Strain gage installation on fiber-reinforced plastics

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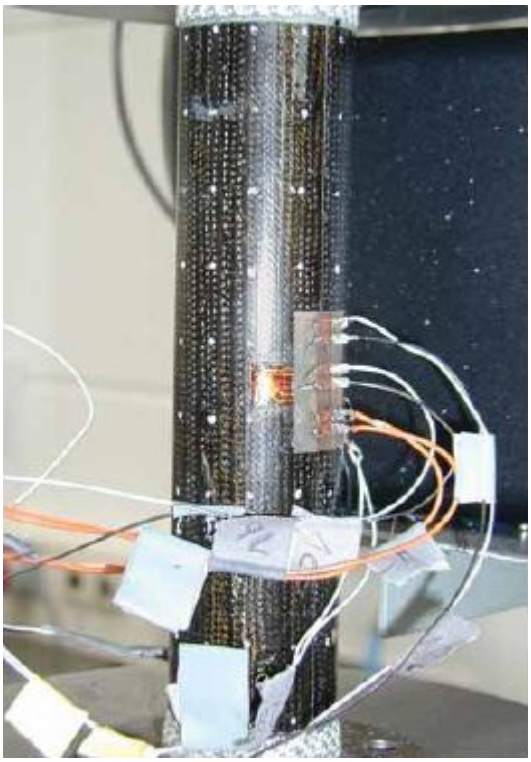
Strain gage installations on fiber-reinforced plastics have some peculiarities distinguishing them from standard installations:



- The mechanical properties are depending on orientation; therefore the standard theoretical approach (Hooke's law) can no longer be applied without knowing the dependence on orientation of the modulus of elasticity.
- On principle, the same rule applies for selecting the strain gages as for concrete: The length of the strain gage should exceed the distance of the fibers by at least factor 5. The width of the strain gage should also cover several fibers.
- Caution is advised when treating plastics with solvents, because they may cause expansion or stress corrosion. White gas and isopropyl alcohol may be considered largely uncritical, especially because of the short contact time. In critical cases, a preliminary test should always be made, because no clear predictions can be made due to the very large number of modified plastics. This also applies to the use of RMS1 cleaning agent.
- We recommend to prepare the measuring point as follows: Roughen with emery cloth (grain size 400), then use dishwater for cleaning and rinse with water (ideal: deionized water).
- All cold-curing adhesives from HBM's range of products can be used for installing strain gages.
- Often the stress peaks between the fibers are a multiple of the average strain. As a consequence, the strain gage may be overloaded at some points, its maximum elongation being reached or exceeded, although the amplifier displays a far smaller strain. Thus there is a risk of the strain gage being overloaded (permanently damaged) at individual points or of failure of the whole installation This problem can be eliminated by inserting a thin Kapton film between the strain gage and the work piece. The film is glued between the component and the strain gage and performs preliminary integration, i.e. it "distributes" the stress peaks under the strain gage measuring grid. Because of the resulting thicker layers, the film should only be used, if high strain is expected.