Advantages emerge in using nanostructured material when forging mechanical components

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In his research conducted at the NUP/UPNA-Public University of Navarre, Salcedo focussed on the isothermal forge that uses temperatures higher than those of conventional forges. "Among the advantages observed," he points out in his conclusions, "we can point to better temperature control during the process, enhanced mechanical properties of the forged parts, and lower energy expenditure, because the preforms have to be heated to a lower temperature."

In the development of the research he also conducted a comparative study on the conventional forging process in order to obtain mechanical elements with a submicrometric and/or nanometric structure. "In each component produced the optimum forging conditions (temperature, heat treatments) were determined by analysing the microhardness and the microstructure," he explained.

His research made it possible to verify that the microhardness of forged mechanical components using predeformed material, "is much higher than in those produced from annealed material, and it was possible to achieve hardness increases of between 50% and 70% in the various mechanical components made, in contrast to the starting material in an annealed state." In this respect, there was also confirmation of an improvement in malleability and in the mechanical properties of the components produced in the cases in which isothermal forging was used rather than conventional forging.

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