The recent trends in the automotive industry are connected with production of strategic elements of vehicles using lightweight materials and keep high strength of construction. There is a general need for an increase of a strength-to-density ratio of materials, in particular in the automotive and aeroplane industries. Maintaining good ductility while increasing the strength is an additional necessary condition. This research led to development of Advanced High Strength Steels (AHSS), in which multi-phase microstructure allows to improve both strength and plastic properties. Currently, work is underway on the development of third generation AHSS steel. They are designed to obtain steel with high strength properties, good ductility and low production costs. The safety aspect is particularly important. The popularity of AHSS (especially, the dual-phase steels - DP) as a material for car bodies is particularly related to its unique properties to absorb energy of impact. AHSS steel sheets can be obtained both by hot rolling and laminar cooling or cold rolling and continues annealing. Proper selection of the cycle of temperature changes with the ratio of desired fraction of ferrite, martensite or bainite phases. Each of these phases has different physical and mechanical properties, but their composition allows for obtaining a material characterized by unique strength and ductility. Designing the optimum process parameters such as temperature, time, heating and cooling rates are made possible by numerical models of phase transformations. Modelling of these transformations plays key role in in the study of physical phenomena occurring in steels and obtaining required properties of the final product. Many models, which are able to predict the evolution of microstructure subjected to different cycles of heating and cooling conditions, can be found in the scientific literature. None of them, however, does reflect fully the nature of the phenomena. The author believes that there is still the possibility for further development of that kind of models, both in terms of speed of calculation and the reliability of the results. Advanced numerical methods, widely used in engineering calculations and modelling, are characterized by high computing times and high demands on computing power. These aspects exclude such models by the industry, where time of calculations is as important as the reliability of the results. Attempts to improve the efficiency of the numerical part of modern numerical models are mainly focused on two aspects, parallelism and simplification of virtual representation of the material. One solution covering both of these areas is the idea of a similar statistically representative volume element (SSRVE). It aims at the reduction of the number of finite elements in micro scale as well as at parallelization of the calculations in micro scale, which can be performed without barriers. The simplification of computational domain is realized by transformation of sophisticated images of material microstructure into artificially created simple objects being characterized by similar features as their original equivalents. A combination of SSRVE methodology and phase transformation modelling is a real opportunity to create a solution that would allow to predict properties of steel sheets with high accuracy, as well as deliver results with a lower computation times.