

1

00:00:00,000 --> 00:00:03,600

On this illuminating episode of Mythbusters...

2

00:00:03,600 --> 00:00:04,800

Ah!

3

00:00:04,800 --> 00:00:06,400

There, one is first class.

4

00:00:06,400 --> 00:00:09,000

Adam and Jamie have a smashing time.

5

00:00:09,000 --> 00:00:11,600

I can see nothing! This is insane!

6

00:00:11,600 --> 00:00:14,800

As they reflect on something truly enlightening.

7

00:00:14,800 --> 00:00:17,200

That looks great! I didn't think it would be this good.

8

00:00:17,200 --> 00:00:19,800

Can you really use mirrors and the sun?

9

00:00:19,800 --> 00:00:22,600

Hold, I am the master of the sun.

10

00:00:22,600 --> 00:00:24,800

As a form of ancient lighting.

11

00:00:24,800 --> 00:00:26,000

There it is!

12

00:00:26,000 --> 00:00:26,800

Boink!

13

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

Man, that's bright.

14

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

Then Tori, Grant and Carrie...

15

00:00:29,800 --> 00:00:30,600

Ah!

16

00:00:30,600 --> 00:00:32,600

That was hairball!

17

00:00:32,600 --> 00:00:34,800

...investigate a freeway fable.

18

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

I think there's some law enforcement people here.

19

00:00:36,800 --> 00:00:38,600

Very interesting talking to them.

20

00:00:38,600 --> 00:00:41,600

...that you can slow down an out of control vehicle.

21

00:00:41,600 --> 00:00:44,400

Your idea of a safe stop is to shank me.

22

00:00:44,400 --> 00:00:48,000

...by playing bumper cars on the blacktop.

23

00:00:48,000 --> 00:00:49,800

We're on the road to madness!

24

00:00:52,600 --> 00:00:54,400

Who are the Mythbusters?

25

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

Adam Savage.

26

00:00:57,000 --> 00:00:58,600

What more do you need to know?

27

00:00:58,600 --> 00:01:00,000

And Jamie Heidemann.

28

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

One in doubt. C4.

29

00:01:02,000 --> 00:01:06,400

Between them more than 30 years of special effects experience.

30

00:01:06,400 --> 00:01:08,200

Joining them...

31

00:01:08,200 --> 00:01:10,000

Grant Imahara.

32

00:01:10,000 --> 00:01:11,400

It's lethal people!

33

00:01:11,400 --> 00:01:12,600

Carrie Byron.

34

00:01:12,600 --> 00:01:14,000

Jamie just doesn't look right.

35

00:01:14,000 --> 00:01:15,800

And Tori Belleggi.

36

00:01:15,800 --> 00:01:17,200

And touchdown!

37

00:01:17,200 --> 00:01:19,400

They don't just tell the myths.

38

00:01:19,400 --> 00:01:21,400

They put them to the test.

39

00:01:27,400 --> 00:01:32,400

I've got a story for you to reflect on.

40

00:01:32,400 --> 00:01:33,400

Hit me.

41

00:01:33,400 --> 00:01:36,400

I will hit you with the sun's rays.

42

00:01:36,400 --> 00:01:41,400

In the film The Mummy, there's a scene in which the hero has to go deep into a dark tomb.

43

00:01:41,400 --> 00:01:46,400

And in order to light his way, he kicks into gear a system of ancient Egyptian mirrors.

44

00:01:46,400 --> 00:01:51,400

Which bounce the sun's rays from outside deep into the bowels of the cavernous tomb.

45

00:01:51,400 --> 00:01:53,400

So that they can navigate safely.

46

00:01:53,400 --> 00:01:54,400

How enlightened.

47

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

Well, that's the question, isn't it?

48

00:01:56,400 --> 00:01:58,400

That's the question.

49

00:01:58,400 --> 00:01:59,400

And here's the clip.

50

00:01:59,400 --> 00:02:02,400

Sunlight is bounced into the Mummy's tomb.

51

00:02:02,400 --> 00:02:05,400

And then there was light.

52

00:02:05,400 --> 00:02:09,400

But is this ancient illumination really possible?

53

00:02:11,400 --> 00:02:12,400

So what do you want to do first?

54

00:02:12,400 --> 00:02:17,400

Well, look, this myth is all about lighting up the darkness with the sun's rays reflected.

55

00:02:17,400 --> 00:02:18,400

We need to answer the question.

56

00:02:18,400 --> 00:02:20,400

What does it mean to light up the darkness?

57

00:02:20,400 --> 00:02:21,400

We need to define that.

58

00:02:21,400 --> 00:02:25,400

What's the minimum amount of light necessary to move around in an unfamiliar space?

59

00:02:25,400 --> 00:02:26,400

Exactly.

60

00:02:26,400 --> 00:02:29,400

And I think I've got just a procedure to test this out.

61

00:02:29,400 --> 00:02:30,400

Okay.

62

00:02:30,400 --> 00:02:31,400

Oh, don't worry.

63

00:02:31,400 --> 00:02:32,400

You're going to love it.

64

00:02:34,400 --> 00:02:37,400

Before we start bouncing light around the shop with mirrors,

65

00:02:37,400 --> 00:02:40,400

we need to determine a couple of benchmarks that we'll be aiming for in these tests.

66

00:02:40,400 --> 00:02:43,400

The first one we've determined is the Hollywood benchmark.

67

00:02:43,400 --> 00:02:47,400

This is the amount of lighting that they use to light up the darkness.

68

00:02:47,400 --> 00:02:50,400

The amount of lighting that they used while filming the film

69

00:02:50,400 --> 00:02:55,400

that properly tells the story of a light beam bouncing around with mirrors and lighting up a room.

70

00:02:55,400 --> 00:02:58,400

The second benchmark is what I consider to be the heart and soul of this story,

71

00:02:58,400 --> 00:03:04,400

and it is what is the minimum amount of ambient light required to see.

72

00:03:05,400 --> 00:03:10,400

So step one is finding the minimum benchmark light level needed to see by.

73

00:03:10,400 --> 00:03:14,400

And Adam's brainwave to test it is a makeshift maze.

74

00:03:14,400 --> 00:03:18,400

We are going to try and make it through this obstacle course under very low light conditions

75

00:03:18,400 --> 00:03:21,400

to determine the minimum light conditions you can make it through this optical course

76

00:03:21,400 --> 00:03:23,400

without breaking anything.

77

00:03:27,400 --> 00:03:28,400

That's the sound of failure.

78

00:03:28,400 --> 00:03:34,400

With the course set, the guys focus on benchmark one, the Hollywood level of illumination.

79

00:03:34,400 --> 00:03:35,400

I'm all set.

80

00:03:35,400 --> 00:03:39,400

That means playing with the light level until it matches that of the movie.

81

00:03:40,400 --> 00:03:41,400

Okay, that works for me.

82

00:03:41,400 --> 00:03:43,400

And then record the lux level.

83

00:03:43,400 --> 00:03:47,400

We're going to measure our ambient light level using a meter like this one,

84

00:03:47,400 --> 00:03:52,400

which receives light in through the sensor here and converts that to an electrical signal.

85

00:03:52,400 --> 00:03:56,400

Now our computer converts that signal into what is known as lux.

86

00:03:57,400 --> 00:04:03,400

In the days when candles were king, scientists determined that one lux is the amount of illumination

87

00:04:03,400 --> 00:04:07,400

that falls over one square meter if a candle is set one meter away.

88

00:04:07,400 --> 00:04:13,400

Using this scale, about 300 lux is the minimum level needed to read by.

89

00:04:13,400 --> 00:04:16,400

But how many lux is the movie scene?

90

00:04:16,400 --> 00:04:24,400

To find out, it's trial by tweaking as the mythbusters crank up the levels bit by bit.

91

00:04:24,400 --> 00:04:25,400

201 lux.

92

00:04:25,400 --> 00:04:33,400

And with the benefit of a jump cut or two, they soon find the level they think is a lux lookalike for the mummy.

93

00:04:34,400 --> 00:04:35,400

This looks great.

94

00:04:35,400 --> 00:04:37,400

It looks just like the movie.

95

00:04:37,400 --> 00:04:40,400

Okay, that gives us an average of 200 lux.

96

00:04:40,400 --> 00:04:43,400

So that's the Hollywood level sorted.

97

00:04:43,400 --> 00:04:45,400

How will benchmark 2 compare?

98

00:04:45,400 --> 00:04:47,400

Adam's got a plan.

99

00:04:48,400 --> 00:04:53,400

Since the archeologists in this myth went from the bright sun into the tomb, we're going to do the same thing.

100

00:04:53,400 --> 00:04:57,400

Here I am in Jamie's electronics room with two lights simulating the bright sun.

101

00:04:57,400 --> 00:05:02,400

I will then leave the electronics room and walk down the tunnel of Osiris,

102

00:05:02,400 --> 00:05:06,400

otherwise known as Jamie's battery and wire storage shelf.

103

00:05:06,400 --> 00:05:13,400

I will then enter the main shop area, which will be pitch black, and I'll use this rope to guide myself out into the middle of the shop.

104

00:05:13,400 --> 00:05:17,400

And when I hit the knot, I turn and start to walk the obstacle course.

105

00:05:17,400 --> 00:05:27,400

The question is, what is the minimum amount of light required for me to walk this obstacle course without breaking anything?

106

00:05:27,400 --> 00:05:28,400

It's not going to be easy.

107

00:05:28,400 --> 00:05:33,400

To find out, Adam set his overhead light source to its bare minimum setting.

108

00:05:33,400 --> 00:05:36,400

Okay, Adam, go ahead and do your thing.

109

00:05:36,400 --> 00:05:37,400

All right, here I go.

110

00:05:37,400 --> 00:05:40,400

Jamie monitors progress on an infrared camera.

111

00:05:41,400 --> 00:05:43,400

Holy crap, there he is.

112

00:05:43,400 --> 00:05:45,400

I can see nothing.

113

00:05:45,400 --> 00:05:53,400

And for those of you who find the sound of breaking glass disturbing, now might be a good time to switch your set to mute.

114

00:05:53,400 --> 00:05:54,400

Oh, shi-

115

00:05:54,400 --> 00:05:57,400

This is, I'm the worst archeologist ever.

116

00:05:57,400 --> 00:06:00,400

It's a bruising encounter.

117

00:06:00,400 --> 00:06:06,400

As Adam, this is insane, stumbles his way through the wine glass maze.

118

00:06:06,400 --> 00:06:08,400

Here I am, I made it to the end.

119

00:06:08,400 --> 00:06:13,400

And it's clear this light level is far too low for the human eye test.

120

00:06:13,400 --> 00:06:15,400

That was a horse, so...

121

00:06:15,400 --> 00:06:18,400

You pretty much broke every glass that was in your path.

122

00:06:18,400 --> 00:06:21,400

Yeah, I think we need to turn up the lights a little bit.

123

00:06:21,400 --> 00:06:24,400

Let's make it a little brighter and see if I can't make out some of these shapes.

124

00:06:24,400 --> 00:06:25,400

Okay.

125

00:06:25,400 --> 00:06:27,400

I'll replace the glasses.

126

00:06:29,400 --> 00:06:32,400

Adam tries a slightly increased light level.

127

00:06:32,400 --> 00:06:33,400

There we go.

128

00:06:33,400 --> 00:06:35,400

One notch up and sets off again.

129

00:06:35,400 --> 00:06:37,400

Okay, Adam, you're good to go.

130

00:06:37,400 --> 00:06:39,400

All right, here I go.

131

00:06:39,400 --> 00:06:42,400

Man, I can't make out...

132

00:06:42,400 --> 00:06:45,400

There, one in his first glass.

133

00:06:45,400 --> 00:06:47,400

I'm starting to be able to see things.

134

00:06:47,400 --> 00:06:48,400

Oh, my eyes are adjusting.

135

00:06:48,400 --> 00:06:50,400

Yeah, he's doing a lot better, actually.

136

00:06:50,400 --> 00:06:51,400

It's still a blue...

137

00:06:51,400 --> 00:06:52,400

Oh!

138

00:06:52,400 --> 00:06:53,400

There's number two.

139

00:06:53,400 --> 00:06:54,400

Oh!

140

00:06:54,400 --> 00:06:55,400

Number three.

141

00:06:55,400 --> 00:06:56,400

Ah!

142

00:06:56,400 --> 00:06:57,400

Four.

143

00:06:57,400 --> 00:06:58,400

Six.

144

00:06:58,400 --> 00:06:59,400

Five.

145

00:06:59,400 --> 00:07:01,400

And after a disappointing start...

146

00:07:01,400 --> 00:07:02,400

Seven.

147

00:07:02,400 --> 00:07:06,400

It soon becomes another catacomb catastrophe.

148

00:07:06,400 --> 00:07:09,400

So they increase the light level again.

149

00:07:09,400 --> 00:07:11,400

And again.

150

00:07:11,400 --> 00:07:13,400

And again.

151

00:07:13,400 --> 00:07:18,400

But it's not until light level six that Adam finally makes it.

152

00:07:18,400 --> 00:07:19,400

This is it.

153

00:07:19,400 --> 00:07:20,400

This is a light level.

154

00:07:20,400 --> 00:07:21,400

I'm going to make it the whole way.

155

00:07:21,400 --> 00:07:24,400

Oh, oh, oh, oh, oh, oh, oh.

156

00:07:24,400 --> 00:07:26,400

Hello!

157

00:07:26,400 --> 00:07:28,400

I made it.

158

00:07:28,400 --> 00:07:34,400

So they break out the lux meter to shed some science on this final setting.

159

00:07:34,400 --> 00:07:35,400

What's the verdict?

160

00:07:35,400 --> 00:07:36,400

How dim is it?

161

00:07:36,400 --> 00:07:39,400

I get .389 of a lux.

162

00:07:39,400 --> 00:07:40,400

Of ambient light?

163

00:07:40,400 --> 00:07:41,400

Yeah.

164

00:07:41,400 --> 00:07:43,400

That is amazingly dim.

165

00:07:43,400 --> 00:07:50,400

At 0.39 lux, the minimum human eye level is 500 times dimmer than Hollywood.

166

00:07:50,400 --> 00:07:59,400

And with both benchmarks in the bag, the question now is can bouncing light with mirrors beat either benchmark?

167

00:07:59,400 --> 00:08:01,400

All right, let's turn out the lights.

168

00:08:11,400 --> 00:08:17,400

All right, so this next myth is all about driving fast out of control and it's totally dangerous.

169

00:08:17,400 --> 00:08:18,400

I love it already.

170

00:08:18,400 --> 00:08:19,400

What is it?

171

00:08:19,400 --> 00:08:26,400

If a car was out of control, could you overtake them, get in front of them and then slow down until you brought that out of control car to a stop?

172

00:08:26,400 --> 00:08:29,400

So as if they had fallen asleep or had a heart attack.

173

00:08:29,400 --> 00:08:30,400

Exactly.

174

00:08:30,400 --> 00:08:31,400

Great, let's try it.

175

00:08:31,400 --> 00:08:37,400

When a driver passes out of the wheel, things get very bad, very fast.

176

00:08:37,400 --> 00:08:40,400

But does it have to end up like this?

177

00:08:40,400 --> 00:08:42,400

Well, apparently not.

178

00:08:42,400 --> 00:08:53,400

Because according to this myth, you can safely stop a runaway car by overtaking it, then carefully bringing it to a standstill, freeway fact or blacktop baloney.

179

00:08:53,400 --> 00:08:55,400

Okay, as I see it, we have two scenarios.

180

00:08:55,400 --> 00:09:00,400

First, the driver's lost total control of the car and has no influence over it all.

181

00:09:00,400 --> 00:09:03,400

There's no steering and the foot is off the accelerator.

182

00:09:03,400 --> 00:09:04,400

So, just coasting then.

183

00:09:04,400 --> 00:09:05,400

Exactly.

184

00:09:05,400 --> 00:09:08,400

The second scenario is a little more extreme.

185

00:09:08,400 --> 00:09:11,400

There's still no steering, but the foot's jammed onto the accelerator.

186

00:09:11,400 --> 00:09:12,400

Would that make a difference?

187

00:09:12,400 --> 00:09:14,400

Alright, so we have two tests.

188

00:09:14,400 --> 00:09:16,400

It sounds like we need to go to Stunt Driving School.

189

00:09:16,400 --> 00:09:22,400

I mean, if this myth is about a car out of control, we need to see what it feels like to be in a car that's out of control.

190

00:09:22,400 --> 00:09:24,400

That is a fantastic idea.

191

00:09:24,400 --> 00:09:27,400

QL, ramped up shot and they're ready to roll.

192

00:09:27,400 --> 00:09:33,400

We're out at the Alameda runway, but before we can start our experiment, we need to learn a little precision driving.

193

00:09:33,400 --> 00:09:36,400

We're going to learn how to approach, bump and overtake a car.

194

00:09:36,400 --> 00:09:43,400

Yep, and the man to take charge of all that scary stuff, long time driving instructor Marvin Ruff.

195

00:09:43,400 --> 00:09:48,400

What sorts of skills would we need to learn in order to pull this maneuver off?

196

00:09:48,400 --> 00:09:55,400

You need to learn how to approach a car, how to get alongside it, and how to slowly make contact with that car and get it to stop.

197

00:09:57,400 --> 00:10:04,400

Unlike the real testing to come later, for this training, Carrie will always be in control of her car.

198

00:10:04,400 --> 00:10:06,400

Marvin's part is to teach Grant to...

199

00:10:06,400 --> 00:10:08,400

Twenty miles an hour?

200

00:10:08,400 --> 00:10:09,400

...Overtake...

201

00:10:09,400 --> 00:10:12,400

Move over in front.

202

00:10:12,400 --> 00:10:14,400

Okay, here we go.

203

00:10:14,400 --> 00:10:15,400

...Slow his car down...

204

00:10:15,400 --> 00:10:17,400

Oh my God, this feels crazy!

205

00:10:17,400 --> 00:10:19,400

...Back the bumper against hers...

206

00:10:19,400 --> 00:10:20,400

Landing an airplane.

207

00:10:20,400 --> 00:10:23,400

It's slowing down too fast, we're going to crash.

208

00:10:25,400 --> 00:10:27,400

You are good.

209

00:10:27,400 --> 00:10:29,400

Now, just start pushing on that brake.

210

00:10:29,400 --> 00:10:31,400

...And bring it all to a stop.

211

00:10:32,400 --> 00:10:34,400

Okay, there it is.

212

00:10:34,400 --> 00:10:35,400

Nice!

213

00:10:35,400 --> 00:10:37,400

Thank you!

214

00:10:37,400 --> 00:10:38,400

That's awesome!

215

00:10:38,400 --> 00:10:40,400

Yeah, we didn't die!

216

00:10:40,400 --> 00:10:44,400

So that's Training Hurdle One passed with flying colors.

217

00:10:47,400 --> 00:10:49,400

Alright, what do you think?

218

00:10:49,400 --> 00:10:52,400

Well, we were only going 20, but I think you did a really nice job.

219

00:10:52,400 --> 00:10:55,400

I only did that at 20 miles an hour.

220

00:10:55,400 --> 00:10:59,400

I think as we attempt to try this at faster and faster speeds,

221

00:10:59,400 --> 00:11:01,400

it's going to get a lot harder.

222

00:11:01,400 --> 00:11:03,400

Next, it's Challenge Two,

223

00:11:03,400 --> 00:11:06,400

learning what it feels like when something goes wrong.

224

00:11:06,400 --> 00:11:09,400

Courtesy of the infamous pit maneuver.

225

00:11:09,400 --> 00:11:13,400

Here we go, in three, two, one, go!

226

00:11:13,400 --> 00:11:15,400

Trying to get away from the law.

227

00:11:15,400 --> 00:11:18,400

Scarier still, the rain set in.

228

00:11:18,400 --> 00:11:20,400

And ready to put them into a spin,

229

00:11:20,400 --> 00:11:22,400

Marvin stalks the red car.

230

00:11:22,400 --> 00:11:24,400

Here he comes!

231

00:11:24,400 --> 00:11:26,400

Pulls up alongside.

232

00:11:26,400 --> 00:11:29,400

Ready to go out of control!

233

00:11:29,400 --> 00:11:31,400

Touches the rear fender.

234

00:11:39,400 --> 00:11:41,400

He just got pit maneuvered!

235

00:11:44,400 --> 00:11:47,400

That felt so good!

236

00:11:47,400 --> 00:11:49,400

It's good to be out of control sometimes.

237

00:11:49,400 --> 00:11:50,400

Training's done.

238

00:11:50,400 --> 00:11:53,400

They're pumped, pumped.

239

00:11:53,400 --> 00:11:55,400

He just got pit maneuvered!

240

00:11:55,400 --> 00:11:57,400

And amped to ramp.

241

00:11:57,400 --> 00:12:00,400

I think I feel the need, the need for speed.

242

00:12:00,400 --> 00:12:02,400

I think we can go faster now.

243

00:12:02,400 --> 00:12:05,400

Coming up on Mythbusters.

244

00:12:05,400 --> 00:12:06,400

Ta-da!

245

00:12:06,400 --> 00:12:11,400

Then, techniques of bumper stopping a careering car.

246

00:12:12,400 --> 00:12:14,400

Here we go.

247

00:12:14,400 --> 00:12:17,400

Oh, alright, alright, nice work!

248

00:12:24,400 --> 00:12:29,400

Can mirrors illuminate a murky mausoleum using the sun?

249

00:12:29,400 --> 00:12:32,400

The film The Mummy claims it can.

250

00:12:32,400 --> 00:12:35,400

And then there was light.

251

00:12:35,400 --> 00:12:38,400

But is this history or who-y?

252

00:12:38,400 --> 00:12:40,400

To find out, Adam and Jamie have established

253

00:12:40,400 --> 00:12:43,400

two benchmarks of illumination.

254

00:12:43,400 --> 00:12:45,400

I can see nothing!

255

00:12:45,400 --> 00:12:47,400

A Hollywood lighting level.

256

00:12:47,400 --> 00:12:48,400

200 lux.

257

00:12:48,400 --> 00:12:49,400

And a human eye level.

258

00:12:49,400 --> 00:12:52,400

I get .389 of a lux.

259

00:12:52,400 --> 00:12:55,400

And now, by using two types of mirrors,

260

00:12:55,400 --> 00:12:58,400

will they be able to match either benchmark?

261

00:12:59,400 --> 00:13:02,400

Well, first up, Adam polishes up some

262

00:13:02,400 --> 00:13:04,400

Yoldi metal mirrors.

263

00:13:04,400 --> 00:13:06,400

And Jamie lines them up.

264

00:13:06,400 --> 00:13:08,400

We've set these mirrors up to bounce light

265

00:13:08,400 --> 00:13:10,400

from mirror to mirror down the length of the room.

266

00:13:10,400 --> 00:13:13,400

Our goal is to see if those beams

267

00:13:13,400 --> 00:13:15,400

will raise the ambient light level.

268

00:13:15,400 --> 00:13:18,400

To test this myth, they'll line up their mirrors

269

00:13:18,400 --> 00:13:20,400

and try a sun substitute.

270

00:13:20,400 --> 00:13:22,400

The artificial sun for this test needs to be

271

00:13:22,400 --> 00:13:25,400

like the sun that is heavily collimated.

272

00:13:25,400 --> 00:13:27,400

That means all the light beams are actually

273

00:13:27,400 --> 00:13:29,400

traveling parallel to each other.

274

00:13:29,400 --> 00:13:31,400

And the most collimated light we can rent is this.

275

00:13:31,400 --> 00:13:33,400

A spotlight.

276

00:13:35,400 --> 00:13:37,400

And with the metal mirrors lined up,

277

00:13:37,400 --> 00:13:39,400

it's time for a moment of discovery.

278

00:13:39,400 --> 00:13:41,400

When the shop lights are turned off,

279

00:13:41,400 --> 00:13:44,400

how bright will the mirrors light be?

280

00:13:44,400 --> 00:13:46,400

Alright, let's turn out the lights.

281

00:13:46,400 --> 00:13:48,400

It looks great!

282

00:13:48,400 --> 00:13:50,400

I didn't think it would be this good.

283

00:13:50,400 --> 00:13:52,400

Adam's right.

284

00:13:52,400 --> 00:13:55,400

First impressions are that these mirrors are working well.

285

00:13:55,400 --> 00:13:58,400

But crucially, how are they doing in the lux department?

286

00:13:58,400 --> 00:13:59,400

Got it.

287

00:13:59,400 --> 00:14:00,400

Alright.

288

00:14:00,400 --> 00:14:03,400

The average ambient light of the polished metal,

289

00:14:03,400 --> 00:14:05,400

1.13 lux.

290

00:14:05,400 --> 00:14:08,400

Do our light bouncing mirrors work like they do in the film?

291

00:14:08,400 --> 00:14:10,400

I'd say that they do.

292

00:14:10,400 --> 00:14:12,400

There is an impressive amount of ambient light in this room,

293

00:14:12,400 --> 00:14:14,400

solely because of the mirrors.

294

00:14:14,400 --> 00:14:16,400

Do they look like they do in the movie?

295

00:14:16,400 --> 00:14:18,400

No, they do not.

296

00:14:18,400 --> 00:14:20,400

By the sixth mirror, this beam is no longer collimated.

297

00:14:20,400 --> 00:14:23,400

It is a heavily, heavily scattered affair.

298

00:14:23,400 --> 00:14:27,400

The scattering, or loss of focus, is not a good look.

299

00:14:27,400 --> 00:14:30,400

But the level of light itself is promising.

300

00:14:30,400 --> 00:14:32,400

It's clearly not as bright as the movie,

301

00:14:32,400 --> 00:14:35,400

but it is better than their naked-eye benchmark.

302

00:14:35,400 --> 00:14:39,400

So can modern glass be a more polished performer?

303

00:14:39,400 --> 00:14:42,400

This is our polished metal mirror.

304

00:14:42,400 --> 00:14:44,400

And this is our glass mirror.

305

00:14:44,400 --> 00:14:47,400

Obviously, the glass mirror is more reflective.

306

00:14:47,400 --> 00:14:49,400

Is that what we really want?

307

00:14:49,400 --> 00:14:54,400

It may be the case that the metal mirror is actually diffusing light more,

308

00:14:54,400 --> 00:14:57,400

and therefore, lighting up the ambient light in the room more.

309

00:14:57,400 --> 00:15:00,400

We're just going to have to try to find out.

310

00:15:00,400 --> 00:15:04,400

So to do that, they position the mirrors with the overhead lights on.

311

00:15:04,400 --> 00:15:07,400

And then, the mirrors are in place, and they look great.

312

00:15:07,400 --> 00:15:10,400

Here we go.

313

00:15:10,400 --> 00:15:12,400

That looks fantastic.

314

00:15:12,400 --> 00:15:14,400

It looks just like the movie.

315

00:15:14,400 --> 00:15:16,400

Surprise, surprise.

316

00:15:16,400 --> 00:15:18,400

The modern glass looks better.

317

00:15:18,400 --> 00:15:19,400

Good.

318

00:15:19,400 --> 00:15:21,400

But does the data back that up?

319

00:15:21,400 --> 00:15:23,400

How did our glass mirrors do?

320

00:15:23,400 --> 00:15:24,400

You're going to love this.

321

00:15:24,400 --> 00:15:27,400

First, you remember the ambient light reading we got from the polished metal

322

00:15:27,400 --> 00:15:29,400

was 1.13 lux?

323

00:15:29,400 --> 00:15:34,400

Our glass mirrors came in at 0.487 lux.

324

00:15:34,400 --> 00:15:35,400

Who knew?

325

00:15:35,400 --> 00:15:36,400

I know.

326

00:15:36,400 --> 00:15:37,400

Less than half.

327

00:15:37,400 --> 00:15:38,400

Isn't that amazing?

328

00:15:38,400 --> 00:15:41,400

There seems to be more going on here than meets the eye.

329

00:15:41,400 --> 00:15:45,400

The goal of all this is to raise the ambient light level in a room.

330

00:15:45,400 --> 00:15:48,400

And mirrors alone aren't going to cut it.

331

00:15:48,400 --> 00:15:51,400

That light needs to hit something that scatters it.

332

00:15:51,400 --> 00:15:54,400

It could be my white shirt, or it can be fog,

333

00:15:54,400 --> 00:15:57,400

but it has to scatter to light the room.

334

00:15:57,400 --> 00:16:00,400

Because the modern mirrors give a cleaner beam,

335

00:16:00,400 --> 00:16:04,400

the ambient light they give off is actually less than the polished metal,

336

00:16:04,400 --> 00:16:06,400

meaning the metal wins.

337

00:16:06,400 --> 00:16:11,400

What's so clear is that the real loser in this proof of concept test is Hollywood.

338

00:16:11,400 --> 00:16:15,400

Look, on this show, we've always known that Hollywood has a penchant for exaggeration.

339

00:16:15,400 --> 00:16:20,400

Our Hollywood lighting setup in this shop was 100 times brighter

340

00:16:20,400 --> 00:16:23,400

than the ambient light levels we got in our small scale testing.

341

00:16:23,400 --> 00:16:25,400

But that doesn't mean this myth is busted.

342

00:16:25,400 --> 00:16:29,400

No, no, no, no, because those ambient light levels were still 2.5 times brighter

343

00:16:29,400 --> 00:16:34,400

than what we determined was necessary to safely maneuver through our tomb.

344

00:16:34,400 --> 00:16:39,400

It tells me we have every reason to go full scale and bring in the real sun.

345

00:16:43,400 --> 00:16:46,400

Now that we've trained, it's time to move on to testing the myth.

346

00:16:46,400 --> 00:16:50,400

The first scenario is as if somebody has been driving, has passed out at the wheel,

347

00:16:50,400 --> 00:16:52,400

and now they're coasting at high speed.

348

00:16:52,400 --> 00:16:56,400

The speed we're going to start off with is first test, 35 miles an hour.

349

00:16:56,400 --> 00:16:58,400

This is going to be interesting.

350

00:16:58,400 --> 00:17:01,400

This time, they're going to try one big change.

351

00:17:01,400 --> 00:17:05,400

Once Grant gets in front of us, I'm going to take my hands off the wheel

352

00:17:05,400 --> 00:17:09,400

and my foot off the accelerator as if I've just passed out.

353

00:17:11,400 --> 00:17:15,400

Let's just hope Grant was paying attention during his training session.

354

00:17:20,400 --> 00:17:21,400

I don't think he was.

355

00:17:21,400 --> 00:17:26,400

And for test one, gentlemen and lady, start your engines.

356

00:17:26,400 --> 00:17:29,400

All right, this is 35 mile an hour.

357

00:17:29,400 --> 00:17:30,400

Drivers passed out.

358

00:17:30,400 --> 00:17:34,400

Here we go in three, two, one, go.

359

00:17:41,400 --> 00:17:45,400

All right, we're at 35 miles an hour and commence passing out.

360

00:17:45,400 --> 00:17:52,400

Look, Mom, no hands and no feet, making this officially an out of control vehicle.

361

00:17:52,400 --> 00:17:53,400

There you go.

362

00:17:53,400 --> 00:18:00,400

Which is Grant's cue to first nose his way in front before slowing down.

363

00:18:02,400 --> 00:18:08,400

And it's easy peasy, brakes a squeazy as he manages to haul, carry in.

364

00:18:11,400 --> 00:18:12,400

You did it.

365

00:18:12,400 --> 00:18:15,400

That was a little rough, but it worked.

366

00:18:15,400 --> 00:18:18,400

It totally worked at 35 miles an hour too.

367

00:18:18,400 --> 00:18:20,400

All right, what's next?

368

00:18:20,400 --> 00:18:21,400

Faster.

369

00:18:21,400 --> 00:18:24,400

Let's take it up to 55 miles an hour freeway speed.

370

00:18:24,400 --> 00:18:26,400

Let me point this out.

371

00:18:26,400 --> 00:18:31,400

The bumper of the out of control car is actually underneath the bumper of the rescue car.

372

00:18:31,400 --> 00:18:36,400

And what that does is it starts to compromise the stability of the rescue car,

373

00:18:36,400 --> 00:18:39,400

making it even harder to rescue the person.

374

00:18:39,400 --> 00:18:43,400

The 35 mile an hour no hands test is down.

375

00:18:43,400 --> 00:18:47,400

Now they're about to up the danger to freeway speed.

376

00:18:47,400 --> 00:18:50,400

For this next test, there's going to be a little more jeopardy here

377

00:18:50,400 --> 00:18:52,400

and all is great as long as you're going straight.

378

00:18:52,400 --> 00:18:54,400

We're going to be passed out at the wheel.

379

00:18:54,400 --> 00:18:57,400

The alignment's not amazing on the salvage vehicle.

380

00:18:57,400 --> 00:18:59,400

We're going double the speed.

381

00:18:59,400 --> 00:19:02,400

Here we go in three, two, one, go.

382

00:19:02,400 --> 00:19:06,400

55 plus different height bumpers plus dodgy alignment.

383

00:19:06,400 --> 00:19:09,400

Oh, and no hands either.

384

00:19:09,400 --> 00:19:11,400

30 miles an hour.

385

00:19:12,400 --> 00:19:15,400

55 miles an hour.

386

00:19:15,400 --> 00:19:17,400

And this is too exciting to pass out.

387

00:19:17,400 --> 00:19:18,400

But here we go.

388

00:19:18,400 --> 00:19:20,400

This is actually kind of scary.

389

00:19:20,400 --> 00:19:21,400

I know.

390

00:19:21,400 --> 00:19:22,400

All right, we're passing out.

391

00:19:22,400 --> 00:19:24,400

The hand is off the wheel.

392

00:19:24,400 --> 00:19:28,400

With Carrie comatose behind the wheel, Grant breaks in front.

393

00:19:28,400 --> 00:19:33,400

If he's a whisker off dead center, one car or other could spin out.

394

00:19:33,400 --> 00:19:35,400

It's a totally tricky maneuver.

395

00:19:35,400 --> 00:19:36,400

Here we go.

396

00:19:40,400 --> 00:19:42,400

All right, nice work.

397

00:19:42,400 --> 00:19:44,400

Woo hoo hoo hoo.

398

00:19:46,400 --> 00:19:48,400

That was a little scary, gotta say.

399

00:19:48,400 --> 00:19:53,400

It's a lot more challenging and at 20 miles an hour,

400

00:19:53,400 --> 00:19:55,400

the corrections are sort of gentle.

401

00:19:55,400 --> 00:19:58,400

At 55, the corrections have to be a lot faster.

402

00:19:58,400 --> 00:20:03,400

And so it's hard to do it really smooth, but it works for life.

403

00:20:03,400 --> 00:20:05,400

It worked at 55 miles an hour.

404

00:20:05,400 --> 00:20:08,400

And look, our hood is almost underneath your bumper

405

00:20:08,400 --> 00:20:10,400

and we didn't lose control.

406

00:20:10,400 --> 00:20:14,400

But having survived at 55, can they let it rest at that?

407

00:20:14,400 --> 00:20:16,400

What if the accelerator were stuck?

408

00:20:16,400 --> 00:20:19,400

Yeah, like if the guy passes out and his foot's stuck on the gas.

409

00:20:19,400 --> 00:20:21,400

Or there was some sort of malfunction.

410

00:20:21,400 --> 00:20:22,400

I like it.

411

00:20:22,400 --> 00:20:24,400

I had more danger to this experiment.

412

00:20:24,400 --> 00:20:26,400

All right, let's do it.

413

00:20:31,400 --> 00:20:36,400

Adam and Jamie have been reflecting on some proof of concept tests at the shop.

414

00:20:36,400 --> 00:20:41,400

The average ambient light of the polished metal, 1.13 lux.

415

00:20:41,400 --> 00:20:45,400

Can you really use mirrors to turn dark in today?

416

00:20:45,400 --> 00:20:48,400

This is more than enough light for me to make it through that maze.

417

00:20:48,400 --> 00:20:50,400

It's certainly a case of so far so good.

418

00:20:50,400 --> 00:20:53,400

But will these results scale up?

419

00:20:53,400 --> 00:20:58,400

Will using the real sun and a much larger crypt be the making of this myth?

420

00:20:59,400 --> 00:21:00,400

Well, this is the place.

421

00:21:00,400 --> 00:21:01,400

Looks great.

422

00:21:01,400 --> 00:21:03,400

Okay, it's not ancient Egypt.

423

00:21:03,400 --> 00:21:05,400

Shall I open it up?

424

00:21:05,400 --> 00:21:06,400

Absolutely.

425

00:21:06,400 --> 00:21:09,400

But Treasure Island in San Francisco Bay,

426

00:21:09,400 --> 00:21:13,400

uncovers an unexpected underground treasure.

427

00:21:13,400 --> 00:21:15,400

Well, shall we set up?

428

00:21:15,400 --> 00:21:17,400

Let's turn on the house lights.

429

00:21:17,400 --> 00:21:19,400

All right, house lights up.

430

00:21:19,400 --> 00:21:21,400

Well, this is our space.

431

00:21:21,400 --> 00:21:25,400

Now it's not a tomb, but it is underground and it's very, very dark.

432

00:21:25,400 --> 00:21:27,400

So it'll be perfect for our testing.

433

00:21:29,400 --> 00:21:33,400

Jamie blocks out a few spots to make total darkness.

434

00:21:33,400 --> 00:21:35,400

There we go.

435

00:21:35,400 --> 00:21:39,400

Meanwhile, Adams manufacturing modern glass mirrors.

436

00:21:39,400 --> 00:21:42,400

Now, I'll wager you're probably yelling at the screen right now,

437

00:21:42,400 --> 00:21:46,400

wondering why I'm building these with glass mirrors when our polished metal mirrors

438

00:21:46,400 --> 00:21:48,400

actually gave us a higher ambient light reading.

439

00:21:48,400 --> 00:21:51,400

1.13 lux.

440

00:21:51,400 --> 00:21:54,400

This is probably easiest to explain if you take a look at these two shots,

441

00:21:54,400 --> 00:21:56,400

our cameraman filmed this morning.

442

00:21:56,400 --> 00:21:58,400

On the left are the polished metal mirrors.

443

00:21:58,400 --> 00:21:59,400

On the right, the glass.

444

00:21:59,400 --> 00:22:01,400

Now, see how the light from the polished metal mirrors

445

00:22:01,400 --> 00:22:03,400

peters outwardly fast?

446

00:22:03,400 --> 00:22:06,400

Compare that to the glass mirrors where the light is strong

447

00:22:06,400 --> 00:22:08,400

virtually all the way to the end,

448

00:22:08,400 --> 00:22:10,400

and that's what's really important.

449

00:22:10,400 --> 00:22:12,400

This myth isn't about the type of mirror used.

450

00:22:12,400 --> 00:22:15,400

It's about bouncing a beam of light,

451

00:22:15,400 --> 00:22:17,400

and the polished metal didn't give us that beam.

452

00:22:17,400 --> 00:22:20,400

It only lasted about 15 feet before it was diffused.

453

00:22:20,400 --> 00:22:23,400

That's why the glass is what we're using in our full-size tomb.

454

00:22:25,400 --> 00:22:28,400

And with that cleared up, there's just one more ingredient left.

455

00:22:29,400 --> 00:22:30,400

The sun.

456

00:22:30,400 --> 00:22:33,400

Now all we need to do is see if the sun's going to cooperate with us.

457

00:22:33,400 --> 00:22:35,400

And that's actually a pretty big if,

458

00:22:35,400 --> 00:22:39,400

because not only do we have to worry about whether we can reflect

459

00:22:39,400 --> 00:22:43,400

sun into the building, in other words, is it lined up at a decent angle for that,

460

00:22:43,400 --> 00:22:48,400

but also this is San Francisco, and it's regularly kind of foggy here.

461

00:22:48,400 --> 00:22:52,400

If we have a few too many clouds, we're going to be out of business.

462

00:22:52,400 --> 00:22:56,400

Yep, without the big guy in the sky, the tombs doomed.

463

00:22:57,400 --> 00:23:02,400

Well, I can see the sun, but it is awfully overcast.

464

00:23:02,400 --> 00:23:04,400

It is what it is.

465

00:23:04,400 --> 00:23:09,400

So with San Francisco's fickle weather doing its garrantest to delay things,

466

00:23:09,400 --> 00:23:11,400

Adam has a backup plan.

467

00:23:11,400 --> 00:23:13,400

Have you met my son?

468

00:23:13,400 --> 00:23:16,400

It is a 7000-watt xenon spotlight.

469

00:23:16,400 --> 00:23:18,400

We're going to turn it on now.

470

00:23:20,400 --> 00:23:21,400

Oh!

471

00:23:22,400 --> 00:23:24,400

Look at that, puppy.

472

00:23:24,400 --> 00:23:26,400

Boom!

473

00:23:26,400 --> 00:23:30,400

Behold, I am the master of the sun!

474

00:23:30,400 --> 00:23:37,400

Adam's humongous light source gives a whopping 160,000 lux at 50 feet.

475

00:23:37,400 --> 00:23:41,400

That is frickin' awesome.

476

00:23:41,400 --> 00:23:45,400

But will it be bright enough to eliminate their colossal crypt?

477

00:23:45,400 --> 00:23:46,400

I think that's right.

478

00:23:46,400 --> 00:23:49,400

To find out, the guys will shine in Adam's sun,

479

00:23:49,400 --> 00:23:52,400

position the mirrors, and then check the light reading.

480

00:23:52,400 --> 00:23:56,400

Starting now, house lights out.

481

00:23:58,400 --> 00:23:59,400

Shall we bring in the sun?

482

00:23:59,400 --> 00:24:00,400

Sure, why not?

483

00:24:00,400 --> 00:24:02,400

Let's bring in the first sunbeam.

484

00:24:05,400 --> 00:24:06,400

Alright, you ready for it?

485

00:24:06,400 --> 00:24:08,400

I'm ready for it, bring it on.

486

00:24:08,400 --> 00:24:09,400

Okay, here it comes.

487

00:24:10,400 --> 00:24:11,400

There it is.

488

00:24:11,400 --> 00:24:17,400

Just like the movie, they're using six mirrors, all of which are around 35 feet apart.

489

00:24:17,400 --> 00:24:18,400

Doink!

490

00:24:18,400 --> 00:24:19,400

Man, that's bright.

491

00:24:19,400 --> 00:24:22,400

Dude, that is like a two-foot laser beam.

492

00:24:22,400 --> 00:24:24,400

Going for mirror number four.

493

00:24:25,400 --> 00:24:26,400

Nice.

494

00:24:27,400 --> 00:24:28,400

Alright, there it is.

495

00:24:28,400 --> 00:24:29,400

That's as good as it gets.

496

00:24:31,400 --> 00:24:32,400

Going for the last mirror.

497

00:24:32,400 --> 00:24:34,400

Okay, coming down.

498

00:24:34,400 --> 00:24:35,400

Zoop!

499

00:24:36,400 --> 00:24:37,400

That's it, you're in.

500

00:24:39,400 --> 00:24:40,400

Ta-da!

501

00:24:41,400 --> 00:24:42,400

And there we go.

502

00:24:44,400 --> 00:24:45,400

That works pretty good.

503

00:24:45,400 --> 00:24:48,400

I swear, I'm gonna go out on a limb and say this room is nicely lit.

504

00:24:49,400 --> 00:24:52,400

I can move through the antiques without hurting anything.

505

00:24:52,400 --> 00:24:53,400

Easily.

506

00:24:53,400 --> 00:24:58,400

Look, nobody can say that we didn't accurately match the look and behavior of this technique in the film.

507

00:24:58,400 --> 00:25:00,400

Yep, looks just like the tune.

508

00:25:01,400 --> 00:25:05,400

It's a good start, but what does the all-important data say?

509

00:25:05,400 --> 00:25:06,400

Alright, let's take a reading.

510

00:25:08,400 --> 00:25:09,400

Okay, I got it.

511

00:25:10,400 --> 00:25:12,400

Well, it turns out that bigger is absolutely better.

512

00:25:12,400 --> 00:25:18,400

Going full-scale with our mirrors is yielding an ambient light reading in this room of 2.3 lux.

513

00:25:18,400 --> 00:25:23,400

And when you're in this room, you can totally carefully make your way among the artifacts without any difficulty at all.

514

00:25:23,400 --> 00:25:29,400

By both an objective and an empirical standard, the theory behind this technique is totally sound.

515

00:25:30,400 --> 00:25:35,400

In fact, it's over five times brighter than the minimum level they determined earlier.

516

00:25:35,400 --> 00:25:39,400

And that's very good news for the myth, except for one little thing.

517

00:25:41,400 --> 00:25:47,400

Going full-scale and using an artificial light source, we were able to very closely replicate what we saw in the movie.

518

00:25:47,400 --> 00:25:50,400

But this story is about using the sun.

519

00:25:53,400 --> 00:25:58,400

Jamie's right, but luckily, the long-lost suns finally put in a show.

520

00:25:58,400 --> 00:26:00,400

So, let there be light.

521

00:26:00,400 --> 00:26:09,400

The question is, will it be enough light for an archeologist such as me or Mr. Heineman to be able to move through a tomb without breaking anything?

522

00:26:09,400 --> 00:26:13,400

Coming right up, it's Runway Runaway Motor Mayhem.

523

00:26:17,400 --> 00:26:26,400

Can you really bring an out-of-control car to a stop with a dangerous game of bumper cars?

524

00:26:26,400 --> 00:26:27,400

So far so good.

525

00:26:27,400 --> 00:26:31,400

Yeah, it turns out you can slow down a coasting car using this technique.

526

00:26:31,400 --> 00:26:33,400

But now, I think it's time to ramp things up.

527

00:26:33,400 --> 00:26:37,400

By seeing what happens when the driver has their foot jammed on the accelerator.

528

00:26:37,400 --> 00:26:43,400

This is going to be a whole other experience, because now that the accelerator is stuck, this car is not going to want to stop.

529

00:26:43,400 --> 00:26:47,400

So, back at Alameda Runway, it's pedal to the metal, literally.

530

00:26:47,400 --> 00:26:53,400

And for that, Tori's going green, because this time, he's doing the rescuing.

531

00:26:53,400 --> 00:26:56,400

Alright, time to go save some lives. Hope they don't wreck my paint job.

532

00:26:56,400 --> 00:27:00,400

This time, he's going for a highway high speed.

533

00:27:00,400 --> 00:27:08,400

For this next test, what I'm being asked to do is to depress the accelerator as if it is stuck, and then take my hands off the wheel.

534

00:27:08,400 --> 00:27:11,400

At no time should I take my foot off the accelerator.

535

00:27:11,400 --> 00:27:14,400

Totally counterintuitive and kind of scary.

536

00:27:15,400 --> 00:27:21,400

We're about to stop a car going 75 miles an hour out of control with another car.

537

00:27:21,400 --> 00:27:24,400

Buckle up. It's about to get real.

538

00:27:24,400 --> 00:27:27,400

In three, two, one, go!

539

00:27:28,400 --> 00:27:37,400

With both cars accelerating to 75, carry again, let's go with the wheel, but keeps her foot on the gas.

540

00:27:37,400 --> 00:27:39,400

Looks like those guys are out of control.

541

00:27:40,400 --> 00:27:45,400

Tori gets in position and then starts pumping the brakes.

542

00:27:50,400 --> 00:27:58,400

At this speed, the cars rapidly head off course, with the fence getting ever closer.

543

00:27:59,400 --> 00:28:03,400

Tori's wheels lock up and he veers off.

544

00:28:04,400 --> 00:28:08,400

Fortunately, he recovers just in time.

545

00:28:09,400 --> 00:28:12,400

That was hair ball.

546

00:28:12,400 --> 00:28:16,400

I had both feet on the brakes and I still wasn't stopping.

547

00:28:16,400 --> 00:28:19,400

We were getting closer and closer to the gate.

548

00:28:19,400 --> 00:28:21,400

I was like, oh man.

549

00:28:21,400 --> 00:28:23,400

I was like, oh, I'm going to push him through the fence.

550

00:28:23,400 --> 00:28:30,400

Without doubt, it was the hardest rescue yet as Tori's smoking tires attest, but he did pull it off.

551

00:28:31,400 --> 00:28:37,400

What I think we learned from this though is that you can stop a car even going 70 miles an hour.

552

00:28:37,400 --> 00:28:42,400

Unless we're going to do this whole thing at 100 miles an hour, I think we have to call it.

553

00:28:42,400 --> 00:28:44,400

This one is confirmed.

554

00:28:44,400 --> 00:28:45,400

Totally confirmed.

555

00:28:45,400 --> 00:28:46,400

Confirmed.

556

00:28:46,400 --> 00:28:51,400

Confirmed it is, but not something you should try at home.

557

00:28:52,400 --> 00:28:59,400

Now, most people would call it quits, but Carrie's got an appetite for more.

558

00:28:59,400 --> 00:29:04,400

So this rescue myth has reminded me of a technique I've heard of that I've always wanted to try,

559

00:29:04,400 --> 00:29:08,400

where you actually can sandwich a car with two cars to slow it down.

560

00:29:08,400 --> 00:29:12,400

Oh, so they wedge the runaway car and use friction to bring it to a stop.

561

00:29:12,400 --> 00:29:13,400

A car sandwich.

562

00:29:13,400 --> 00:29:14,400

That sounds dangerous.

563

00:29:14,400 --> 00:29:15,400

I love it.

564

00:29:16,400 --> 00:29:22,400

So, hunger and for more action, Grant and Tori are about to put the squeeze on Carrie's car.

565

00:29:23,400 --> 00:29:28,400

So we show that it's possible to stop an out of control car with another car.

566

00:29:28,400 --> 00:29:34,400

But now we're back to the Alameda runway, and this time we're going to try to stop an out of control car with two cars.

567

00:29:34,400 --> 00:29:36,400

We're making a car sandwich.

568

00:29:36,400 --> 00:29:41,400

Basically, this thing we're about to do right here, this is the most dangerous thing we're going to do all week.

569

00:29:41,400 --> 00:29:47,400

You heard right, if they overcook this sandwich maneuver, Carrie's toast.

570

00:29:47,400 --> 00:29:54,400

So far I've been able to handle this, but I noticed that I put my seatbelts on just a little bit tighter for this one.

571

00:29:54,400 --> 00:29:56,400

In three, two, one.

572

00:29:56,400 --> 00:30:00,400

Most sane people would see this as a seriously crazy thing to try.

573

00:30:00,400 --> 00:30:06,400

Carrie driving with stuck accelerator, no hands at silly speed, and they'd be right.

574

00:30:06,400 --> 00:30:11,400

There's a real danger here of one, two, or all three cars rolling.

575

00:30:11,400 --> 00:30:15,400

Grant and Tori pull alongside, move closer, and...

576

00:30:19,400 --> 00:30:21,400

Well, you can see the result.

577

00:30:24,400 --> 00:30:26,400

Oh my God, it worked!

578

00:30:28,400 --> 00:30:29,400

Oh my gosh!

579

00:30:30,400 --> 00:30:31,400

It worked!

580

00:30:31,400 --> 00:30:35,400

It was ugly, but I think it worked.

581

00:30:35,400 --> 00:30:38,400

We stopped an out of control car with two cars.

582

00:30:38,400 --> 00:30:40,400

Oh my God, it's working!

583

00:30:40,400 --> 00:30:41,400

I would have to say that's working.

584

00:30:41,400 --> 00:30:44,400

It definitely was successful in stopping the car.

585

00:30:44,400 --> 00:30:47,400

Man, I think we could do this better.

586

00:30:47,400 --> 00:30:50,400

I mean, this was super clumsy.

587

00:30:55,400 --> 00:31:02,400

And having survived that rescue, Carrie's throwing down the gauntlet for a custom built challenge.

588

00:31:03,400 --> 00:31:08,400

Why don't you guys figure out a better way to stop the out of control vehicle?

589

00:31:08,400 --> 00:31:12,400

What if both of you go off and come up with your own ways to stop the car,

590

00:31:12,400 --> 00:31:16,400

and I'll give you a challenge as a really out of control vehicle?

591

00:31:16,400 --> 00:31:18,400

You like being out of control, don't you?

592

00:31:18,400 --> 00:31:22,400

Next up, we'll Tuts Toom Ever See Daylight.

593

00:31:22,400 --> 00:31:24,400

That is intense.

594

00:31:25,400 --> 00:31:35,400

Back on Treasure Island, the San Francisco Sun is finally smiling on Jamie and Adam's test setup.

595

00:31:35,400 --> 00:31:36,400

I'm in the door.

596

00:31:36,400 --> 00:31:43,400

Meaning they can finally attempt a real world test using their large tomb and the real sun.

597

00:31:43,400 --> 00:31:44,400

Yeah, baby!

598

00:31:44,400 --> 00:31:49,400

The problem is, unlike all their other tests, they can't just point the sun straight inside.

599

00:31:49,400 --> 00:31:51,400

I think we're set. Should we bring in the sun?

600

00:31:51,400 --> 00:31:53,400

Let's bring it in.

601

00:31:53,400 --> 00:31:55,400

Okay, house lights out.

602

00:31:55,400 --> 00:32:01,400

Instead, they have to bounce it in, courtesy of a primary mirror outside.

603

00:32:01,400 --> 00:32:03,400

Wow, look at that.

604

00:32:03,400 --> 00:32:05,400

I'm gonna go for the first mirror.

605

00:32:05,400 --> 00:32:06,400

Okay.

606

00:32:06,400 --> 00:32:09,400

But once that's sorted, that is intense.

607

00:32:09,400 --> 00:32:11,400

You've got a beam in the room.

608

00:32:11,400 --> 00:32:12,400

Here I am.

609

00:32:12,400 --> 00:32:13,400

Here it comes.

610

00:32:13,400 --> 00:32:17,400

It's then back to the tricky task of aligning all the mirrors.

611

00:32:19,400 --> 00:32:22,400

Okay, that's pretty good.

612

00:32:22,400 --> 00:32:23,400

Look at that.

613

00:32:23,400 --> 00:32:24,400

It's actually working.

614

00:32:24,400 --> 00:32:25,400

One by one.

615

00:32:25,400 --> 00:32:27,400

Going for mirror two.

616

00:32:27,400 --> 00:32:28,400

Oh, right.

617

00:32:28,400 --> 00:32:29,400

Mirror two.

618

00:32:29,400 --> 00:32:31,400

Until the end target is lit.

619

00:32:31,400 --> 00:32:32,400

Mirror three.

620

00:32:34,400 --> 00:32:35,400

Ah.

621

00:32:35,400 --> 00:32:36,400

There we go.

622

00:32:36,400 --> 00:32:37,400

That's beautiful.

623

00:32:37,400 --> 00:32:40,400

All right, I'm gonna bring it in on our last target.

624

00:32:41,400 --> 00:32:43,400

And there it is.

625

00:32:44,400 --> 00:32:45,400

Ha ha, perfect.

626

00:32:45,400 --> 00:32:47,400

That is fantastic.

627

00:32:48,400 --> 00:32:49,400

This is the best yet.

628

00:32:49,400 --> 00:32:51,400

I can totally see things in here.

629

00:32:52,400 --> 00:32:54,400

But what are the lux levels?

630

00:32:54,400 --> 00:32:57,400

2.51 lux.

631

00:32:57,400 --> 00:32:58,400

That's amazing.

632

00:32:58,400 --> 00:32:59,400

That's really bright.

633

00:32:59,400 --> 00:33:03,400

They've cracked it six times brighter than the minimum eye level.

634

00:33:03,400 --> 00:33:06,400

Enough to put a smile on Adam's dial.

635

00:33:06,400 --> 00:33:07,400

Well, briefly.

636

00:33:07,400 --> 00:33:08,400

We're losing our beam.

637

00:33:08,400 --> 00:33:09,400

Yeah, we are.

638

00:33:09,400 --> 00:33:11,400

You know what the problem is.

639

00:33:11,400 --> 00:33:12,400

What?

640

00:33:12,400 --> 00:33:13,400

The sun's moving.

641

00:33:13,400 --> 00:33:16,400

The relationships have all changed a little bit, Jimmy.

642

00:33:16,400 --> 00:33:17,400

Have they?

643

00:33:17,400 --> 00:33:18,400

Yeah.

644

00:33:18,400 --> 00:33:20,400

The sun's moved off the primary,

645

00:33:20,400 --> 00:33:23,400

which means the aim on the secondary is a little bit off.

646

00:33:23,400 --> 00:33:26,400

As the sun moves off the primary mirror,

647

00:33:26,400 --> 00:33:28,400

it kicks all the others out of kilter.

648

00:33:28,400 --> 00:33:29,400

And the sun's moved again.

649

00:33:29,400 --> 00:33:30,400

I'm gonna kick the primary one more time.

650

00:33:30,400 --> 00:33:31,400

Okay.

651

00:33:31,400 --> 00:33:33,400

And for lighting up a tomb,

652

00:33:33,400 --> 00:33:35,400

that is a problem.

653

00:33:35,400 --> 00:33:39,400

The thing about using the sun is that the earth is rotating on its axis,

654

00:33:39,400 --> 00:33:41,400

and it's also rotating around the sun,

655

00:33:41,400 --> 00:33:44,400

which means that from our perspective,

656

00:33:44,400 --> 00:33:47,400

the sun is moving all over the place across the sky.

657

00:33:47,400 --> 00:33:50,400

So you can't really expect to be able to aim a beam of light

658

00:33:50,400 --> 00:33:53,400

using a mirror at a specific spot

659

00:33:53,400 --> 00:33:57,400

without constantly adjusting it to accommodate for the sun's movement.

660

00:33:57,400 --> 00:33:59,400

And its movement is surprisingly fast.

661

00:33:59,400 --> 00:34:02,400

With this much distance on these mirrors,

662

00:34:02,400 --> 00:34:05,400

the amount the sun's moving on the last one is like inches per minute.

663

00:34:05,400 --> 00:34:09,400

Well, it works, but only for about three minutes at a time before the sun moves.

664

00:34:09,400 --> 00:34:10,400

The mirrors are static.

665

00:34:10,400 --> 00:34:13,400

They don't move dynamically, but the sun does.

666

00:34:13,400 --> 00:34:15,400

And as the sun moves through the sky,

667

00:34:15,400 --> 00:34:17,400

it changes its geometry on the primary mirror,

668

00:34:17,400 --> 00:34:20,400

which changes the geometry on all the other mirrors in this room.

669

00:34:20,400 --> 00:34:24,400

They'd have to be moved dynamically throughout the whole thing to keep this room lit.

670

00:34:24,400 --> 00:34:30,400

So because of that, I don't feel like we've really seen the theory behind this technique work as well as it could.

671

00:34:30,400 --> 00:34:34,400

Yep, and that's something that didn't happen in the movie.

672

00:34:34,400 --> 00:34:36,400

But before the sun sets on this myth,

673

00:34:36,400 --> 00:34:39,400

Jamie's got one little trick up his sleeve.

674

00:34:40,400 --> 00:34:44,080

The

675

00:34:44,400 --> 00:34:47,400

Carrie Grant and Tori have confirmed the myth.

676

00:34:47,400 --> 00:34:53,400

You can stop an out-of-control car with another, with brake and bumper technique,

677

00:34:56,400 --> 00:34:59,400

plus that crazy sandwich combo.

678

00:35:01,400 --> 00:35:07,400

Now, Carrie set the boys a challenge to come up with that custom-built device to stop a car.

679

00:35:07,400 --> 00:35:09,400

I'm in speed.

680

00:35:09,400 --> 00:35:13,400

Challenge. Ah, such a nice ring to it.

681

00:35:14,400 --> 00:35:17,400

So with a mix of metal and midnight oil later,

682

00:35:17,400 --> 00:35:18,400

Perfect.

683

00:35:18,400 --> 00:35:22,400

They come up with a typical ingenious myth buster solution.

684

00:35:22,400 --> 00:35:23,400

Yeah.

685

00:35:23,400 --> 00:35:26,400

Now they're ready to reveal all.

686

00:35:26,400 --> 00:35:28,400

Come on, you guys, try and stop me.

687

00:35:28,400 --> 00:35:30,400

Grant first.

688

00:35:31,400 --> 00:35:36,400

To address Carrie's challenge to come up with a better way to stop a car, I have this.

689

00:35:37,400 --> 00:35:40,400

These paddles mount underneath the front bumper of each car.

690

00:35:40,400 --> 00:35:49,400

Employing the sandwich technique will come in and they will allow us to control the runaway car and bring it to a safe stop.

691

00:35:49,400 --> 00:35:51,400

All right.

692

00:35:51,400 --> 00:35:54,400

See, the other car's bumper comes in like this.

693

00:35:54,400 --> 00:36:00,400

We don't have to get so far in front so there's no chance of spinning out.

694

00:36:00,400 --> 00:36:04,400

Then we just lock you in with the L shape and slow you down.

695

00:36:04,400 --> 00:36:06,400

Sounds good on paper.

696

00:36:06,400 --> 00:36:10,400

Sounds bad when that's through the grill of the car.

697

00:36:10,400 --> 00:36:18,400

As for Tori's approach, all you need to do is get your car going really fast and then rear in the

car that's out of control.

698

00:36:18,400 --> 00:36:22,400

The whole idea here is that you harpoon the car in front of you.

699

00:36:22,400 --> 00:36:26,400

Once you are inside the car, you release that hook.

700

00:36:26,400 --> 00:36:29,400

Really? This is your idea?

701

00:36:29,400 --> 00:36:32,400

It might give you whiplash, but it should stop your car.

702

00:36:32,400 --> 00:36:35,400

Your idea of a safe stop is to shank me?

703

00:36:35,400 --> 00:36:37,400

More like harpooning.

704

00:36:37,400 --> 00:36:40,400

Next, custom built car craziness.

705

00:36:40,400 --> 00:36:43,400

Nothing about it seems like a good idea.

706

00:36:59,400 --> 00:37:01,400

Ready to drive.

707

00:37:01,400 --> 00:37:03,400

3, 2, 1, go.

708

00:37:05,400 --> 00:37:08,400

France ingeniously bolted bars to the front of each car.

709

00:37:08,400 --> 00:37:09,400

Tori?

710

00:37:09,400 --> 00:37:11,400

Here they come.

711

00:37:11,400 --> 00:37:15,400

To act like a barrier to stop Carrie's car.

712

00:37:15,400 --> 00:37:18,400

Now it may look crazy.

713

00:37:23,400 --> 00:37:25,400

But it's blitz the job.

714

00:37:29,400 --> 00:37:31,400

Gotcha.

715

00:37:31,400 --> 00:37:33,400

Woo!

716

00:37:33,400 --> 00:37:35,400

That was beautiful.

717

00:37:35,400 --> 00:37:38,400

That worked so much better than the original sandwich.

718

00:37:38,400 --> 00:37:41,400

Oh my God. We totally got you.

719

00:37:41,400 --> 00:37:43,400

That was awesome.

720

00:37:43,400 --> 00:37:45,400

Grant, your method is safer.

721

00:37:45,400 --> 00:37:46,400

Nice work.

722

00:37:46,400 --> 00:37:47,400

Thanks.

723

00:37:47,400 --> 00:37:49,400

Now if we can only get the cars apart.

724

00:37:49,400 --> 00:37:51,400

Are we going to have to drive from home like this?

725

00:37:51,400 --> 00:37:58,400

I get to a constant speed, take my hands off the wheel and watch the cars on either side of me.

726

00:37:58,400 --> 00:38:01,400

Start to close in very, very quickly.

727

00:38:01,400 --> 00:38:04,400

They slam at the same time.

728

00:38:04,400 --> 00:38:10,400

My bumper hits the front pedals and they actually are slowing me down.

729

00:38:10,400 --> 00:38:14,400

I smell rubber burning, but I'm coming to a stop.

730

00:38:14,400 --> 00:38:16,400

It's amazing.

731

00:38:16,400 --> 00:38:21,400

And if that wasn't scary enough, then there's the harpoon.

732

00:38:21,400 --> 00:38:23,400

This is a new technique.

733

00:38:23,400 --> 00:38:31,400

This is more of a stabbing, hooking, and then using the weight of the vehicle to slow the out of control car down.

734

00:38:31,400 --> 00:38:35,400

This plan? Nothing about it seems like a good idea.

735

00:38:35,400 --> 00:38:39,400

Harpooning the back of my car, ramming it as hard as you can.

736

00:38:39,400 --> 00:38:43,400

Who comes up with this kind of idea? Only a crazy person.

737

00:38:43,400 --> 00:38:46,400

Think we're set?

738

00:38:46,400 --> 00:38:48,400

It's a simple plan.

739

00:38:48,400 --> 00:38:53,400

Get up behind Carrie's car, crash into the trunk, slam on your brakes.

740

00:38:53,400 --> 00:38:55,400

What could possibly go wrong?

741

00:38:55,400 --> 00:38:58,400

Three, two, one, go.

742

00:39:02,400 --> 00:39:06,400

The Runway Road Warrior sets out, ready to rescue.

743

00:39:06,400 --> 00:39:10,400

This is Tori and Grant in Harpoon Rescue, in pursuit.

744

00:39:10,400 --> 00:39:13,400

Okay, hands off the wheel. Go for it, man.

745

00:39:15,400 --> 00:39:17,400

Here we go.

746

00:39:19,400 --> 00:39:22,400

Carrie's car is skewed.

747

00:39:22,400 --> 00:39:26,400

Now on the sophistication scale, it's crafting.

748

00:39:26,400 --> 00:39:29,400

As for the all-important results rating, it's a hit.

749

00:39:29,400 --> 00:39:31,400

Working!

750

00:39:31,400 --> 00:39:33,400

Working!

751

00:39:33,400 --> 00:39:34,400

Nice!

752

00:39:34,400 --> 00:39:36,400

But it's working!

753

00:39:36,400 --> 00:39:38,400

Nice!

754

00:39:39,400 --> 00:39:41,400

Good job!

755

00:39:41,400 --> 00:39:43,400

I can't believe that worked!

756

00:39:43,400 --> 00:39:44,400

The rear spare!

757

00:39:44,400 --> 00:39:46,400

Dude, that's awesome!

758

00:39:46,400 --> 00:39:48,400

It stopped the car out of control!

759

00:39:48,400 --> 00:39:51,400

Okay, we're going to have to take both of these ideas and patent them,

760

00:39:51,400 --> 00:39:54,400

so that we can sell them back to the Highway Patrol, because that's amazing.

761

00:39:54,400 --> 00:39:58,400

I think there's some law enforcement people that would be very interested in talking to us.

762

00:39:59,400 --> 00:40:02,400

The Harpoon Technique worked. Carrie took off at 50 miles an hour.

763

00:40:02,400 --> 00:40:06,400

I caught up with her. It didn't take much to punch through the back of her car.

764

00:40:06,400 --> 00:40:08,400

And it both get...

765

00:40:10,400 --> 00:40:12,400

I came to a stop, she came to a stop.

766

00:40:12,400 --> 00:40:14,400

Yeah!

767

00:40:14,400 --> 00:40:18,400

I have to say that stopping a car with another car has been very successful.

768

00:40:18,400 --> 00:40:21,400

We've gotten in front of the Runaway car and applied our brakes,

769

00:40:21,400 --> 00:40:25,400

and safely stopped it at speeds and access of 70 miles per hour.

770

00:40:25,400 --> 00:40:30,400

We've come up to the side, sandwiched the car, using plates welded to our front bumpers,

771

00:40:30,400 --> 00:40:35,400

and finally we've deployed a crazy, Harpoon-like spear

772

00:40:35,400 --> 00:40:40,400

to punch into the trunk of the Runaway car and drag it to a stop.

773

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

Just goes to show, if you have a Runaway car, call the Mythbusters.

774

00:40:45,400 --> 00:40:47,400

Actually, no, you should call the police.

775

00:40:54,400 --> 00:40:59,400

Back at Tut HQ on Treasure Island, Jamie's not quite done testing lux levels.

776

00:40:59,400 --> 00:41:02,400

There's one other thing I'd like to try. You're gonna like it.

777

00:41:02,400 --> 00:41:04,400

Alright, let's do it.

778

00:41:04,400 --> 00:41:09,400

In their earlier small-scale tests, Jamie made an ambient light level breakthrough.

779

00:41:09,400 --> 00:41:13,400

The goal of all this is to raise the ambient light level in a room,

780

00:41:13,400 --> 00:41:16,400

and mirrors alone aren't gonna cut it.

781

00:41:16,400 --> 00:41:18,400

That light needs to hit something that scatters it.

782

00:41:18,400 --> 00:41:22,400

So now, in their full-sized, sunlit tomb,

783

00:41:22,400 --> 00:41:25,400

he's itching to see if this scatter theory will scale.

784

00:41:25,400 --> 00:41:28,400

Turn off your headlamp and check this out.

785

00:41:32,400 --> 00:41:33,400

That's beautiful!

786

00:41:33,400 --> 00:41:35,400

And you thought I didn't know how to light up a room.

787

00:41:35,400 --> 00:41:38,400

I stand corrected. Let's take a reading.

788

00:41:40,400 --> 00:41:42,400

Okay, maximum.

789

00:41:45,400 --> 00:41:46,400

Alright, moving away.

790

00:41:47,400 --> 00:41:50,400

Average lux, 8.62 lux.

791

00:41:51,400 --> 00:41:53,400

Woo for Jamie's shirt.

792

00:41:53,400 --> 00:41:56,400

Amazingly, with this reflective scattering,

793

00:41:56,400 --> 00:42:01,400

Jamie's whiter-than-white shirt has given the maximum light reading for the entire experiment.

794

00:42:01,400 --> 00:42:03,400

Adam's gobsmacked.

795

00:42:03,400 --> 00:42:07,400

Well, it turns out that Jamie's starched white shirt provides almost three times

796

00:42:07,400 --> 00:42:14,400

as much ambient light in this space as the next best technique of everything that we've tried.

797

00:42:14,400 --> 00:42:16,400

And Jamie's reaction?

798

00:42:16,400 --> 00:42:18,400

Well, this is Jamie.

799

00:42:18,400 --> 00:42:22,400

A mirrored surface is gonna be your best bet to get light into a room because it's very directional.

800

00:42:22,400 --> 00:42:26,400

But if you want to actually light the room, once that light gets in there,

801

00:42:26,400 --> 00:42:29,400

you're best off if it hits a surface like my white shirt,

802

00:42:29,400 --> 00:42:35,400

because the white isn't so directional, it's gonna spread the light and raise your ambient light level.

803

00:42:35,400 --> 00:42:37,400

How do you want to wrap this up?

804

00:42:39,400 --> 00:42:45,400

In theory, it's plausible, because the sun's rays did in fact provide enough ambient light to move around the room.

805

00:42:45,400 --> 00:42:49,400

I agree. Plausible, but totally impractical.

806

00:42:49,400 --> 00:42:54,400

First of all, the sun moves, so you only get that light for about three and a half minutes before it's to shift everything.

807

00:42:54,400 --> 00:43:01,400

And the idea that all those mirrors would sit around for 3,000 years and be ready to light up that room, totally ridiculous.

808

00:43:01,400 --> 00:43:04,400

Yeah, plausible, but ridiculous.