.

686

00:39:37,000 --> 00:39:44,000

Now there's only one way to find out. They're bunkering down for the RPG survivability.

687

00:39:46,000 --> 00:39:51,000

Okay, this is survivability test RPG shooter versus bullet shooter.

688

00:39:51,000 --> 00:39:56,000

In five, four, three, two, one.

689

00:40:01,000 --> 00:40:06,000

That was intense.

690

00:40:06,000 --> 00:40:08,000

Intense is right.

691

00:40:08,000 --> 00:40:16,000

Unsurprisingly, the RPG detonates and throws forward a shower of molten copper and debris.

692

00:40:16,000 --> 00:40:20,000

But did the dummies survive it?

693

00:40:20,000 --> 00:40:25,000

I don't believe this. She's still alive in the movie. She was totally decimated.

694

00:40:26,000 --> 00:40:29,000

Yeah, and that goes along with what we've been seeing with these RPGs.

695

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

I mean, they're not like regular grenades. It's very directional.

696

00:40:32,000 --> 00:40:38,000

But look at that. Our bikini gauges are still intact, which means she would have survived that blast wave.

697

00:40:38,000 --> 00:40:45,000

Unlike the movie, the villain made it through. But more surprisingly, so did the good guy.

698

00:40:45,000 --> 00:40:51,000

Oh my God, that is incredible. He did not get touched. I mean, he didn't get hit by one single bit.

699

00:40:52,000 --> 00:40:55,000

And look, our bikini gauge didn't get ruptured.

700

00:40:55,000 --> 00:41:00,000

Yeah, he may have survived, but just by luck, there was a stream of molten copper coming straight at him.

701

00:41:00,000 --> 00:41:03,000

If he were one foot over, he'd be totally Swiss cheese.

702

00:41:06,000 --> 00:41:11,000

Especially since in the movie, the warhead would not have been armed on contact with the bullet,

703

00:41:11,000 --> 00:41:15,000

but on contact with the gun totem good guy.

704

00:41:15,000 --> 00:41:18,000

Yeah, this is the exact opposite of what it was in the movie.

705

00:41:18,000 --> 00:41:22,000

She would likely have been killed and she would likely have survived. It's busted.

706

00:41:22,000 --> 00:41:23,000

Totally busted.

707

00:41:23,000 --> 00:41:26,000

Hollywood, not being scientifically accurate again.

708

00:41:26,000 --> 00:41:27,000

Ha.

709

00:41:28,000 --> 00:41:32,000

Look, I'll admit it, I was fooled by Hollywood, but here's why.

710

00:41:32,000 --> 00:41:37,000

Normally when we see an RPG hit something, there's a big blast and then that thing explodes.

711

00:41:37,000 --> 00:41:43,000

But in this case, the RPG exploded in midair. There was nothing to create any shrapnel.

712

00:41:43,000 --> 00:41:48,000

And the bullet, it didn't have very much mass, so there's nothing to stop that energy in its tracks.

713

00:41:48,000 --> 00:41:53,000

As a result, all the energy went forward exactly as it was designed to.

714

00:41:57,000 --> 00:41:59,000

Well, that didn't suck.

715

00:41:59,000 --> 00:42:01,000

No, it didn't.

716

00:42:01,000 --> 00:42:04,000

Another day of work for the Mythbusters.