DIAGNOSTIC ENGINEERING

The objective of the discipline is to assist the technical community in investigations into buildings, through the use of tools such as surveys, inspections, audits, expertise and consultancy, with the aim of improving quality or determining responsibilities

It is a discipline related to the **evaluation of structures, buildings, systems and engineering components**. The objective is to detect and diagnose **failures, deficiencies** or possible **deterioration in performance.**

Diagnostic engineering in buildings had an original definition, which would be the art of creating **proactive actions through prognoses, diagnoses and prescriptions, aiming for total quality.**

This concept was recently updated and mentions the use of diagnostic tools, aimed precisely at diagnosing performance levels with the aim of improving quality or determining responsibilities. The doctrine was created based on diagnostic medicine, which deals with human health.

The basis is to assist the technical environment in technical investigations of buildings, through the use of diagnostic tools, which have specific responsibilities, but can be used in mixed ways, depending on the objective of the investigation.

For the inspection, the keyword is technical verification of a certain fact, condition or right relating to a building.

The inspection goes beyond the inspection, because it involves an analysis, an in-depth investigation. And it also has the ability to make a risk classification, intervention priority, in addition to a simplified technical recommendation.

Building audits are responsible for certifying compliance, or not, in relation to a document, such as a project or a contract.

Every time you make any type of comparison with a document, project or contract, you are performing an audit.

Expertise deals with determining the origin, cause and mechanism of action of a fact, condition or right in relation to the building.

And finally, we have building consultancy. Assuming that the diagnosis was made, for example, based on an expert opinion, the objective of the consultancy is precisely to determine the prognosis, the technical prescription, based on symptoms, to verify the evolution of the problems.

Diagnostic engineering is not listed in any ABNT (Brazilian Association of Technical Standards) technical standard. There is a publication by the Engineering Institute, a traditional entity with more than 106 years old, in São Paulo, which presents the guidelines for diagnostic engineering in buildings, which deals precisely with the tools and a compilation of guidelines for nine technical works, including the inspection standard building maintenance inspection standard and the building performance assessment standard.

Pathology, in fact, is an engineering science that studies the symptoms, mechanisms of action, causes and origins of problems in civil construction. It studies the aspects that make up the diagnosis of these analyzed problems. Sometimes the symptom is confused with the disease itself. Engineering borrowed this terminology from medicine, where there is a differentiation between the science that studies the

problem and the disease itself. But the disease is often confused with the symptom and called it a specific pathology.

Pathological symptoms are the injuries, the damage, the effects that are being investigated. Pathological manifestations can be described and classified, guiding the diagnosis.

Among the common symptoms that can be cited, as an example, we have fissures, cracks, infiltrations, efflorescence and stains, corrosion of reinforcement, detachment of coatings and so on.

Engineering expertise works to determine the causal link, that is, the identification of anomalies or failures in a construction system, aiming at diagnosing and determining causes by mechanism of action. The result of the expertise must be consolidated in a report, whose conclusions must be substantiated, presented objectively and always based on technical references.

Diagnostic engineering, depending on the objective of the investigation and the age of the building, establishes or chooses the master tool to be used in the investigation.

A fundamental question, proposed and answered by diagnostic engineering: what is the objective of the work? What do you intend to demonstrate with it? To give an example: in a work receipt inspection, when a diagnostic engineer cites a plan, a project, he makes a reference to a certificate of conformity. Compare what was actually executed with the project, standard or even the contract that was established between the parties.