

1

00:00:00,000 --> 00:00:08,720

Music

2

00:00:08,720 --> 00:00:09,720

Don't!

3

00:00:09,720 --> 00:00:16,720

Music

4

00:00:16,720 --> 00:00:17,720

I've seen it.

5

00:00:17,720 --> 00:00:18,720

This is so-

6

00:00:18,720 --> 00:00:19,720

Sigh

7

00:00:19,720 --> 00:00:21,720

Definitely no.

8

00:00:21,720 --> 00:00:23,720

Music

9

00:00:23,720 --> 00:00:24,720

Bzzz

10

00:00:24,720 --> 00:00:26,720

Music

11

00:00:26,720 --> 00:00:27,720

No!

12

00:00:27,720 --> 00:00:39,440

Music

13

00:00:39,440 --> 00:00:40,440

No!

14

00:00:40,440 --> 00:00:41,440

No!

15

00:00:41,440 --> 00:00:42,440

Boring.

16

00:00:42,440 --> 00:00:44,440

So many channels.

17

00:00:44,440 --> 00:00:45,440

Nothing's on.

18

00:00:45,440 --> 00:00:46,440

Music

19

00:00:46,440 --> 00:00:48,440

Welcome to the Mith Crackers.

20

00:00:48,440 --> 00:00:49,440

Music

21

00:00:49,440 --> 00:00:50,440

Ah!

22

00:00:50,440 --> 00:00:51,440

Music

23

00:00:51,440 --> 00:00:57,400

That was fun being on that show.

24

00:00:57,420 --> 00:00:58,420

What was it?

25

00:00:58,420 --> 00:00:59,420

We were trying to prove again.

26

00:00:59,420 --> 00:01:00,420

Don't know.

27

00:01:00,420 --> 00:01:01,420

Don't care.

28

00:01:01,420 --> 00:01:02,420

Oh, oh, oh, oh, oh.

29

00:01:02,420 --> 00:01:03,420

Blow it up.

30

00:01:03,420 --> 00:01:08,560

But you know, I was thinking, if we did their show, shouldn't they do our show?

31

00:01:08,560 --> 00:01:10,680

A Simpson's special?

32

00:01:10,680 --> 00:01:11,680

Absolutely.

33

00:01:11,680 --> 00:01:12,680

Ha ha ha.

34

00:01:12,680 --> 00:01:13,680

Let's do it.

35

00:01:13,680 --> 00:01:17,440

■■■■

36

00:01:41,920 --> 00:01:42,220

Capt. Har Matter

37

00:01:42,320 --> 00:01:43,420

Hey.

38

00:01:43,420 --> 00:01:44,420

Who's this?

39

00:01:44,420 --> 00:01:46,420

It's Al Jean.

40

00:01:46,420 --> 00:01:47,920

Okay. Hi Al.

41

00:01:47,920 --> 00:01:48,920

Pleased to meet you.

42

00:01:48,920 --> 00:01:50,920

Jamie, it's Al Jean.

43

00:01:50,920 --> 00:01:51,920

I'm sorry.

44

00:01:51,920 --> 00:01:56,000

The executive producer and the showrunner of the best animated series ever in the longest

45

00:01:56,000 --> 00:01:58,420

running scripted show on television, The Simpsons?

46

00:01:58,420 --> 00:02:00,920

Oh, The Simpsons. Welcome Al.

47

00:02:00,920 --> 00:02:03,920

You were thinking South Park.

48

00:02:03,920 --> 00:02:06,420

So, are we going to be animating?

49

00:02:06,420 --> 00:02:10,420

No, look, their writing staff is packed with science and math-geeks, right?

50

00:02:10,420 --> 00:02:11,420

110%.

51

00:02:11,420 --> 00:02:14,420

And they try and hold to the laws of physics, right?

52

00:02:14,420 --> 00:02:15,420

Yeah.

53

00:02:15,420 --> 00:02:17,420

Conservation of math, it's the law.

54

00:02:17,420 --> 00:02:19,420

Ish, we're going to do a couple of stories from The Simpsons.

55

00:02:19,420 --> 00:02:20,420

Like what?

56

00:02:20,420 --> 00:02:24,420

Okay, we've got one where Bart throws a lit cherry bomb into the sewer system of the

57

00:02:24,420 --> 00:02:27,420

school and turns all of the toilets in the school into geysers.

58

00:02:27,420 --> 00:02:29,420

My favorite episodes, The Crepes of Rat.

59

00:02:29,420 --> 00:02:31,420

Okay, that works. What else?

60

00:02:31,420 --> 00:02:37,420

We have another one where Homer protects his house from a 5,000-pound wrecking ball by

61

00:02:37,420 --> 00:02:40,420

putting his body between the wrecking ball and the house.

62

00:02:40,420 --> 00:02:43,420

So, cartoon physics in the real world.

63

00:02:43,420 --> 00:02:45,420

That's Jamie excited.

64

00:02:45,420 --> 00:02:47,420

He's excited to get out of this room.

65

00:02:47,420 --> 00:02:48,420

Yeah, problem.

66

00:02:53,420 --> 00:02:57,420

Now, it is one thing to look at physics from the movie world and see how realistic they

67

00:02:57,420 --> 00:02:59,420

are in the real world.

68

00:02:59,420 --> 00:03:02,420

It's another entirely to try that with a cartoon.

69

00:03:02,420 --> 00:03:07,420

And in an investigating Homer versus the wrecking ball, Jamie's tackling the wrecking ball.

70

00:03:08,420 --> 00:03:14,420

And I've got to build a full-size Homer with all the same dimensions, body mass, and water

71

00:03:14,420 --> 00:03:19,420

content as if Homer was a real person.

72

00:03:19,420 --> 00:03:26,420

Yep, to determine the kinetic energy implications of Homer's heroic intervention, the size and

73

00:03:26,420 --> 00:03:32,420

mass of the key animated elements have to be accurately translated from Springfield to

74

00:03:32,420 --> 00:03:34,420

the real world.

75

00:03:34,420 --> 00:03:39,420

So Al, we really strive to be as accurate as possible on this show.

76

00:03:39,420 --> 00:03:44,420

So I'm hoping you can supply us with some real-world dimensions of Homer.

77

00:03:46,420 --> 00:03:48,420

Lights. How tall is he?

78

00:03:48,420 --> 00:03:52,420

Well, you have to be really accurate. He's 5'11", and that's what the animators always use.

79

00:03:52,420 --> 00:03:53,420

What about his shoe size?

80

00:03:53,420 --> 00:03:54,420

11 and a half.

81

00:03:54,420 --> 00:03:56,420

Those are almost exactly my dimensions.

82

00:03:56,420 --> 00:03:59,420

Well, the good news for you is you have less stomach and more hair.

83

00:04:00,420 --> 00:04:04,420

Speaking of his stomach, how much does Homer actually weigh?

84

00:04:04,420 --> 00:04:08,420

Well, about 240, but we think 239 is funnier. So 239.

85

00:04:13,420 --> 00:04:18,420

Ladies and gentlemen, this is Homer Simpson, full-size. AI, thank you so much.

86

00:04:18,420 --> 00:04:20,420

I'm going to leave you alone with the donuts. Is that okay?

87

00:04:20,420 --> 00:04:21,420

They'll be gone when you're back.

88

00:04:21,420 --> 00:04:24,420

Mmm, donuts.

89

00:04:25,420 --> 00:04:33,420

Armed with Homer's exact specs, Adam commences the construction of an animated American icon.

90

00:04:33,420 --> 00:04:36,420

USA! USA!

91

00:04:36,420 --> 00:04:38,420

Starting with upholstery foam.

92

00:04:38,420 --> 00:04:40,420

That's pretty good.

93

00:04:40,420 --> 00:04:45,420

Adam utilizes a method with familiar, family-friendly results.

94

00:04:47,420 --> 00:04:53,420

This technique that I'm using of gluing an open-cell urethane foam to itself is referred to as

95

00:04:53,420 --> 00:04:59,420

additive foam building. Because instead of like casting and mold making a flexible foam,

96

00:04:59,420 --> 00:05:04,420

I'm physically building the parts that I need out of sheet foam.

97

00:05:04,420 --> 00:05:09,420

What you might not know, this is how all your muppets were made.

98

00:05:09,420 --> 00:05:10,420

Yep.

99

00:05:10,420 --> 00:05:12,420

Same technique.

100

00:05:12,420 --> 00:05:15,420

There we go. Do I look like Homer at all?

101

00:05:15,420 --> 00:05:17,420

Hi.

102

00:05:18,420 --> 00:05:20,420

What?

103

00:05:23,420 --> 00:05:28,420

With the arms starting to take shape, it's on to Homer's famously tubby torso.

104

00:05:28,420 --> 00:05:32,420

One, two, three, four, and five.

105

00:05:32,420 --> 00:05:35,420

Doesn't look like much, but that's going to be Homer soon.

106

00:05:35,420 --> 00:05:40,420

A series of cylindrical discs glued together form the tapered shape.

107

00:05:40,420 --> 00:05:42,420

Yeah!

108

00:05:42,420 --> 00:05:45,420

The human-like mass and density will come later.

109

00:05:45,420 --> 00:05:48,420

For now, Adam's immersed in his art.

110

00:05:48,420 --> 00:05:51,420

I know exactly what it feels like to be Michelangelo.

111

00:05:51,420 --> 00:05:54,420

Well, maybe not exactly, but just like a little bit.

112

00:05:54,420 --> 00:05:57,420

If he carved in foam, it made cartoon characters.

113

00:05:59,420 --> 00:06:03,420

This is what we call a shop shower.

114

00:06:03,420 --> 00:06:08,420

Next, the arms are attached to shoulder joints.

115

00:06:08,420 --> 00:06:15,420

And the legs are measured, cut, and positioned on the posterior.

116

00:06:15,420 --> 00:06:17,420

That's it, ladies and gentlemen.

117

00:06:17,420 --> 00:06:20,420

And with those foam pieces of the puzzle in place.

118

00:06:20,420 --> 00:06:22,420

All right, I'm pretty happy with that.

119

00:06:22,420 --> 00:06:24,420

That's looking a lot like Homer.

120

00:06:24,420 --> 00:06:27,420

Adam heads out for help with Homer's head.

121

00:06:27,420 --> 00:06:29,420

This is the set of the foam.

122

00:06:29,420 --> 00:06:32,420

Adam heads out for help with Homer's head.

123

00:06:32,420 --> 00:06:36,420

This is the center of what used to be industrial light magic.

124

00:06:36,420 --> 00:06:39,420

Now, behind that blue door is legendary machinist,

125

00:06:39,420 --> 00:06:42,420

Merrick Cheney, who built armatures for the stop-motion films

126

00:06:42,420 --> 00:06:45,420

Nightmare Before Christmas and a million other movies.

127

00:06:45,420 --> 00:06:49,420

And he's going to help us get Homer's head screwed on right.

128

00:06:50,420 --> 00:06:52,420

So, Merrick, how's this going to work?

129

00:06:52,420 --> 00:06:55,420

So, we've taken your model of Homer's head.

130

00:06:55,420 --> 00:06:58,420

I've converted it into a machineable file.

131

00:06:58,420 --> 00:07:01,420

And I've cut it up into, like, eight chunks.

132

00:07:01,420 --> 00:07:02,420

That is cool.

133

00:07:02,420 --> 00:07:06,420

And they all fit together kind of like a three-dimensional puzzle.

134

00:07:06,420 --> 00:07:09,420

And that eight-piece puzzle will form a central cavity,

135

00:07:09,420 --> 00:07:14,420

a negative space mold of Homer's ironically large cranium.

136

00:07:14,420 --> 00:07:19,420

So, there you go. That is mold block number one, comprising the bottom left side

137

00:07:19,420 --> 00:07:22,420

of Homer's face, the front part.

138

00:07:22,420 --> 00:07:24,420

That's number one of eight.

139

00:07:24,420 --> 00:07:26,420

While Adam waits for all eight,

140

00:07:26,420 --> 00:07:30,420

the Heinemann has been concocting an ingenious plan.

141

00:07:30,420 --> 00:07:35,420

In the cartoon, Homer appears to be on a wrecking ball that's about as tall as he is.

142

00:07:35,420 --> 00:07:39,420

And because it's so much larger than a real-world wrecking ball,

143

00:07:39,420 --> 00:07:41,420

I've got to make my own.

144

00:07:41,420 --> 00:07:44,420

And that's not exactly an easy task.

145

00:07:44,420 --> 00:07:46,420

But I've got an idea.

146

00:07:46,420 --> 00:07:48,420

Easy as pie.

147

00:07:48,420 --> 00:07:51,420

The task at hand is to build a custom wrecking ball

148

00:07:51,420 --> 00:07:54,420

the same dimensions as the one in the clip.

149

00:07:54,420 --> 00:07:58,420

But weighing in at a realistic 5,000 pounds.

150

00:07:58,420 --> 00:08:01,420

So, you're starting to get the picture?

151

00:08:01,420 --> 00:08:03,420

It's a unique manufacturing assignment.

152

00:08:03,420 --> 00:08:07,420

The Heinemann is tackling in his own unique way.

153

00:08:07,420 --> 00:08:11,420

There are a lot of different ways of making a big heavy ball.

154

00:08:11,420 --> 00:08:18,420

But the quickest and easiest way I know of to do it would be with steel reinforced concrete.

155

00:08:18,420 --> 00:08:21,420

Now, to do that, you need a mold.

156

00:08:21,420 --> 00:08:27,420

I've come up with an idea of creating what amounts to a hemispherical shaped auger

157

00:08:27,420 --> 00:08:30,420

that I can chuck onto the back of some earth moving equipment

158

00:08:30,420 --> 00:08:34,420

and dig two hemispherical holes right in the ground.

159

00:08:34,420 --> 00:08:38,420

It looks like it might sort of just make it.

160

00:08:38,420 --> 00:08:40,420

Ha ha ha ha ha.

161

00:08:40,420 --> 00:08:44,420

We pour our concrete in there around a steel armature,

162

00:08:44,420 --> 00:08:47,420

let it cure, put them together,

163

00:08:47,420 --> 00:08:49,420

and you got a ball.

164

00:08:49,420 --> 00:08:52,420

Yes, heavy ball.

165

00:08:52,420 --> 00:08:55,420

Yep, to make two hemispherical molds.

166

00:08:55,420 --> 00:08:57,420

It's working.

167

00:08:57,420 --> 00:09:00,420

For the two halves of the concrete wrecking ball,

168

00:09:00,420 --> 00:09:02,420

that's what I'm talking about.

169

00:09:02,420 --> 00:09:06,420

Jamie's designed and constructed a one of a kind tool.

170

00:09:06,420 --> 00:09:09,420

This is working great.

171

00:09:09,420 --> 00:09:12,420

Ha ha ha.

172

00:09:12,420 --> 00:09:13,420

Ha ha.

173

00:09:13,420 --> 00:09:16,420

Next.

174

00:09:16,420 --> 00:09:18,420

The rig didn't break.

175

00:09:18,420 --> 00:09:24,420

It's made a nice symmetrical half sphere.

176

00:09:24,420 --> 00:09:28,420

It's clearly solid enough to have concrete poured in it.

177

00:09:28,420 --> 00:09:30,420

It's perfect.

178

00:09:30,420 --> 00:09:33,420

Which is what's going to happen pretty much next.

179

00:09:37,420 --> 00:09:39,420

Oh, look at that.

180

00:09:39,420 --> 00:09:41,420

The steel armature made back at the shop

181

00:09:41,420 --> 00:09:45,420

will provide structure for the concrete half shells.

182

00:09:45,420 --> 00:09:48,420

And you could say the Heidemann is happy.

183

00:09:48,420 --> 00:09:52,420

This is working exactly like I had in mind.

184

00:09:54,420 --> 00:09:57,420

Normally if you want to make a big sphere like this,

185

00:09:57,420 --> 00:10:00,420

you'd start off with a big chunk of foam,

186

00:10:00,420 --> 00:10:02,420

you'd carve it into a sphere.

187

00:10:02,420 --> 00:10:04,420

Our little hose are perfect.

188

00:10:04,420 --> 00:10:06,420

You'd put fiberglass over it,

189

00:10:06,420 --> 00:10:10,420

and then you'd make another mold of the interior cavity

190

00:10:10,420 --> 00:10:14,420

and it'd take several people pretty much all week long

191

00:10:14,420 --> 00:10:17,420

just to accomplish this.

192

00:10:17,420 --> 00:10:22,420

Instead of doing that, we just dug a hole.

193

00:10:22,420 --> 00:10:24,420

I'm just saying.

194

00:10:24,420 --> 00:10:27,420

With the concrete shaped and edged with matching seams,

195

00:10:27,420 --> 00:10:32,420

phase one of Janie's big ball is complete.

196

00:10:32,420 --> 00:10:34,420

Now that has to sit for about a week and a half

197

00:10:34,420 --> 00:10:36,420

and then we're going to pull that one out,

198

00:10:36,420 --> 00:10:40,420

turn it upside down and put it on top of this one.

199

00:10:40,420 --> 00:10:42,420

And we'll bond the two things together

200

00:10:42,420 --> 00:10:44,420

and we've got a wrecking ball.

201

00:10:44,420 --> 00:10:49,420

With two weeks before Janie can wreak wrecking ball havoc,

202

00:10:49,420 --> 00:10:54,420

it's back to the shop for part two of this Springfield Spectacular.

203

00:10:54,420 --> 00:10:55,420

So what's next?

204

00:10:55,420 --> 00:10:57,420

Toilet bomb. Al, you want to do the honors?

205

00:10:57,420 --> 00:10:58,420

Thank you, Adam.

206

00:10:58,420 --> 00:11:00,420

Well, in one of the early episodes of The Simpsons,

207

00:11:00,420 --> 00:11:03,420

Bart flushes a cherry bomb down the toilet.

208

00:11:03,420 --> 00:11:05,420

So long, sucker!

209

00:11:05,420 --> 00:11:08,420

And it immediately sends geysers of water shooting

210

00:11:08,420 --> 00:11:10,420

out of every toilet on the block.

211

00:11:13,420 --> 00:11:16,420

So explosives and toilets.

212

00:11:16,420 --> 00:11:19,420

I'm thinking we should start small scale.

213

00:11:19,420 --> 00:11:21,420

I totally agree.

214

00:11:24,420 --> 00:11:27,420

I am licensed to drive this.

215

00:11:27,420 --> 00:11:28,420

Oh, whoop.

216

00:11:30,420 --> 00:11:33,420

The myth is that an explosion will travel through a plumbing system

217

00:11:33,420 --> 00:11:36,420

causing multiple geysers out of the toilets.

218

00:11:37,420 --> 00:11:39,420

That's the bowl.

219

00:11:39,420 --> 00:11:42,420

And that's where the magic happens.

220

00:11:42,420 --> 00:11:45,420

And to test that, we're going to do three things.

221

00:11:46,420 --> 00:11:49,420

Number one, I'm going to make three transparent working toilets

222

00:11:49,420 --> 00:11:52,420

so we can really see what happens when things go boom.

223

00:11:52,420 --> 00:11:54,420

Number two, number two,

224

00:11:54,420 --> 00:11:59,420

I'm going to connect them with an accurate waste disposal system.

225

00:12:00,420 --> 00:12:02,420

Two more like that, if we're good to go.

226

00:12:02,420 --> 00:12:04,420

And finally, we're going to be introducing

227

00:12:04,420 --> 00:12:08,420

a cherry bomb-like explosion into that system.

228

00:12:08,420 --> 00:12:11,420

And well, then we're going to see what we see.

229

00:12:11,420 --> 00:12:14,420

Recreating Springfield Elementary's plumbing system

230

00:12:14,420 --> 00:12:16,420

sounds elementary.

231

00:12:16,420 --> 00:12:18,420

Melting my brain.

232

00:12:18,420 --> 00:12:20,420

But it's anything but.

233

00:12:22,420 --> 00:12:24,420

I'm trying to work out how to do this

234

00:12:24,420 --> 00:12:26,420

and because I'm molding it,

235

00:12:26,420 --> 00:12:28,420

effectively I have to think upside down and backwards.

236

00:12:28,420 --> 00:12:30,420

So the negative space here,

237

00:12:30,420 --> 00:12:33,420

you see I'm going to fill with a stone plaster.

238

00:12:33,420 --> 00:12:36,420

So that when the stone plaster sets,

239

00:12:36,420 --> 00:12:38,420

I'll pull out all the bead foam

240

00:12:38,420 --> 00:12:40,420

and I'll be left with a toilet negative.

241

00:12:40,420 --> 00:12:43,420

The front to which I will mount a piece of acrylic.

242

00:12:43,420 --> 00:12:45,420

Excellent.

243

00:12:45,420 --> 00:12:47,420

So that we can see what's happening in the toilet.

244

00:12:47,420 --> 00:12:49,420

It's going to be freaking awesome.

245

00:12:49,420 --> 00:12:51,420

And after the plaster is set,

246

00:12:51,420 --> 00:12:54,420

the negative space molds are removed.

247

00:12:54,420 --> 00:12:56,420

Okay, one.

248

00:12:56,420 --> 00:12:58,420

To reveal the balls.

249

00:12:58,420 --> 00:13:00,420

Number two.

250

00:13:00,420 --> 00:13:01,420

Number two, get it?

251

00:13:01,420 --> 00:13:03,420

Because in a, never mind.

252

00:13:04,420 --> 00:13:06,420

Add once they're cleaned up

253

00:13:06,420 --> 00:13:08,420

and dried out.

254

00:13:10,420 --> 00:13:12,420

A little bit of an oven.

255

00:13:13,420 --> 00:13:15,420

Adam mounts them

256

00:13:15,420 --> 00:13:17,420

and seals the system

257

00:13:17,420 --> 00:13:20,420

with a transparent sheet of half inch acrylic.

258

00:13:20,420 --> 00:13:23,420

I get excited about a good experimental rig.

259

00:13:25,420 --> 00:13:27,420

There we go.

260

00:13:27,420 --> 00:13:29,420

She is a freestanding.

261

00:13:29,420 --> 00:13:31,420

My freestanding toilet sculptor.

262

00:13:31,420 --> 00:13:34,420

I think it's time to flush a toilet.

263

00:13:34,420 --> 00:13:36,420

So long sucker.

264

00:13:36,420 --> 00:13:39,420

I'm going to watch one of these work right now.

265

00:13:42,420 --> 00:13:44,420

Now, right here, this is where the important part

266

00:13:44,420 --> 00:13:47,420

of the functionality of a toilet is about to happen.

267

00:13:47,420 --> 00:13:49,420

We think of toilets as like,

268

00:13:49,420 --> 00:13:51,420

there's water and it's water all the way down,

269

00:13:51,420 --> 00:13:53,420

but it's not.

270

00:13:53,420 --> 00:13:56,420

Toilet systems are mostly air and here's how it works.

271

00:13:56,420 --> 00:13:59,420

If you put more liquid in the system,

272

00:13:59,420 --> 00:14:02,420

then it can handle, it just spills over here.

273

00:14:02,420 --> 00:14:05,420

Now, if I flush this toilet by putting more water in,

274

00:14:05,420 --> 00:14:07,420

check out what happens.

275

00:14:08,420 --> 00:14:10,420

That works just like a toilet.

276

00:14:12,420 --> 00:14:15,420

But that's only half the story.

277

00:14:18,420 --> 00:14:20,420

Now that the toilets are finished

278

00:14:20,420 --> 00:14:23,420

and actually working, it's time to plumb them into a system.

279

00:14:23,420 --> 00:14:25,420

Excellent.

280

00:14:25,420 --> 00:14:28,420

Okay, see, the toilets in Bart's school

281

00:14:28,420 --> 00:14:31,420

would have all been connected to a central set of pipes.

282

00:14:31,420 --> 00:14:34,420

That's what I'm about to build in scale.

283

00:14:36,420 --> 00:14:38,420

So here we go.

284

00:14:40,420 --> 00:14:42,420

You're supposed to cut.

285

00:14:42,420 --> 00:14:45,420

The plumbing beneath the bowls is crucial.

286

00:14:45,420 --> 00:14:46,420

Good.

287

00:14:46,420 --> 00:14:49,420

To accurately model the pressure wave effects of Bart's bomb,

288

00:14:49,420 --> 00:14:53,420

it has to be set up just like a three-stall school sewage system.

289

00:14:53,420 --> 00:14:56,420

Complete with two crucial effluent outflows

290

00:14:56,420 --> 00:14:59,420

the system has multiple exits for the blast.

291

00:15:00,420 --> 00:15:05,420

And with that, this Simpson special Game of Thrones

292

00:15:05,420 --> 00:15:07,420

Fire in the Bowl.

293

00:15:07,420 --> 00:15:08,420

Explosion in three.

294

00:15:08,420 --> 00:15:11,420

Is ready for blast off. Go!

295

00:15:19,420 --> 00:15:22,420

Adam and Jamie have hit Springfield again.

296

00:15:22,420 --> 00:15:26,420

Tonight we take on the classic myth that a cat will always land on its feet.

297

00:15:27,420 --> 00:15:32,420

But this time, instead of experimenting as animated characters...

298

00:15:32,420 --> 00:15:34,420

What was it we were trying to prove again?

299

00:15:34,420 --> 00:15:36,420

Don't know. Don't care.

300

00:15:38,420 --> 00:15:41,420

They're animatively experimenting.

301

00:15:43,420 --> 00:15:46,420

And with a transparent trio of toilets ready to blow,

302

00:15:47,420 --> 00:15:51,420

they want to know if Bart's bomb could have really got it.

303

00:15:52,420 --> 00:15:55,420

And it could have flashed multiple geysers.

304

00:15:57,420 --> 00:16:00,420

Now what happens when you flush a cherry bomb down one of these toilets?

305

00:16:00,420 --> 00:16:03,420

Well, it's going to go down through the plumbing and it could blow anywhere.

306

00:16:03,420 --> 00:16:06,420

It could blow here, it could blow here, it could blow down there.

307

00:16:06,420 --> 00:16:09,420

That's actually what these black caps are.

308

00:16:09,420 --> 00:16:13,420

These are places in the plumbing system we can introduce the pressure from the cherry bomb.

309

00:16:13,420 --> 00:16:15,420

But we're not going to use a cherry bomb.

310

00:16:15,420 --> 00:16:17,420

Not in my shop, we're not.

311

00:16:17,420 --> 00:16:19,420

Number one, it's illegal.

312

00:16:19,420 --> 00:16:24,420

And number two, it's potentially dangerous and definitely very messy.

313

00:16:24,420 --> 00:16:27,420

So we're going to need a little bit more control if we're going to do it here.

314

00:16:27,420 --> 00:16:31,420

For that, we have my little pop gun, which has a fast-acting valve on it

315

00:16:31,420 --> 00:16:34,420

that releases a blast of pressurized air.

316

00:16:36,420 --> 00:16:38,420

And that's essentially what an explosion does.

317

00:16:38,420 --> 00:16:42,420

It creates a volume of rapidly expanding gases in a pressure wave.

318

00:16:42,420 --> 00:16:46,420

So we're going to plumb my little pop gun into Adam's rig in various places,

319

00:16:46,420 --> 00:16:49,420

adjust the pressure and see what happens.

320

00:16:49,420 --> 00:16:50,420

20 psi?

321

00:16:50,420 --> 00:16:52,420

Yeah, that's a big fat dump.

322

00:16:52,420 --> 00:16:54,420

Of pressure.

323

00:16:56,420 --> 00:16:57,420

Nice.

324

00:16:57,420 --> 00:16:59,420

Let me know when you're ready.

325

00:16:59,420 --> 00:17:00,420

All right, I'm going to count it down.

326

00:17:00,420 --> 00:17:09,420

Cherry bomb, half-scaled toilet experiment, position number one, explosion in three, two, one, go.

327

00:17:09,420 --> 00:17:10,420

Go.

328

00:17:15,420 --> 00:17:22,420

A simultaneous tsunami and the physics of Springfield are looking surprisingly accurate.

329

00:17:22,420 --> 00:17:25,420

This first test showed that pressure delivered to the middle toilet

330

00:17:25,420 --> 00:17:28,420

was pretty evenly distributed to the other toilets around it.

331

00:17:28,420 --> 00:17:30,420

It's quite pretty, actually.

332

00:17:30,420 --> 00:17:32,420

Yeah, it's like a little bit of a water ballet.

333

00:17:32,420 --> 00:17:34,420

Some sort of modern art.

334

00:17:35,420 --> 00:17:40,420

Now we want to know what would happen if the cherry bomb and its pressure went here or here.

335

00:17:40,420 --> 00:17:42,420

Would that make any difference?

336

00:17:45,420 --> 00:17:51,420

I don't know about you folks, but whenever I go to the toilet, I always take my umbrella.

337

00:17:51,420 --> 00:18:00,420

Half-scaled cherry bomb, toilet experiment, position number two, two, explosion in three, two, one, go.

338

00:18:05,420 --> 00:18:07,420

That's very satisfying.

339

00:18:08,420 --> 00:18:11,420

Another successful concurrent eruption.

340

00:18:11,420 --> 00:18:13,420

Position number three, go.

341

00:18:13,420 --> 00:18:18,420

One that's replicated regardless of where the explosion originates.

342

00:18:19,420 --> 00:18:23,420

Which kind of makes sense because there's resistance in each of these toilets,

343

00:18:23,420 --> 00:18:28,420

and so with multiple inlets, that resistance is going to tend to equalize the pressure.

344

00:18:28,420 --> 00:18:29,420

Yeah.

345

00:18:29,420 --> 00:18:33,420

The pressure spread is plausible, but Adam has an issue with volume.

346

00:18:33,420 --> 00:18:37,420

Now up until now we've been experimenting with a properly set up plumbing system,

347

00:18:37,420 --> 00:18:43,420

but it's not quite the fountain of water that we see in the show because there's just not enough water in the system.

348

00:18:43,420 --> 00:18:46,420

But what if there is a clog in the system?

349

00:18:46,420 --> 00:18:47,420

There we go.

350

00:18:47,420 --> 00:18:55,420

The clog could have water backed up in that system, and the cherry bomb could go in that, and then it's pushing water.

351

00:18:56,420 --> 00:18:57,420

What do you think?

352

00:18:57,420 --> 00:18:58,420

That's about got it.

353

00:18:58,420 --> 00:18:59,420

All right.

354

00:18:59,420 --> 00:19:02,420

What happens to that water? Does it come out of the toilets?

355

00:19:02,420 --> 00:19:06,420

I kind of think so, but we're going to try it just to make sure.

356

00:19:06,420 --> 00:19:09,420

All right. This is a fully clogged toilet system.

357

00:19:09,420 --> 00:19:12,420

Three, two, one, go.

358

00:19:20,420 --> 00:19:23,420

I think we found the explosion we were looking for.

359

00:19:33,420 --> 00:19:39,420

Well, aside from being pretty to look at, our half scale system has demonstrated exactly what we were hoping,

360

00:19:39,420 --> 00:19:45,420

and that is the Simpsons like fountain water shooting out of the toilet behavior from a cherry bomb thrown into the system.

361

00:19:49,420 --> 00:19:51,420

So I think we're going to go full scale.

362

00:19:51,420 --> 00:19:55,420

I think we're going to detonate our cherry bomb back behind some clogged up water.

363

00:19:55,420 --> 00:20:01,420

The question we have when we go to full scale, will the cherry bomb actually generate the pressure we need?

364

00:20:03,420 --> 00:20:04,420

We don't know.

365

00:20:04,420 --> 00:20:05,420

That's why we're going to do it.

366

00:20:05,420 --> 00:20:06,420

Excuse me.

367

00:20:06,420 --> 00:20:07,420

Sorry.

368

00:20:10,420 --> 00:20:12,420

While the crew completes the cleanup,

369

00:20:15,420 --> 00:20:19,420

the epic odyssey of Hall's heroic intervention continues,

370

00:20:20,420 --> 00:20:23,420

because Jamie's big ball has hardened,

371

00:20:24,420 --> 00:20:28,420

and his distinctly unconventional plan is paid off.

372

00:20:29,420 --> 00:20:31,420

It's looking pretty good.

373

00:20:32,420 --> 00:20:37,420

Next, he makes the two halves a hull and seals the deal with a super strong sealant.

374

00:20:37,420 --> 00:20:43,420

This is a specially formulated epoxy for anchoring things in concrete.

375

00:20:46,420 --> 00:20:51,420

So my plan worked exactly as I had in mind, and we've got a nice spherical shape.

376

00:20:51,420 --> 00:20:55,420

Little chiseling and a little mortar, and this thing will clean up real nice,

377

00:20:55,420 --> 00:20:58,420

and we'll have one heck of a big wrecking ball.

378

00:20:58,420 --> 00:21:03,420

With that, Jamie heads back to the shop, where Homer's head has just arrived.

379

00:21:03,420 --> 00:21:05,420

Dude, look at that.

380

00:21:05,420 --> 00:21:07,420

That is so pretty.

381

00:21:07,420 --> 00:21:09,420

That's a nice smooth surface.

382

00:21:09,420 --> 00:21:12,420

Now that we have these lovely molds of Homer's head,

383

00:21:12,420 --> 00:21:16,420

we're going to coat the inside of the hull with a little bit of resin.

384

00:21:16,420 --> 00:21:19,420

Now that we have these lovely molds of Homer's head,

385

00:21:19,420 --> 00:21:22,420

we're going to coat the insides with a tinsid latex,

386

00:21:22,420 --> 00:21:27,420

because that'll give us the correct color and also a nice tough skin.

387

00:21:27,420 --> 00:21:33,420

Once the latex skin is dried, Jamie fills Homer's head with a two-part pouring foam.

388

00:21:34,420 --> 00:21:37,420

Now this stuff expands about four to one,

389

00:21:37,420 --> 00:21:42,420

and it's a little hard to estimate Homer's head volume.

390

00:21:42,420 --> 00:21:45,420

All I can see is that it's much larger than mine.

391

00:21:46,420 --> 00:21:48,420

As hard as that is to believe.

392

00:21:48,420 --> 00:21:50,420

Want to help me pull this thing apart?

393

00:21:50,420 --> 00:21:52,420

Fifty minutes later, the foam is set.

394

00:21:52,420 --> 00:21:53,420

There you go.

395

00:21:54,420 --> 00:21:55,420

Come on.

396

00:21:55,420 --> 00:22:00,420

And Homer's precisely proportioned profile is revealed in all its glory.

397

00:22:00,420 --> 00:22:02,420

It's kind of heavy.

398

00:22:02,420 --> 00:22:04,420

That looks awesome.

399

00:22:04,420 --> 00:22:06,420

Totally fantastic.

400

00:22:06,420 --> 00:22:11,420

For the finishing touches, Jamie paints Homer's famously unshaven mug.

401

00:22:11,420 --> 00:22:13,420

Starting to look like Homer.

402

00:22:13,420 --> 00:22:16,420

Adam coats his torso with waterproof rubber.

403

00:22:18,420 --> 00:22:22,420

And Jamie adds the ears and those instantly recognizable eyes.

404

00:22:24,420 --> 00:22:26,420

Kind of comes to life when you do that.

405

00:22:29,420 --> 00:22:33,420

So Homer is very, very nearly complete.

406

00:22:33,420 --> 00:22:36,420

We've painted all of his body parts, including his head and now his hands,

407

00:22:36,420 --> 00:22:39,420

a suitable shade of Simpson's yellow.

408

00:22:39,420 --> 00:22:44,420

After this, we'll send his measurements out to our seamstress to make him a full set of clothes.

409

00:22:44,420 --> 00:22:47,420

Then it's time to take him out to the location and abuse him.

410

00:22:58,420 --> 00:23:06,420

To recap, Homer supposedly protects his house by placing himself between a wrecking ball and his house

411

00:23:06,420 --> 00:23:08,420

and absorbing the shot with his body.

412

00:23:08,420 --> 00:23:13,420

In order to test this, we are absolutely, of course, going to need a wrecking ball.

413

00:23:13,420 --> 00:23:14,420

Check.

414

00:23:14,420 --> 00:23:16,420

Well, that's a big-ass ball.

415

00:23:16,420 --> 00:23:20,420

We are also going to need a house to swing this wrecking ball into.

416

00:23:27,420 --> 00:23:29,420

So we decided to build our own.

417

00:23:29,420 --> 00:23:31,420

Actually, we built two.

418

00:23:31,420 --> 00:23:34,420

I've always painted some before we destroy it.

419

00:23:35,420 --> 00:23:39,420

There's a very good reason, because what we want to find out is whether Homer would have made any difference

420

00:23:39,420 --> 00:23:41,420

to the wrecking ball's effect on his house.

421

00:23:46,420 --> 00:23:47,420

All right, let's go.

422

00:23:49,420 --> 00:23:51,420

Therefore, that's our control house.

423

00:23:51,420 --> 00:23:53,420

We're going to swing just a straight-all wrecking ball into it.

424

00:23:53,420 --> 00:23:57,420

It's only when we get to this one that we're going to strap Homer to that wrecking ball

425

00:23:57,420 --> 00:24:03,420

and find out if the amount of destruction is actually different, i.e., less on this one.

426

00:24:03,420 --> 00:24:05,420

Now, it's a home worth protecting.

427

00:24:07,420 --> 00:24:09,420

Yeah, perfect.

428

00:24:10,420 --> 00:24:14,420

In the demolition industry, wrecking balls are kind of iconic.

429

00:24:14,420 --> 00:24:16,420

Jamie wire brushes his balls every morning.

430

00:24:18,420 --> 00:24:22,420

But we've come to find out that they don't actually use them that much anymore.

431

00:24:22,420 --> 00:24:24,420

Now it looks like it's all business.

432

00:24:24,420 --> 00:24:27,420

And when you think about it, it's sort of understandable.

433

00:24:27,420 --> 00:24:28,420

There we go.

434

00:24:28,420 --> 00:24:32,420

Because you get thousands of pounds of weight swinging on the end of a cable,

435

00:24:32,420 --> 00:24:35,420

it's not exactly a precision instrument.

436

00:24:36,420 --> 00:24:37,420

You're right on the money.

437

00:24:37,420 --> 00:24:39,420

5,000 pounds is perfect.

438

00:24:39,420 --> 00:24:42,420

Not only that, it's hard on the equipment that swings it.

439

00:24:47,420 --> 00:24:52,420

So we've found that whenever we need a wrecking ball, we make our own.

440

00:24:52,420 --> 00:24:57,420

With their accurately sized and weighted homemade Homer wrecker,

441

00:24:57,420 --> 00:24:59,420

ready to swing into action,

442

00:24:59,420 --> 00:25:01,420

I love having the right hardware.

443

00:25:01,420 --> 00:25:03,420

It's simply a question of lifting it.

444

00:25:04,420 --> 00:25:06,420

I'll hold it up in case it falls.

445

00:25:06,420 --> 00:25:07,420

Awesome.

446

00:25:07,420 --> 00:25:09,420

Pulling it back and letting it go.

447

00:25:09,420 --> 00:25:10,420

Right?

448

00:25:10,420 --> 00:25:12,420

Ray, how do you feel about it?

449

00:25:12,420 --> 00:25:13,420

You like it?

450

00:25:13,420 --> 00:25:14,420

Wrong.

451

00:25:14,420 --> 00:25:18,420

If it goes out too far, it's going to want to bring it over.

452

00:25:18,420 --> 00:25:19,420

You understand?

453

00:25:19,420 --> 00:25:20,420

Right.

454

00:25:20,420 --> 00:25:21,420

So that's an interesting question.

455

00:25:21,420 --> 00:25:25,420

If we pull it back too far and it swings far out, it's going to pull the crane over.

456

00:25:25,420 --> 00:25:28,420

Probably the big question is how far do we pull it back?

457

00:25:28,420 --> 00:25:30,420

To answer that...

458

00:25:30,420 --> 00:25:33,420

I can go 40 foot radius.

459

00:25:33,420 --> 00:25:34,420

Okay.

460

00:25:34,420 --> 00:25:35,420

So let's talk this through.

461

00:25:35,420 --> 00:25:36,420

That's 40.

462

00:25:36,420 --> 00:25:40,420

The guys look into the limits of the crane's live load capacity.

463

00:25:40,420 --> 00:25:44,420

Let's say the ball hangs here and the crane is here in relation to the house.

464

00:25:44,420 --> 00:25:46,420

Discuss the physics involved.

465

00:25:46,420 --> 00:25:48,420

Force equals mass times acceleration.

466

00:25:48,420 --> 00:25:52,420

So once that ball starts to move, it wants to keep going.

467

00:25:52,420 --> 00:25:55,420

No!

468

00:25:55,420 --> 00:25:58,420

And after an hour of tense discussion...

469

00:25:58,420 --> 00:26:01,420

Really, you have no intuition about that whatsoever.

470

00:26:01,420 --> 00:26:03,420

...come up with a swing distance of...

471

00:26:03,420 --> 00:26:05,420

What if we did 12 feet?

472

00:26:05,420 --> 00:26:11,420

12 feet is significantly less than the freewheeling cartoon capers of Springfield.

473

00:26:11,420 --> 00:26:12,420

Good.

474

00:26:13,420 --> 00:26:17,420

But it's as far as the real world physics allow.

475

00:26:17,420 --> 00:26:18,420

Alright, you like that?

476

00:26:18,420 --> 00:26:20,420

Yeah, I think that's perfect.

477

00:26:20,420 --> 00:26:24,420

And with those parameters in place, the guys set up for the control.

478

00:26:24,420 --> 00:26:26,420

Extending now.

479

00:26:26,420 --> 00:26:32,420

You may be wondering why we're not pulling our wrecking ball back quite as far as you see them doing the Simpsons.

480

00:26:32,420 --> 00:26:34,420

About four feet away.

481

00:26:34,420 --> 00:26:39,420

Well, cranes aren't designed to swing heavy weights around like tether balls.

482

00:26:39,420 --> 00:26:43,420

If they did that in a heartbeat, they could tip the whole crane right over.

483

00:26:43,420 --> 00:26:45,420

Stop.

484

00:26:45,420 --> 00:26:46,420

Stop.

485

00:26:46,420 --> 00:26:47,420

Are you happy with that?

486

00:26:47,420 --> 00:26:48,420

You betcha.

487

00:26:48,420 --> 00:26:50,420

In rigging there are two kinds of loads.

488

00:26:50,420 --> 00:26:51,420

A dead load and a live load.

489

00:26:51,420 --> 00:26:56,420

A live load is one that moves and this load is about as live as it gets.

490

00:26:56,420 --> 00:27:01,420

The repercussions of a miscalculation could be catastrophic.

491

00:27:01,420 --> 00:27:07,420

It's just like destruction and potential.

492

00:27:07,420 --> 00:27:14,420

But the question they're aiming to answer is what kind of hit will the house take without Homer?

493

00:27:14,420 --> 00:27:19,420

This is Simpsons wrecking ball control minus Homer.

494

00:27:19,420 --> 00:27:23,420

In three, two, one, go.

495

00:27:37,420 --> 00:27:40,420

Yeah!

496

00:27:40,420 --> 00:27:42,420

Oh, fabulous.

497

00:27:42,420 --> 00:27:46,420

Second hit.

498

00:27:46,420 --> 00:27:48,420

Oh yeah.

499

00:27:48,420 --> 00:27:51,420

Third hit. Let's go for third hit.

500

00:27:51,420 --> 00:27:56,420

The whole building just is kind of shifting.

501

00:27:56,420 --> 00:28:06,420

Our test showed that a wrecking ball hitting a house like this would severely damage any masonry as well as the framing and the wall of the house.

502

00:28:08,420 --> 00:28:11,420

Just like it did here.

503

00:28:11,420 --> 00:28:17,420

Now the question is, will Homer make any difference if he gets in between that ball and the house?

504

00:28:17,420 --> 00:28:19,420

Honestly, I don't know.

505

00:28:37,420 --> 00:28:42,420

After having played with miniature toilets to our hearts' content, go.

506

00:28:42,420 --> 00:28:50,420

We're going to assemble three real toilets on a platform seven feet off the ground with a real full-scale plumbing system.

507

00:28:50,420 --> 00:28:52,420

Ready to get started and build this thing?

508

00:28:52,420 --> 00:28:53,420

Can you give me a minute?

509

00:28:53,420 --> 00:28:54,420

Sure.

510

00:28:54,420 --> 00:28:59,420

So that we can cherry bomb it all day long and believe me, we will.

511

00:29:01,420 --> 00:29:03,420

Yeah! Come on.

512

00:29:03,420 --> 00:29:06,420

One toilet, two toilets, three toilets.

513

00:29:06,420 --> 00:29:10,420

To recreate the exact same setup as the shop test.

514

00:29:12,420 --> 00:29:16,420

Remember kids, proper care of your toilet requires brushing twice a day.

515

00:29:16,420 --> 00:29:19,420

But as a standard-sized sewage system...

516

00:29:19,420 --> 00:29:24,420

It's almost like Godzilla.

517

00:29:24,420 --> 00:29:27,420

The guys plumb the multiple inputs.

518

00:29:30,420 --> 00:29:32,420

Yes, that's it.

519

00:29:32,420 --> 00:29:37,420

A gas vent and central waste pipe to a seven-foot-high platform.

520

00:29:41,420 --> 00:29:43,420

Maybe we should just back away a little bit.

521

00:29:43,420 --> 00:29:47,420

And up top, Adam finishes with three fully functional toilets.

522

00:29:47,420 --> 00:29:50,420

Hey! That totally worked!

523

00:29:52,420 --> 00:29:58,420

Now, what about the boom that shakes the restroom under strict bomb squad supervision?

524

00:29:58,420 --> 00:30:05,420

The guys are using their own mythbusters made cherry bombs to find out if the fuse will fizzle when wet.

525

00:30:05,420 --> 00:30:10,420

Now, when you hear that Bart throws a cherry bomb into the toilet, let's get to safety, shall we?

526

00:30:10,420 --> 00:30:11,420

Come on.

527

00:30:11,420 --> 00:30:17,420

Your mind might be set to thinking, I wonder if water would actually put out a cherry bomb's fuse?

528

00:30:17,420 --> 00:30:21,420

An excellent question and one I am just about to answer.

529

00:30:21,420 --> 00:30:24,420

Can't get over how much like a cherry they look.

530

00:30:25,420 --> 00:30:27,420

Here we go. It's about to go underwater.

531

00:30:28,420 --> 00:30:31,420

Oh, it's burning underwater.

532

00:30:33,420 --> 00:30:35,420

I don't get it.

533

00:30:35,420 --> 00:30:39,420

So how is it that the fuse on Bart's cherry bomb is able to burn underwater?

534

00:30:39,420 --> 00:30:41,420

Well, to burn something, you need three things.

535

00:30:41,420 --> 00:30:45,420

You need fuel, you need oxygen, and you need a source of ignition.

536

00:30:45,420 --> 00:30:51,420

Now, as it happens, the gunpowder that runs along inside this fuse has everything it needs to burn.

537

00:30:51,420 --> 00:30:54,420

It has its own fuel and its own oxidizer.

538

00:30:54,420 --> 00:30:59,420

So it's quite happy to burn without any kind of exterior source of oxygen.

539

00:30:59,420 --> 00:31:03,420

Every time I learn something new, it pushes some old stuff out of my brain.

540

00:31:04,420 --> 00:31:08,420

Oh! Nice!

541

00:31:09,420 --> 00:31:11,420

That was awesome.

542

00:31:13,420 --> 00:31:19,420

With the fuse firing just fine and the cherry bomb packing a punch, got it.

543

00:31:19,420 --> 00:31:23,420

It's time to fill up and bring the boom.

544

00:31:24,420 --> 00:31:26,420

Okay, that's it.

545

00:31:26,420 --> 00:31:29,420

Our first cherry bomb experiment with the full-size toilet system

546

00:31:29,420 --> 00:31:34,420

is going to replicate the circumstances that we found to be our ideal circumstances in the small scale.

547

00:31:34,420 --> 00:31:39,420

That is, the sewer system clogged with water with the cherry bomb placed under that water.

548

00:31:40,420 --> 00:31:41,420

Right about here.

549

00:31:41,420 --> 00:31:46,420

Now, we're going to be lighting this off with an electric spark via these wires

550

00:31:46,420 --> 00:31:49,420

because that'll allow us to place this exactly where we want

551

00:31:49,420 --> 00:31:53,420

and set it off exactly when we want from a safe distance.

552

00:31:53,420 --> 00:31:55,420

Okay, we're all sealed up.

553

00:31:56,420 --> 00:31:59,420

Setting off explosives in the air as opposed to water is really quite different

554

00:31:59,420 --> 00:32:02,420

and that's because air compresses and water does not.

555

00:32:02,420 --> 00:32:09,420

So if you apply pressure to water, it'll deliver a shock wave directly to whatever it's connected to.

556

00:32:09,420 --> 00:32:11,420

Kind of like a hammer blow.

557

00:32:12,420 --> 00:32:13,420

Are you ready?

558

00:32:13,420 --> 00:32:15,420

I'm ready. High speed's ready.

559

00:32:15,420 --> 00:32:18,420

Now, in our case, that water hammer can become massive.

560

00:32:18,420 --> 00:32:19,420

And three.

561

00:32:19,420 --> 00:32:22,420

And it'll deliver the shock wave through the water, through the plumbing.

562

00:32:22,420 --> 00:32:23,420

Two.

563

00:32:23,420 --> 00:32:25,420

To anything that it's connected to.

564

00:32:25,420 --> 00:32:26,420

One.

565

00:32:43,420 --> 00:32:44,420

That was catastrophic.

566

00:32:50,420 --> 00:32:53,420

Yep, Jamie's hammer theory nailed it.

567

00:32:53,420 --> 00:32:57,420

In contrast to the shop tests, Simpsons like water fountain...

568

00:32:58,420 --> 00:33:01,420

Oh, yes. Hey, this camera's still rolling here.

569

00:33:02,420 --> 00:33:06,420

When faced with the same firepower as a real cherry bomb...

570

00:33:06,420 --> 00:33:08,420

It is a freaking horror show up here.

571

00:33:08,420 --> 00:33:13,420

The standard full-size lavatory fixtures were forced free of their moorings,

572

00:33:13,420 --> 00:33:15,420

leaving the porcelain...

573

00:33:16,420 --> 00:33:19,420

And possibly the myth busted.

574

00:33:19,420 --> 00:33:21,420

Looking carefully at the high-speed footage,

575

00:33:21,420 --> 00:33:24,420

you'll notice that water starts coming out beneath the toilets

576

00:33:24,420 --> 00:33:26,420

at the same time as it starts coming out the bowls.

577

00:33:26,420 --> 00:33:29,420

Now, that means that that water was moving so fast

578

00:33:29,420 --> 00:33:34,420

that the toilet's plumbing was not able to absorb the onrush,

579

00:33:34,420 --> 00:33:37,420

which is why it broke the toilets off their mounts

580

00:33:37,420 --> 00:33:39,420

instead of creating three large geysers.

581

00:33:39,420 --> 00:33:45,420

Arpchery bomb gave us a stunning explosion.

582

00:33:45,420 --> 00:33:51,420

Unfortunately, it also happened to rip all three of our toilets right out of the floor.

583

00:33:55,420 --> 00:33:56,420

That pretty good?

584

00:33:56,420 --> 00:33:57,420

Looks good to me.

585

00:33:57,420 --> 00:34:02,420

So we have gone to the measure of bolting them right to the cast iron flanges

586

00:34:02,420 --> 00:34:03,420

of the plumbing that they are plumbed to,

587

00:34:03,420 --> 00:34:06,420

and that should hold them tight for this test.

588

00:34:07,420 --> 00:34:10,420

After a quick reset up top...

589

00:34:10,420 --> 00:34:12,420

You know, all evidence to the contrary,

590

00:34:12,420 --> 00:34:14,420

I think you and I would make a good pair of plumbers.

591

00:34:16,420 --> 00:34:20,420

This time, they placed the cherry bomb at the lowest possible point of the plumbing.

592

00:34:20,420 --> 00:34:24,420

The geyser hoping the larger volume of water above the explosive

593

00:34:24,420 --> 00:34:29,420

will absorb more energy and give them the mythical gushing geysers.

594

00:34:29,420 --> 00:34:30,420

This is it.

595

00:34:30,420 --> 00:34:32,420

After small-scale and large-scale experiments,

596

00:34:32,420 --> 00:34:34,420

this is the blast we hope will work.

597

00:34:34,420 --> 00:34:36,420

We have changed the position of the bomb.

598

00:34:36,420 --> 00:34:38,420

Hell, we've even bolted them to their own plumbing,

599

00:34:38,420 --> 00:34:40,420

which is totally unrealistic,

600

00:34:40,420 --> 00:34:44,420

but it's what we hope it will take to give us the geysers that we're looking for.

601

00:34:44,420 --> 00:34:45,420

And it's just about to happen.

602

00:34:45,420 --> 00:34:46,420

Are you ready, sir?

603

00:34:46,420 --> 00:34:47,420

I am.

604

00:34:47,420 --> 00:34:48,420

Okay.

605

00:34:48,420 --> 00:34:57,420

Five, four, three, two, one.

606

00:34:57,420 --> 00:34:59,420

Go!

607

00:35:03,420 --> 00:35:06,420

No force can contain the cherry bomb!

608

00:35:12,420 --> 00:35:14,420

What are you gonna do?

609

00:35:16,420 --> 00:35:18,420

Yep, the power was simply too much.

610

00:35:18,420 --> 00:35:23,420

The pressure blast couldn't escape through the narrow plumbing fast enough,

611

00:35:23,420 --> 00:35:25,420

and something had to give.

612

00:35:25,420 --> 00:35:28,420

What we're seeing is that if you have enough energy to push a lot of water

613

00:35:28,420 --> 00:35:32,420

up and out of those toilets using something like our cherry bomb,

614

00:35:32,420 --> 00:35:35,420

that same energy and the shockwave that accompanies it

615

00:35:35,420 --> 00:35:39,420

is also going to break the toilets off at their bases.

616

00:35:39,420 --> 00:35:42,420

They're simply not strong enough to stay in place.

617

00:35:42,420 --> 00:35:46,420

So, as far as I'm concerned, using an explosive,

618

00:35:46,420 --> 00:35:50,420

you're never gonna see the kind of geyser that we saw in the cartoon.

619

00:35:50,420 --> 00:35:53,420

In this house, we obey the laws of thermodynamics!

620

00:35:53,420 --> 00:35:56,420

The cartoons don't reflect reality?

621

00:35:56,420 --> 00:35:58,420

Wow, this is big.

622

00:35:58,420 --> 00:36:00,420

This is...what's the word? Busted.

623

00:36:00,420 --> 00:36:01,420

It's busted.

624

00:36:01,420 --> 00:36:02,420

Yes.

625

00:36:02,420 --> 00:36:04,420

Yeah!

626

00:36:04,420 --> 00:36:08,420

Kicking toilets apart since 1930.

627

00:36:10,420 --> 00:36:12,420

They have some steel-tipped shoes.

628

00:36:13,420 --> 00:36:15,420

With the porcelain pummeled,

629

00:36:17,420 --> 00:36:20,420

Adam and Jamie head back to Homer's house,

630

00:36:20,420 --> 00:36:24,420

where our humble hero awaits his moment of glory.

631

00:36:24,420 --> 00:36:25,420

No!

632

00:36:28,420 --> 00:36:29,420

Hello, friends.

633

00:36:29,420 --> 00:36:31,420

If you're like most people, you probably are sad

634

00:36:31,420 --> 00:36:34,420

that you haven't been able to afford your slice of the American dream,

635

00:36:34,420 --> 00:36:37,420

but now it turns out that you can.

636

00:36:39,420 --> 00:36:42,420

On the outskirts of Springfield, a new development has arisen,

637

00:36:42,420 --> 00:36:44,420

one that provides picture-perfect homes.

638

00:36:44,420 --> 00:36:46,420

If viewed from the right angle,

639

00:36:46,420 --> 00:36:49,420

we've reduced home ownership to its barest essentials.

640

00:36:49,420 --> 00:36:52,420

One wall, one couch, one floor.

641

00:36:52,420 --> 00:36:54,420

Welcome to Shady Acres.

642

00:36:54,420 --> 00:36:56,420

Hey, no attention to the wrecking wall.

643

00:37:05,420 --> 00:37:08,420

Jamie and Adam are chasing a cartoon conundrum.

644

00:37:08,420 --> 00:37:09,420

Oh!

645

00:37:10,420 --> 00:37:11,420

That's his home.

646

00:37:11,420 --> 00:37:13,420

It's a Homer record.

647

00:37:14,420 --> 00:37:19,420

Can our hero's leap of faith dissipate the force of this impact?

648

00:37:23,420 --> 00:37:24,420

Yeah!

649

00:37:24,420 --> 00:37:26,420

You know, it didn't move very fast,

650

00:37:26,420 --> 00:37:29,420

but it had quite a kick to it, didn't it?

651

00:37:29,420 --> 00:37:32,420

I think that's Newton's second wall right there.

652

00:37:34,420 --> 00:37:38,420

Now, we're going to leave all this damage intact as it is.

653

00:37:38,420 --> 00:37:40,420

Ah, couldn't be better.

654

00:37:40,420 --> 00:37:43,420

And go ahead and do the test with Homer on the wrecking ball

655

00:37:43,420 --> 00:37:45,420

with the identical house.

656

00:37:45,420 --> 00:37:48,420

Now that is a proper cartoon wrecking ball.

657

00:37:48,420 --> 00:37:52,420

And if it shows damage anything like this,

658

00:37:53,420 --> 00:37:57,420

we will know that Homer's efforts would have been for naught.

659

00:37:58,420 --> 00:38:00,420

And ta-da!

660

00:38:00,420 --> 00:38:02,420

Allow me to introduce you to the completed,

661

00:38:02,420 --> 00:38:05,420

ready-to-be-tested with hero,

662

00:38:05,420 --> 00:38:08,420

of this episode, Mr. Homer J. Simpson.

663

00:38:08,420 --> 00:38:11,420

Ladies and gentlemen, let's give a round of applause.

664

00:38:13,420 --> 00:38:14,420

Woo-hoo!

665

00:38:14,420 --> 00:38:17,420

Our accurately sized and dressed Homer

666

00:38:17,420 --> 00:38:21,420

is attached to the ball exactly as per the clip.

667

00:38:21,420 --> 00:38:23,420

That's it. First arm is on. Okay.

668

00:38:23,420 --> 00:38:26,420

With a final, crucial component.

669

00:38:26,420 --> 00:38:31,420

Since part of this is what happens with Homer's body mass on the ball,

670

00:38:31,420 --> 00:38:33,420

we need to give it a shot.

671

00:38:33,420 --> 00:38:35,420

With the body mass on the ball,

672

00:38:35,420 --> 00:38:38,420

we need to give him some body mass other than just bump.

673

00:38:38,420 --> 00:38:40,420

We're doing that by adding water.

674

00:38:40,420 --> 00:38:43,420

The average density of a human body

675

00:38:43,420 --> 00:38:45,420

is within a couple of percentage points of water.

676

00:38:45,420 --> 00:38:46,420

Perfect.

677

00:38:46,420 --> 00:38:51,420

So a water-filled Homer is an almost perfect energy absorption analog

678

00:38:51,420 --> 00:38:54,420

for a real person of that size and shape.

679

00:38:54,420 --> 00:38:56,420

Oh, oh!

680

00:38:56,420 --> 00:38:58,420

Homer is substantial.

681

00:38:58,420 --> 00:39:00,420

Our cartoon character is coming to life.

682

00:39:00,420 --> 00:39:04,420

The question is, with a real-life mass of 239 pounds,

683

00:39:04,420 --> 00:39:06,420

can he save his house?

684

00:39:06,420 --> 00:39:08,420

I think we're good to go up.

685

00:39:08,420 --> 00:39:09,420

All right.

686

00:39:09,420 --> 00:39:10,420

It's happening.

687

00:39:13,420 --> 00:39:15,420

We're making sure that we're positioning the ball

688

00:39:15,420 --> 00:39:19,420

exactly the same way that we did the first time.

689

00:39:20,420 --> 00:39:24,420

We'll let it settle, so the physics should all be the same,

690

00:39:24,420 --> 00:39:26,420

except for Homer.

691

00:39:26,420 --> 00:39:29,420

Does it look like his ass is dead center?

692

00:39:29,420 --> 00:39:32,420

He couldn't be more perfectly on the horizon of the lines

693

00:39:32,420 --> 00:39:35,420

of force between the ball and his house.

694

00:39:38,420 --> 00:39:40,420

Look at the potential.

695

00:39:40,420 --> 00:39:42,420

The potential energy.

696

00:39:42,420 --> 00:39:44,420

As per the control, the velocity on impact

697

00:39:44,420 --> 00:39:48,420

may only be a pedestrian six miles an hour.

698

00:39:50,420 --> 00:39:52,420

What are we doing?

699

00:39:52,420 --> 00:39:55,420

But with 5,000 pounds of ball...

700

00:39:55,420 --> 00:39:57,420

Who's paying for this?

701

00:39:57,420 --> 00:39:58,420

This is awesome.

702

00:39:58,420 --> 00:40:01,420

There's a lot of energy to dissipate.

703

00:40:02,420 --> 00:40:04,420

Say goodbye, Homer.

704

00:40:04,420 --> 00:40:08,420

Can our hefty hero really absorb that impact?

705

00:40:08,420 --> 00:40:10,420

All right. Here we go.

706

00:40:10,420 --> 00:40:12,420

Homer versus the wrecking ball.

707

00:40:12,420 --> 00:40:15,420

The final experiment.

708

00:40:15,420 --> 00:40:19,420

Three, two, one.

709

00:40:19,420 --> 00:40:21,420

Here we go!

710

00:40:21,420 --> 00:40:25,420

Oh! Oh! Oh!

711

00:40:25,420 --> 00:40:27,420

Ha-ha-ha-ha!

712

00:40:27,420 --> 00:40:30,420

That's a result that I never would have bet on.

713

00:40:30,420 --> 00:40:31,420

Ha-ha-ha!

714

00:40:31,420 --> 00:40:33,420

He's clearly made a big difference.

715

00:40:33,420 --> 00:40:36,420

Yeah, I mean, look at this house, and look at that one.

716

00:40:36,420 --> 00:40:37,420

Wow!

717

00:40:37,420 --> 00:40:39,420

I'm just saying.

718

00:40:39,420 --> 00:40:42,420

Homer's ass is quite impressive, actually.

719

00:40:51,420 --> 00:40:53,420

It's an astonishing result.

720

00:40:53,420 --> 00:40:56,420

The house didn't escape completely unscathed,

721

00:40:56,420 --> 00:40:58,420

but Homer did help.

722

00:41:00,420 --> 00:41:03,420

He did crack the chimney.

723

00:41:03,420 --> 00:41:06,420

It almost fell, but the fact is that it didn't,

724

00:41:06,420 --> 00:41:07,420

and that's a result.

725

00:41:07,420 --> 00:41:08,420

Yeah.

726

00:41:08,420 --> 00:41:11,420

Well, astonishingly, it turns out Homer did in fact make a difference

727

00:41:11,420 --> 00:41:14,420

by placing himself between the wrecking ball and his house.

728

00:41:14,420 --> 00:41:16,420

He clearly made a heroic effort,

729

00:41:16,420 --> 00:41:18,420

and it had a heroic outcome.

730

00:41:20,420 --> 00:41:23,420

Those cartoonists don't get enough credit for proper engineering.

731

00:41:24,420 --> 00:41:28,420

I am too smart. I am too smart.

732

00:41:28,420 --> 00:41:31,420

S-M-R-T. I mean, S-M-A-R-R-T.

733

00:41:31,420 --> 00:41:33,420

All right, Al. I got some good news.

734

00:41:33,420 --> 00:41:34,420

Woo-hoo!

735

00:41:34,420 --> 00:41:35,420

And some bad news.

736

00:41:35,420 --> 00:41:36,420

Don't!

737

00:41:36,420 --> 00:41:38,420

I'm going to start with the bad news, which is the toilet bomb.

738

00:41:38,420 --> 00:41:42,420

Unfortunately, all we got was total toilet destruction.

739

00:41:42,420 --> 00:41:43,420

It's busted.

740

00:41:43,420 --> 00:41:46,420

Well, you forget that the school is near a nuclear plant.

741

00:41:46,420 --> 00:41:48,420

Nuclear plant run by idiots.

742

00:41:48,420 --> 00:41:50,420

Oh, it's funny, because it's true.

743

00:41:50,420 --> 00:41:52,420

And there could be a nuclear explosion at any moment,

744

00:41:52,420 --> 00:41:56,420

which means that the toilets are ultra-super reinforced, not busted.

745

00:41:56,420 --> 00:41:57,420

Hmm.

746

00:41:57,420 --> 00:41:58,420

I see where you're headed with that.

747

00:41:58,420 --> 00:41:59,420

Good news?

748

00:41:59,420 --> 00:42:01,420

The good news is Homer wrecker.

749

00:42:01,420 --> 00:42:04,420

We are totally amazed by these results,

750

00:42:04,420 --> 00:42:06,420

but the fact is that Homer made a difference

751

00:42:06,420 --> 00:42:09,420

by placing his body between the wrecking ball and his house.

752

00:42:09,420 --> 00:42:12,420

He was successfully able to keep it from being damaged.

753

00:42:12,420 --> 00:42:16,420

So you're saying the show is 100% scientifically accurate.

754

00:42:16,420 --> 00:42:18,420

Sure.

755

00:42:20,420 --> 00:42:22,420

Thank you gentlemen.