Electric Strain Transducers

Measurements of forces and stresses with electric strain transducers at or in structures are based on the fundamental idea to calculate stresses or forces at the structure by the detour of strain measurement. For this purpose the measured strain is multiplied by the modulus of elasticity of the structure. But this is one of the disadvantages of all these procedures. While the electric strain measurement is exact enough, the exact determination of the elasticity modulus - f. e. of concrete - is rather difficult, because it depends on the composition and on the external strain of the concrete, and furthermore because it varies with time. When using this method at steel structures those difficulties can be excluded.

The following components are often used for strain measurements:

- High precise, electric deformation transducers,
- Vibrating wire strain transducers and
- Strain foil gauges.

These strain transducers are used, when the properties of the material where they are embedded or fixed are known. It is advantageous, as for displacement measurements, that the strain transducers have a rather long measuring base when they are used for stress measurements. Thus an integrating effect results that filters a mean representative stress from the often erratic stress values.

When calculating the stress from strain measurements you have always to consider that strains at the test specimen and at the transducer are caused by temperature changes which have nothing to do with the external stresses. Therefore we recommend to measure the temperature at the test specimen and at the transducer or - in case of strain transducers - to make use of circuits that compensate thermal strains. If the temperature changes at the test specimen and at the transducer are known, you can take the influence of the temperature into account when determining the effective strain in consequence of load.

Geotechnisches Ingenieurbüro
Prof. Fecker & Partner GmbH
Am Reutgraben 9 Fon: ++7243/5983-7
D-76275 Ettlingen Fax: ++7243/5983-97