

## ANALYSIS OF METALLIC FLOORS USING DYNAMIC TESTS

### ABSTRACT

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The increasing tendency of the last years to the conservation of buildings has caused an important rise of the rehabilitation projects of existing constructions. This kind of projects take with himself certain special features, between which it emphasizes like habitual, the short or nonexistent in some cases, information of the building especially of the structure. This has generated the necessity of obtaining important data with precision of the structure quickly. For the inspection of buildings three main routes of performance are developed basically:

1. Visual inspection.
2. Taking of samples and destructive testings.
3. Non-destructive testings (N.D.T.).

It is within the framework of the non-destructive testings, in concrete in the field of the dynamic tests, where the present study is developed. The object of this study is by a side to optimize and to develop the field of the non-destructive testings, especially the dynamic tests, and their application to the building floors and on the other hand to advance in the definition of the security of the constructed structures that need performances rehabilitation to adapt them to new uses, creating diagnosis tools that of complementary form to the existing ones (static tests of load, characterization of materials...) allow to evaluate the state and the situation of risk of the building floors.

With the will to apply the described thing previously to real cases, the structural definition of a building located in Barcelona that will be object of a project of rehabilitation to adapt it to its new use as building of offices, different from the previous use like laboratories has been carried out. The main structure of the build is formed by flat metallic porches with metallic floors. After making the structural definition "in situ" from the building, it has been come to the accomplishment of a campaign of dynamic tests with the objective to validate the structure from the point of view of rigidity and vibrations studying the influence or collaboration of the different structural and nonstructural subsystems from the total stiffness of the structure. During the phase of accomplishment of the dynamic tests in the work, different situations have studied to value the influence of each subsystem. They are also considering, different situations from propping of the structure with the objective to determine the second own frequency of vibration that allows to determine the clamping degree that as well allows us to consider the real increase of stiffness of the floor. Later to the campaign of dynamic tests carried out in different phases, a modelling of the different studied structures has been made in the tests to be able to understand and to interpret correctly the obtained values.

With the obtained results of the tests and the different modelling the main floors of the building have been valued from a structural point of view according to some criteria of different national and international norms. In addition one has advanced in the knowledge of the degrees of clamping of the floors of the structure, studying as well the increase of real stiffness that display. Also the floors have been analyzed from a point of view of their behavior in good condition following the indications of different national and international norms. It has been confirmed that the dynamic tests constitute a useful auxiliary tool in inspection workings and floors diagnosis of buildings.