STRUCTURAL HEALTH MONITORING (SHM)

WHAT IS SHM?

Structural **H**ealth **M**onitoring enables the owner to monitor the structural integrity of his asset (e.g. bridge, tunnel, building, pipeline or even a dike) over its entire life span and to put it, when so desired, under “intensive care” from time to time. To this end permanent sensors are embedded in or mounted on critical parts of the structure. Whenever deformations and stresses reach specific pre-set magnitudes, the SHM-system automatically raises a warning or an alarm. Thus the owner or asset manager is in a position to take relevant action in time. Even recent history has shown that a structural monitoring system for certain assets is a real necessity.

WHY STRUCTURAL MONITORING?

- Provides insight in the actual structural condition of the asset
- Brings to light errors in design and construction in time
- Reveals deficiencies that arise with time
- Shows hidden reserves
- Brings safety
- Enables control over the use of the asset
- Can limit liability
- Enlarges knowledge on structural behaviour
- Predicts the behaviour of the structure when conditions change e.g. expected increase in traffic load on a bridge.

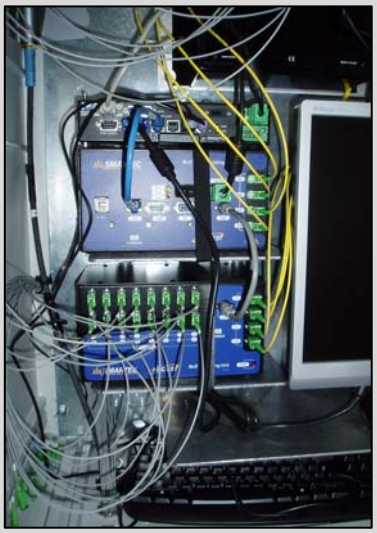
WHY MEASURE WITH LIGHT?

- Unmatched reliability and accuracy
- Totally immune to electromagnetic induction
- No drift, not even over a period of decades
- Insensitive to corrosion, humidity, water and vibration
- Not influenced by variations in temperature
- Very small size
- Resists the most hostile environments
- Intrinsically safe, so ideally suited for use in harzardous areas
- Unrivalled durability.

In addition, our fiber optic sensors measure over a much wider span (0,30 to 2,00m) than traditional sensors. This leads to a much more accurate and realistic picture of the overall condition of the structure. This is essential, in particular when dealing with heterogeneous building materials such as reinforced concrete.

WHAT DOES SHM COST?

In general the cost of a fully operational SHM-system does not exceed a couple of percents of the capital investment in the asset as a whole. For such a small additional investment SHM offers a real-time monitoring system that guards the structure over its entire life span. Incidental monitoring at a later stage with no SHM-system being in place, is bound to be complicated and more expensive. Furthermore the interpretation of the measurement data will then be less reliable.
An SHM-system is designed, engineered and implemented in close collaboration with the asset owner, the structural engineer and the architect.



EXAMPLES OF SHM

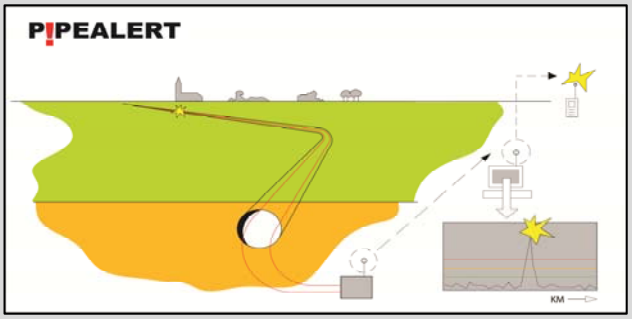
Bridges, fly-overs, tunnels: displacement, deformation, stresses, temperature. Also dynamic measurements.

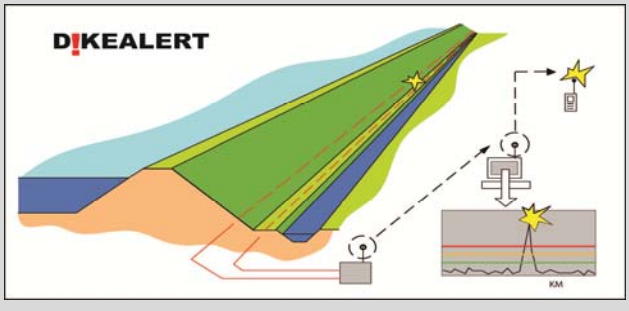
Pipelines: distributed strain/stress over distances up to 50km with a single reading unit.

Quay-walls: deformation of retaining wall, soil erosion behind quay-wall, grout anchor forces, load on quay-wall and storage area, ground water levels.

Dikes/Levees: early warning system for impending failure. Technique: distributed deformation sensing. Distances up to 50km with a single read-out.

Buildings: strain, stress, displacement of critical construction elements. Absence of SHM in buildings that are frequented by the general public is to be considered socially irresponsible.





INVENTEC

In all above cases we engineer, supply, install and commission a comprehensive, fully operational SHM-system. If so desired the measurement data can be processed on our web server on which the asset manager can log-in.

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