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Modeling and Simulation of the Defect Form Effect on Mechanical Behaviour of Shrink-Fit Assemblies.

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Abstract : The calculation methods of shrink fit assemblies remain traditional and have hardly changed for several years. They consider that the contact surfaces are perfectly smooth and do not take into account their geometrical defects (shape, roughness). The models created impose too high manufacturing costs to make consistent assumptions of calculations with the operational conditions of realization. To reduce manufacturing costs, the study of the influence of defect form on assemblies resistance characteristics is essential. The objective of this work is to study the influence of the defect form on the strength characteristics of shrink fit assemblies. It is shown that the defect form is not prejudicial to the strength of the assembly: the mean pressures are almost equivalent to the conventional case of surfaces without defects. Various finite element simulations were performed. The influence of the amplitude and of the default period was studied for different types of tightening.

Keywords : shrink-fit, finite element, modeling of contact, machining, behavior