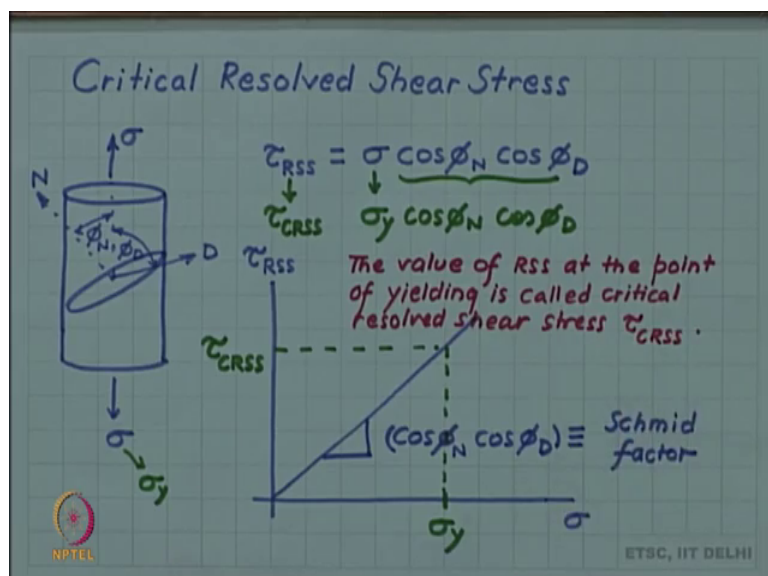**Lecture – 111**
CRSS

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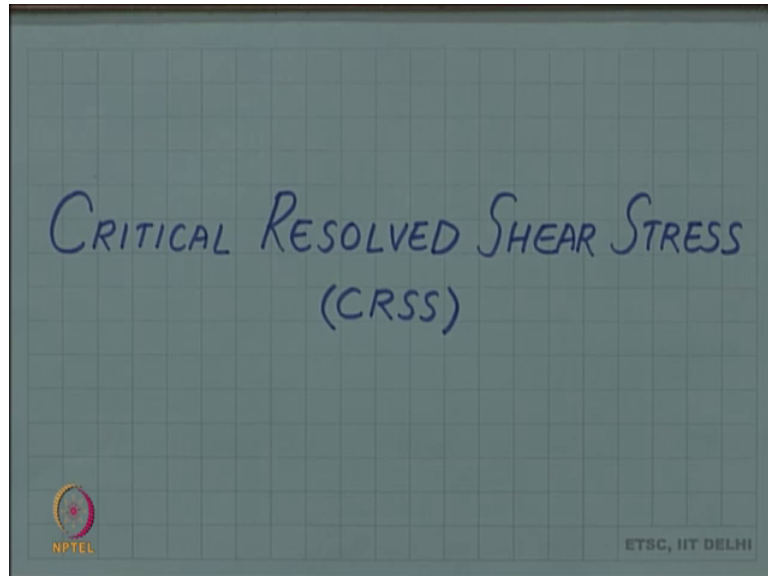
In the last video we saw the concept of resolved shear stress. Now we will look at a related concept which is called Critical Resolved Shear Stress.

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Now, suppose we are loading a sample in a uniaxial tension. So, we have seen that on a slip plane which is inclined at an angle phi N and a slip direction which is inclined at an angle phi D, there is a resolved shear stress acting on the material, which is given by the applied tensile stress times cos phi N cos phi D.

So, if we plot this relationship m resolved shear stress as a function of sigma, we expect to get a straight line with this as our slope. So, let us do that so, and the slope is expected to be cos phi N, cos phi D sometimes this factor is called a schmid factor, this product is called a schmid factor.

Now, if you are doing a tensile test on the sample sooner or later this tensile stress will reach a value sigma y the yield stress and when you reach yield stress there will be plastic deformation. So, let us now indicate that on the tensile axis, there is a critical value called the yield stress at which yielding begins. Now corresponding to that yield stress, if I find what is the resolved shear stress. So, that value of resolved shear stress will be called critical resolved shear stress CRSS.

So, which means I am increasing I am increasing resolved shear stress, I am increasing actually the tensile stress, tensile stress reaches a value sigma y, the correspondingly resolved shear stress reaches the value critical resolved shear stress; sigma cos phi N cos phi D. So, for completeness let us write this definition, with the value the value of resolved shear stress at the point of yielding is called critical resolved shear stress, we can call it tau CRSS.