



## Evaluation of the material's damage in gas turbine rotors by instrumented spherical indentation

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**ABSTRACT.** Experimental indentations are carried out on items of two different materials, taken in several location of various components from high pressure gas turbine rotor which have seen an extensive service. The components object of investigation consisted in 1<sup>st</sup> and 2<sup>nd</sup> high pressure turbine wheels made in nickel-base superalloy (Inconel 718), the spacer ring (Inconel 718) and the compressor shaft made in CrMoV low alloy steel (ASTM A471 type10).

Aim of the work is to set up the capability of the instrumented spherical indentation testing system to evaluate variations in the material properties due to damage, resulting from temperature field and stresses acting on components during service. To perform this task load-indentation depth curves will be acquired in various zones of the above mentioned components. The analysis of the results has allowed to identify an energy parameter which shows a linear evolution with the mean temperature acting on the components.

**KEYWORDS.** Instrumented indentation; Depth-sensing indentation; Material characterization.