

Abstract of the science project:

"Study of the effect of simultaneous application of welding methods and nitriding technology on the mechanical and structural properties of hybrid new face layers dedicated to hot forging tools."

Engineering methods currently used to improve the resistance of the tool surface are not sufficient, although they include a number of advanced technologies. It is imperative to introduce new solutions that increase the durability of tool surfaces that could cope with extremely high temperatures, heat shocks, variable pressures and friction occurring in hot working processes. The main research objective of the project is the development of innovative technology of surface layer production proposed by Author and Ph.D. Marcin Kaszuba from the Department of Plastic Forming at the Faculty of Mechanical Engineering of the Wrocław University of Science and Technology. This is a groundbreaking solution in surface engineering utilizing two well-known and commonly used techniques to increase the hardness and resistance of tool surfaces, ie preventive and nitriding. The aim of the project is to select different hardfacing methods and to design nitriding processes to achieve the effect of complementary properties. The research work includes, but is not limited to, advanced material testing, mechanical properties, internal stresses measurement, tribological and fatigue resistance to gain knowledge of new coatings for the production of new generation hybrid layers with exceptional abrasion resistance and fatigue cracking. These are original researches that have not yet been conducted at any scientific center in the world. Their implementation will undoubtedly be the foundation for the new generation of forging tools.