› DYNAMIC REMOTE MONITORING OF STRUCTURES

4DVib

Remote and contactless dynamic displacement measurements

YOUR CHALLENGES

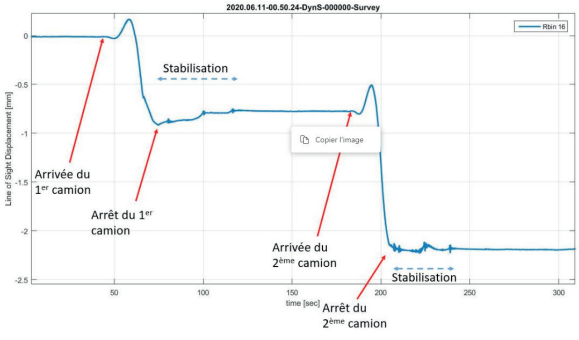
- **Follow structural behaviour**
- **Monitor structural health**
- **Control** assets' **fitness-to-service**
  - **Monitor vibrations** and **fast deformations** of structures
  - **Determine natural frequency** of structures

OUR SOLUTION

- **The 4DVib unit is set up facing the structure** to be monitored.
- **4DVib measures** the **distance** between itself and the structure at **very high frequency.**
- **Multiple points of the structure are monitored simultaneously** and differentiated automatically based on their distance to the 4DVib unit.
- **High-frequency movement measurements** make it easy to **calculate displacement velocities** (vibration in the same way as a geophone), and the **natural frequency modes** of the structure.
- **Technical reference :** Michele Crosetto, International Expert- CTTC *(Catalunya Technologic and Telecommunications Centre)*

THE BENEFITS

- **Fast setup**
- **Instant measurement**
- **No need to access the asset, no need to fix the device on the structure**
- **Simultaneous measurement** of several points of the structure
- **High frequency** and **high accuracy measurements**



Sixense's

- Expertise in measurements + structural expertise + competence in site interventions: Our teams understand your requirements and can develop optimised solutions for your project.
- The worldwide specialists in accurate and useful measurements.
- We offer a monitoring solution suited to your project's requirements.
- Possibility to combine different monitoring solutions.

CONTACT US

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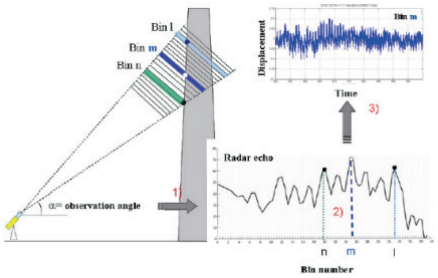
TECHNICAL PRINCIPLE

How interferometric radar works:

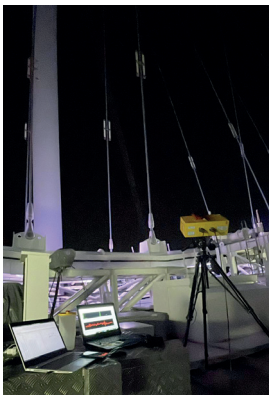
The radar unit emits frequency-modulated electromagnetic waves that enable target points to be differentiated on the basis of their distance from the device (1 point every 75 cm).

Differential interferometric analysis of the return signals calculates distance variations with a field accuracy of around 0.02 mm.



APPLICATIONS

- Acceptance of works (measurement during static or dynamic load tests)
- Optimisation of the dimensioning of a structure by resetting models using measurement data
- Measurement of tension in cables and cable stays
- Detection of degradations of the structure by measurements at regular intervals
- Definition of the structure's natural behaviour
- Measurement under external influence or vibration measurement in ambient noise
- Structures, bridges, viaducts
- Pedestrian bridges
- Buildings, very high towers
- Stadiums
- Industrial buildings
- Nuclear assets
- Chimneys, pylons, telecom towers
- Windfarms

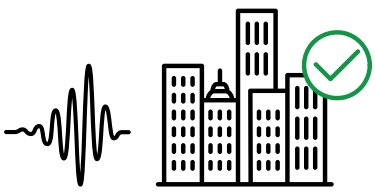


SPECIFICATIONS & LIMITATIONS

- Accuracy: 0.01 mm to 0.1 mm
- Measurement frequency : 100 à 200 Hz
- Reach: up to 1 km
- Measurements possible night and day, all weather conditions
- The measurement of an asset takes about 10 minutes
- Separation of measurement points: 75 cm
- Operating temperature: -20°C to +50°C
- Waterproofness: IP66
- Measures in the line of sight: projection by calculation can be needed in some cases
- Good reflection needed (elements returning the signal)
- In case of measurements needed in precise locations, it is possible to install small targets

ASSOCIATED PRODUCTS AND TOOLS

- Build'Health: estimating structural health by analysing structure's natural frequencies.
- Possibility of dynamic monitoring measurements with other types of sensors: geophones or accelerometers.
- Possibility to combine the 4DVib system with other sensors like strain gauges for example.



REFERENCES

- Telecom Tower cables, Barcelona
- Suspension bridge, Châtillon-sur-Loire
- A10 highway bridge, Bordeaux
- Singapore Flyer ferris wheel

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