What causes pile-ups in the real world?

- The causes of crashes are really complex.

It's not just a single factor like speed, or weather, or distraction.

It's often many factors coming together.

It's incidents like this that have inspired the scenario for James' experiment.

His plan is to replicate the conditions of icy roads for the crash.

- If we can make the road more slippery, then you will start to see what the effect of that will be on the stopping distances of the cars.

To identify the perfect surface to match the slippery conditions, James and his team have covered a section of tarmac with three different ice substitutes: gravel, oil and water, and oil on its own.

But which surface most closely replicates the stopping distance on an icy road?

To find out, stunt driver Paul will drive at a moderate 40 miles per hour and hit the brakes when his car reaches each surface.

First up, oil.

(car revving)
(tires screeching)

- [Crew Member] Okay, turn your logger off.

Stay there for a second.

The next lane combines oil and water.

And because oil floats on water, the team believes this mixture will reduce traction even further.

- [Crew Member] Three, two, one, action.

(engine revving)
(tires rubbing)
(water splashing)

- [Crew Member] Blimey.

To be honest, that's, that's a shocker.

That's like a foot and a half further than oil on its own.

And that's it.

Neither option has come anywhere close to providing the reduced friction the team needs.

So they are now pinning all their hopes on the loose gravel.

- [Crew Member] Ready? And three, two, one, action.

(gravel rattles)

- [Crew Member] That actually is a surprise.

That is a surprise.

Okay, folks, stay there.

Unexpectedly, loose gravel looks to be the best substitute to replicate ice.

- As soon as I touched the brakes, there was nothing.

It just went on.

- [Crew Member] Was it just constantly trying to do something?

- And then, with the other two, but they felt exactly the same and the distance was-

- Very predictable.

- Yeah.

The gravel reduced the grip on the road just as freezing conditions affect traction.