

Tensile tests

> The Rincenc Nord-Pas-de-Calais agency carried out direct tensile tests on anchors dedicated for handling concrete slabs. These elements are involved in the construction of a viaduct, the site on which the tests were carried out.

The measuring device consisted of displacement sensors to the hundredth of a millimeter and a digitally read load cell.

The purpose of the anchor tensile tests was to verify the behavior of these fixings and indirectly the design and execution of these anchors.



Slip resistance tests



> In a quite different area, the agency RINCENC Nord - Pas de Calais carried out slip resistance tests on pedestrian surfaces according to standards NF EN 1339 and XP CEN / TS 16165 "Determination of the slip resistance of pedestrian surfaces"

The material used is a friction pendulum whose characteristics and conditions of use are specified by these standards.

vidéo link:

<https://www.pinterest.fr/pin/648448046336867549/>

The pendulum can be used for pavements and in this case, it is the standard NF EN 13036-4 "Characteristics of road and aerodrome surfaces".

A rubber covered pad is mounted at the end of the pendulum which must sweep a surface of a fixed length. The mass of the pendulum, the elasticity and the hardness of the pad are precisely defined.

The slip resistance is the average of the pendular values obtained over five tests.

The National Institute of Research and Safety, INRS publishes technical checklists including one specific to the problems of "slips, technical prevention and measurement methods" ED 6210.

INRS : www.inrs.fr/media.html?refINRS=ED%206210

More than one in 10 work-related accidents can be attributed to the problem of slipping falls



Control of Ceiling fixings

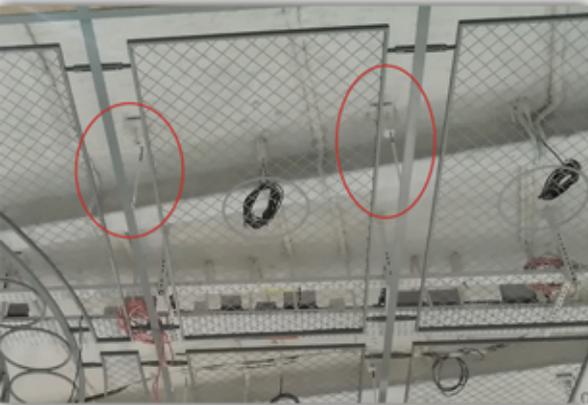


> Suspended ceiling fixings installed in commercial premises in airport areas have been checked by Rincent Ile-de-France-Nord.

Suspended ceilings can have multiple functions: aesthetic, acoustic and thermal. DTU 58.1 Modular suspended ceilings deals with the installation of ceilings made up of trim elements and a suspension system defined in standard NF EN 13964. This document is applicable to private and public contracts.

The DTUs, Codes of practice for building works, may contain: the technical specifications (CCT), the special contract conditions (CCS) which defines the limits of services and obligations towards other building trades and the design calculation rules.

In the present case, calculation notes have defined the loads applicable to these fixings, hence the direct traction tests which make it possible to verify the calculations and the quality of implementation of the tested elements.



Control of compaction

> Rincent Ile-de-France Sud has reorganized its premises by increasing the storage space and differentiating the areas of activity.

The increase in demand for penetrometer tests led to the acquisition of "penetrocompactometer" Apafor 100 compliant with standards NF EN ISO 22476-2, NF EN ISO 22476-3 and NF P 94-063.

This compact equipment, easily transportable, allows the control of common road-type embankments but also excavation and trench embankments.

The objective is :

- Evaluate the layer thicknesses
- to check that the targeted densification objective is achieved
- to check that the compaction complies to that carried out on trial area on the site.

The resistance to dynamic penetration q is the value calculated by the penetrometer acquisition system, at each stroke of the striking mass, as a function of the penetration of the point and the energy supplied at the head of the rod, by application of the so-called Dutch formula. The penetrogram is the curve of the distribution of resistance to dynamic penetration q as a function of depth. A Panda-type penetrometer and a light penetrometer complete the agency's intervention resources in this area.



Checked the fabrication characteristics of bituminous products



> The upgrading of the A 630 Bordeaux ring road to 2 x 3 lanes, between interchanges n° 4 and n° 5 was interrupted in mid-March after the adoption of the lockdown of measures. Work resumed at the end of April. Rincenc Matériaux, Bordeaux agency, checked the fabrication characteristics of bituminous products. These checks took place during the work carried out at night and were applied to high modulus asphalt concretes and semi grained asphalt concretes. High Modulus Asphalt concretes are asphalt mixes characterized by a higher modulus of rigidity than that of bituminous bound aggregates; they are applied for bedding layers. Semi-grained asphalt concretes (BBSG) are used for wearing courses.

On the samples taken, tests were carried out in accordance with standards NF P 12697-1 and NF P 12697-2.

The first standard deals with "Methods of test for hot mix asphalt - Part 1: soluble binder content"

The second standard specifies a procedure for determining the particle size composition of aggregates in bituminous mixtures, by sieving. The test applies to aggregates recovered after extraction of the binder according to EN 12697-1 or EN 12697-39.

These tests make it possible to ensure that production complies with the contract specifications.



Calculation of pavement Service Indices



> After intervening at Ouagadougou airport in Burkina Faso to perform deflection measurements with the HWD (Heavy Weight Deflectometer) and radar tests, Rincent Airports returned to Gard at Nîmes-Garons airport or Nîmes-Alès-Camargue-Cévennes.

This involved carrying out the pavement deterioration survey for the calculation of the condition indexes of these pavements. The calculated condition indexes are of three types: global, structural and superficial.

Standby and alarm thresholds are given for each of the identified areas.

Rincent Matériaux Agency of Bordeaux carried out core sampling for:

- Define the structures of the roadways within the parking areas
- Take soil samples with an auger at the bottom of the cored boreholes for laboratory tests.

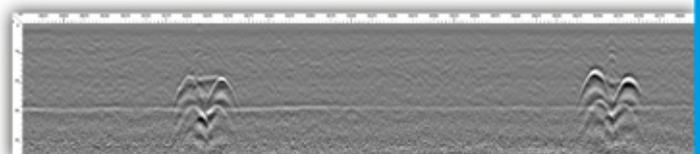
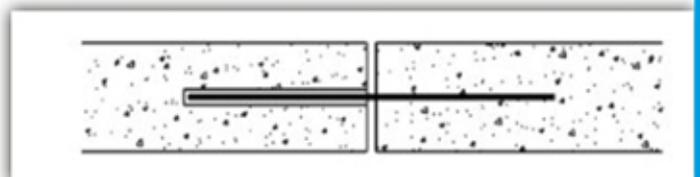
Asbestos diagnostics were carried out on the concrete cores and on the polymerized joints.

The quantification of Polycyclic Aromatic Hydrocarbons (PAHs) by gas chromatography was associated with detection by mass spectrometry.

Finally, one of the objectives was to locate the existing studs between the concrete slabs.

A stud is made up of a steel rod that connects two reinforced concrete elements at a joint, this rod on one side is anchored in the concrete and is sliding on the other which constitutes a sliding support for the joint between slabs. The transfer of loads between slabs is improved by this device.

The localization of these studs was carried out from radargrams where they appear in a very characteristic way.



Mechanical impedance tests and static loadings



> Wind power generation in Brazil exceeds 14 gigawatts (GW), which is equivalent to the consumption of approximately 26 million households or 80 million people. Energy is produced by 568 wind farms and more than 7,000 turbines spread in 12 states.

The northeast of Brazil, and mainly the state of Rio Grande do Norte, currently has the largest wind power generation capacity in Brazil with 146 wind farms. This region is known for its exceptional wind conditions.

Brazil map : www.todamateria.com.br/mapa-do-brasil

Since 2008 the Rincent agency in Recife has tested around 10,000 piles constituting the foundations of 600 wind tower bases.

The tests performed are generally mechanical impedance tests and static loadings. The piles tested here, under static loading, are part of Aventura parks II to V. The photos of the test relate to an 800mm diameter pile loaded at 735 tonnes.

These wind farms are often isolated, which complicates the supply of the loading beams, equipment and their installation. The teams have acquired real experience related to the conditions of intervention.

Static and dynamic tests on anchors

> An anchor in the rock is the result of: drilling the rock, then sealing a threaded metal bar and finally fixing the anchor head consisting of a plate and a nut.

These anchors are used to reinforce unstable rock, to fix elements of protective structures, for example fences, stone screens, boulders screens, avalanche screens, etc.

Rincent Alpes carried out static and dynamic tests on anchors located on the road RD 518 in Sainte-Eulalie-en-Royans in the Drôme. The XP P 94-444 standard entitled "Rocks - Static pull-out test, under an axial tensile force, of an anchor sealed in a rock mass" defines the methods of carrying out static tests. The attached photo shows the difficulties of execution.

The results of the static tests were used to calibrate the dynamic tests performed on the anchors of the site. These quick and easier to perform tests increase the number of tested anchors.

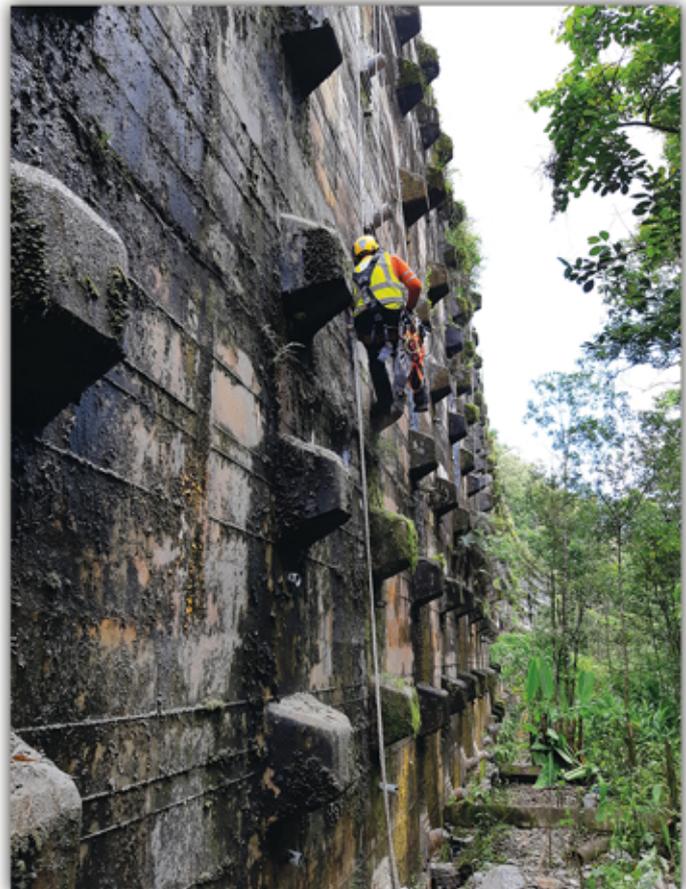


Prestressed tie rods

> Motorway or rail network concessionaires have to manage a fleet of prestressed tie rods, some of which were put in place 30 or 40 years ago.

The diagnosis of existing tensions is costly when done using conventional means. Consequently, the tests are carried out in a limited number which is not representative of the quantities to be managed.

To the cost must be added the difficulty of performing tests at height, for example tensile tests.



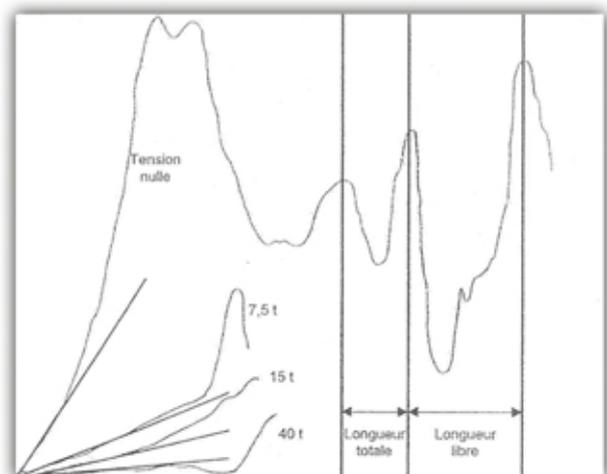
The patent developed by Jean-Jacques Rincenc and carried by Rincenc Laboratoires for more than fifteen years allows, by means of non-destructive tests, to determine:

- The total and free lengths of the tie rods
- the existing tensile force®.

The approach described below is about embankments having 700 and 1,500 tie rods on motorway and rail sites in Brazil.

The non-destructive test implemented consists in analyzing the vibratory response of the tie rod in terms of frequency and stiffness. The frequency response gives the total length of the tie rod and the so-called free length of tie rod.

The calculation of the dynamic stiffness, which is a complex number, is made from the inverse of the slope of the V / F curve as a function of the frequency.

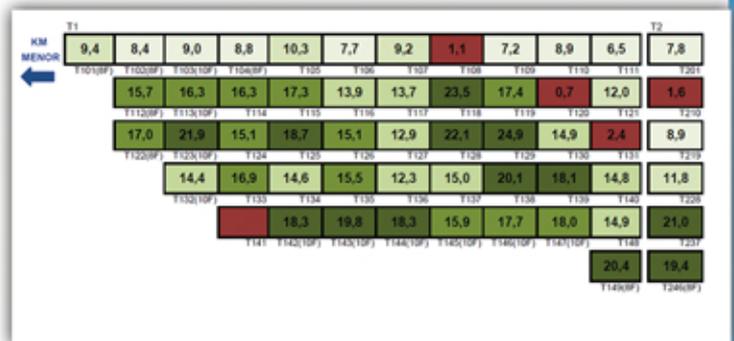


Prestressed tie rods

- The rigidity of the system depends on
- The inertia of the tie rod
 - The geotechnical environment of the tie rod, soils, rocks, etc.
 - The inertia of the wall or screen maintained by these tie rods
 - The internal tensile force of the tie rod.

The scope of the method excludes limited volumes. For example, for a volume defined by concrete structures, the measuring gives the inertia of the element delimited by the concrete structure even though the tie rods are in tension. The tests require accessing the head of the tie rods and attaching the sensor which will record the vibratory response of the item under test.

The compression wave is generated by a hammer equipped with a piezoelectric sensor which will determine the force of the impact. On a small number of tie rods, non-destructive tests are carried out simultaneously with tensile tests. This phase, which aims to improve the precision of the interpretation of the tests, also has an educational role since a comparison of the results can be made. The internal force of the tie rod, calculated for each of them, is presented as follows. Further investigation was about corrosion, it is a key point on which depends the re-tensioning of the tie rods. The first checks are dimensional using a caliper to measure the diameter reductions if they exist.



The supplements to Swiss standard SIA 267 concern the control of the corrosion protection of tie rods. The tie rod must have an electrical resistance greater than 0.1 Mega Ohm. High electrical resistance is indicative of proper tie rod insulation. This step having been completed, a procedure for re-tensioning the tie rods was developed. This first phase of improving the stability of the retaining wall is rapid and economical. The extension of the life of the tie rods and the structure must be done provided that a monitoring over time is implemented.

Rincenc Academy

> Rincenc Academy, the training structure of Rincenc Laboratoires, organized two Visio-training sessions for Agency Managers and Technicians from Rincenc Laboratoires during the lockdown period.

The first training concerned the diagnosis of Structures led by Daniel Durot, Manager of the "Recherche Expertise" Entity, the second made a presentation of non-destructive auscultation methods of deep foundations and was led by Corinne Horb, Manager of RINCENT ND Applications.

These meetings also allowed everyone to meet and discuss. These training courses, carried out internally, are offered externally by RINCENT Formation (Datadock n° 11 91 07892 91), they are part of a catalog offer which can be supplemented for personalized requests.

