[SQUEAKING]

[RUSTLING]

[CLICKING]

RICHARD DE NEUFVILLE: So this is a vision of-- that is, a fairly classic example of simulation, and has to do with the development of the Antamina copper mine in Peru. And for those who know anything about mining, it's not just copper you get out of it, but it's zinc and all kinds of other things that may be associated with it, molybdenum in particular.

So first of all, I want the opportunity to talk about two kinds of flexibility, on a system and in a system. So design features that enable systems to evolve easily in the future has some technical thing that you do to the physical design. It is in the system. That is, this requires an engineering approach to it. You need to be able to do the right things and you mess with the guts of the simulation, so it's in that.

At the same time they have the flexibility to do various things, such as abandon the project is one thing where it has nothing to do with the design of it. It's just simply saying, OK. If prices are not right, it's not worthwhile to proceed, we're going to stop. So that's a flexibility that you might have as opposed to saying, I'm going to continue regardless. That is a flexibility on the system.

It's useful later to have that capability to think about between flexibility in and on a system, and both are involved in this case. And this presentation was originally built up by some economists at the Harvard Business School.

Now the idea is that it's a site in the mountains of the Andes, north of Lima towards Ecuador, that was privatized and the government wanted to get people to look at it. So it was in two phases.

First of all, you asked for bids. And the bid was to say, OK. I have the right to examine the site for two years. I mean, nobody was sure how difficult it was to get the ore out, although there was some there. But how difficult it was and whether it would be worthwhile. Would the price be right, and whatever.

So the idea was that they'd go and explore it with geological information, et cetera, et cetera. And they were given two years to do that. And they could either proceed with the development or give the project up.

Now just to give you an example of what this is, we're talking-- these are altitudes in Meters Above Sea Level, MASL. And this is an enormous project. So you have the scope of the mine. You're seeing it going down to about 2,000 feet of it.

And just to give you an impression of what this means in terms of the vision-- and by the way, this is all at about 15,000 feet, so the air is thin. And for those of you who have been hiking at that level, you run out of steam pretty quickly unless you've been acclimatized over a long period.

So here's what it looks like to get to the copper deposit. You're taken down several hundred feet and quite wide across an area of it. And here is an example of what's happening here.

And by the way, these cranes and so on, this may be the equivalent of three or four stories high. These are really monster units and the same thing with the trucks. The wheels on these trucks here are about six feet tall, typically. It's a big thing. Here it is. It's actually operating. And the plant. So a big project.