Slotstress™

Stress measurement in concrete structures
High precision flat jack test

YOUR CHALLENGES

During its lifetime, the **load distribution** inside a **concrete structure** can change due to external incidents, or slow **deterioration** of the structure. At some stage, the loads become **incompatible** with the **safety** of the structure and its users.
That's why you need to understand how the new **loads** are **distributed** in your structure to:

- Get **useful information** about the **health state** of your infrastructure
- **Optimize maintenance strategies** and **asset reinforcement**
- **Secure** structures **and people** in the area

OUR SOLUTION

Our patented Slotstress™ technique enables the direct measurement of **in-situ concrete stress**. Provided with the knowledge of the existing **state of stress** in a structural member, the structure owner can:

- know the **current residual charge** beared by the structure,
- estimate the **extent of deterioration**,
- estimate the **additional load capacity** and **update** the **safety factors**,
- **optimize** the design of **strengthening** or **repair** solutions.

THE BENEFITS

- **Direct measurement** of **stress** and **strain** in structures
- Detection of **hidden defects** before they become visible (armature **corrosion**, **wire break** in prestressing cables)
- **Pathology assessment** and analysis of the **structure's residual life**

Sixense's

- Slotstress is a patented flat jack method, more robust to the measurement conditions and with improved accuracy.
- With our 20 years experience and over 800 measurements carried out, our teams can operate reliable measurement campaigns, within tight schedules.
- We offer a complete monitoring service and the possibility to combine monitoring and surveys in a global Sixense offering.

CONTACT US

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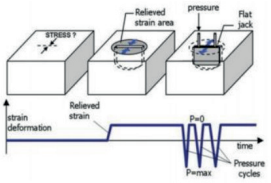
TECHNICAL PRINCIPLES

Slotstress™ measure the residual stress in concrete by using the **strain release method** (flat jack method). The method is based on the ASTM D4729-087 standard and eliminates the uncertainty of the elastic modulus of the concrete. Thanks to the innovative shape of the slot, among other things, a very high accuracy can be achieved (up to 0.5 Mpa).



APPLICATIONS

In most of the projects Slotstress™ is used for providing important information on the actual situation of a structure in relation to repair and rehabilitation works.
It allows the stress measurement in structures of:

- **Tunnels, bridges, dams**
- **Buildings, car parks**
- **Prestressed beams**

SPECIFICATIONS & LIMITATIONS

- **Measurement of real residual stress**
- **Stress measurement** without prior information about the material (Young Modul)
- **Accuracy:** 0.5 MPa
- **Validity of the measurement** is not impacted by the proximity of the steels, nor by the state of cracking of the concrete

CERTIFICATION OF THE METHOD

Slotstress™ has **demonstrated** its **capabilities** on **different types of concrete**, including damaged concrete (cracked).

The calibrated flat-jack eliminates uncertainty on the elastic modulus and overcomes the interference of reinforcement with the strain relief, and therefore the technique is applicable for **any concrete**, even with dense reinforcement spacing. Laboratory testing performed on **unreinforced, reinforced and prestressed concrete** specimens demonstrated that stress can be measured within 0.5 N/mm² with a 80% confidence level.

The technique has been evaluated and **certified by independent organizations** in several countries.

RELATED TOOLS & SERVICES

- Our **complete monitoring** and surveillance service for concrete and prestressed concrete structures. For example, using **deformation gauges** allows following the stress evolution in time.
- Our special **Uscan** and **Escan** technologies to monitor shrouds and prestressing cables.
- Our **4DVib** and **Build'Health** methods to control the health state of your asset by using dynamic analysis.

REFERENCES

- Grand Paris Express, Lot T3C
- Adolphe Bridge, Luxemburg
- La Fontaine Tunnel, Quebec, Canada
- Première-Chute Dam, Quebec, Canada
- Ile-aux-Tourtes Bridge, Quebec, Canada

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