Structural Integrity: Materials Testing
Specialised Tests for Problem Areas

Corus, as a company, does a tremendous amount of testing, primarily release testing for its products, and this is mainly tensile tests or Charpy tests, here at the Corus Research & Development Laboratories, Swinden Technology Centre at Rotherham, we don't do the release testing, we concentrate on the more specialised tests, and we'll be seeing later on toughness testing, K_{1C}, COD, crack opening displacement, type of testing.

The main reason for us having such extensive facilities and capability in this type of, uh, area is primarily to help both ourselves and our customers develop new applications and new uses for steels and trying to help our customers through problem areas

so a lot of the problems are associated with fabrication from welding joining problems or something like that or if they're wanting to use a material which is much higher strength than they normally use or at a different temperature than they normally use or for a much more highly stressed application,

For instance, aircraft undercarriage materials, which are a steel component, uh, are, are absolutely essential, you wouldn't want to land on an aircraft that had a defect in it that wasn't capable of sustaining, so t… that's a classic example of how a toughness requirement is for a steel and this is getting particularly more prominent now as people are more wanting to use higher strength materials to push the design strength up, uh, in order to minimise the weight of different components.

The three different types of toughness test, K_{1C}, CTOD, or CODs, and J-integral, all use basically the same type of toughness test, in that it's a, a specimen taken from the thickness of the material with a machine notch put into it like this one. There's then a fatigue crack grown from that notch and the specimen is then fractured in, usually, in this case it would be in bending, until it breaks, and the, the load and displacement is recorded during that test.