
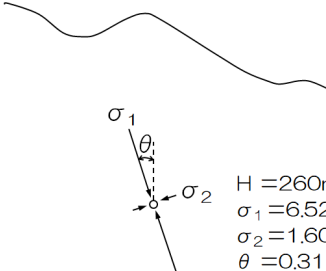
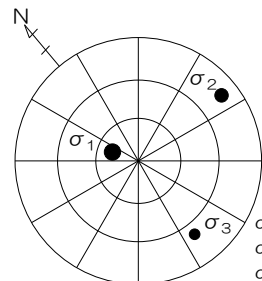


Initial stress measurement using the AE Method

Keywords	Initial stress, laboratory testing, AE, principal stresses	
Technology overview	<p>This is a technique for measuring the pre-existing stress in materials using the Kaiser effect. Test specimens are cut from borehole cores in 3 to 6 different directions. This allows for the identification of principal stresses and their directions in two or three dimensions.</p>	<p>Test Status:</p> 
Applications	<ul style="list-style-type: none"> • Design loads for underground caverns • Critical stress for rock burst phenomena • Evaluation of asymmetric deformation in caverns 	
Know-how	<p>elimination of noise from the specimen end face the effect of release stress after in-situ sampling</p>	
Related technologies	<p>in-situ testing methods: Stress release method etc. laboratory testing methods: DSCA, ASR, DRA etc.</p>	
Examples	<p>I. Hard rock formation</p> <ol style="list-style-type: none"> 1_granite (Tunnel): 6*¹ 2_granodiorite (Dam): 1 3_porphyrite (Underground power station): 1 4_andesite (Tunnel): 1 5_gneiss (Mine) : 1*² 6_granite (Nuclear Power Plant): 1 7_schist (Nuclear Power Plant): 1 8_limestone (Mine) : 1 <p>II. Soft rock formation</p> <ol style="list-style-type: none"> 1_tuff (Tunnel): 1 2_slate (Tunnel): 1 3_siltstone (Tunnel): 1 4_tuffaceous sandstone (Mine): 5 5_mudstone (mine): 3 6_Siliceous mudstone (URL): 1 	<p>Examples of 2D Analysis *¹ :</p> <p>H260m, granite(Tunnel)</p>  <p>σ_1 θ σ_2</p> <p>H = 260m $\sigma_1 = 6.52\text{MPa}$ $\sigma_2 = 1.60\text{MPa}$ $\theta = 0.31\text{rad}$</p> <p>Examples of 3D Analysis *² :</p> <p>H180m, gneiss (Mine)</p>  <p>σ_1 σ_2 σ_3</p> <p>$\sigma_1 = 5.53\text{MPa}$ $\sigma_2 = 3.74\text{MPa}$ $\sigma_3 = 2.97\text{MPa}$</p>