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## The Process of Risk Assessment

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How does someone think about risk analysis? Management Science and Engineering department chair Dr. Elisabeth Paté-Cornell breaks down the process of assessing risk: She first speaks with experts to find out how a given system works and how it might fail; then she examines ways of reinforcing a system. A risk analyst can only provide options based on available resources; they cannot make decisions for someone.



### Transcript

Now, all risks don't need to be qualified. But I would say that for many risk management decisions, it does help. And I'm going to show you particularly for complex systems and new situations. The most interesting risk problems are with risks that were never seen, systems that we have never seen and things that are completely new. The others, that's much easier. OK, so how do we think about risk analysis and how do I approach it? Well, when I want to explain what I do in life, I'm going to see experts and I'm going to say tell me how it works, whatever it is. So let's talk about satellites for a minute. Let's figure out how it might fail, guidance system, propulsion system, electric system, optical systems. In other terms, any of the critical functions of that engineered systems that you need to have for the whole thing to work might be a source of failure. Then let's find ways to reinforce it.

There are many different things that you can do. One of them is to make some of the components stronger. For example, you can have stronger pillars, or stronger beams in a building. Another one is to put redundancies behind the system. Another one is to manage it better and to make sure that you give the right incentives to the people who are the operators of your system. We are going to see in a minute why it really matters. So then we are going to find the best way of doing the application and again, as you can see, experts matter enormously. Now, other risk analysts are not making the decision. I'm just providing information to a decision-maker who has his or her own preferences and I want to help that person to the degree that that person wants help to make a number of decisions. For example, adopt a new technology.

As you know, nanotechnologies these days RE sometimes feared by some. What's the real risk? There's the system, cite a facility. For example a chemical plant, where do you want to put it? Manage inspection and maintenance; there for, example, the airlines. I've worked with airlines with a group of students from the 250D which is the project class, the project course of mine. It follows my class. And the question is really how do you do the maintenance on schedule, how often do you do it, for what parts. There the Federal Aviation Administration is allowed to say, and how do you do the inspection on demand, how do you manage that? And then finally, adopt and implement government regulations. The Nuclear Regulatory Commission, for example, makes decisions regarding the safety of nuclear power plants even though the industry itself does a lot of policing. OK, so as you can see, I see risk analysis in this context as part of systems engineering.