POLITECHNIKA ŚLĄSKA
WYDZIAŁ TRANSPORTU

ROZPRAWA DOKTORSKA

OCENA WŁAŚCIWOŚCI UŻYTKOWYCH RAM POJAZDÓW CIĘŻAROWYCH NA PODSTAWIE WYBRANYCH WŁASNOŚCI MATERIAŁÓW KONSTRUKCYJNYCH

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The assessment of useful properties of goods-vehicles frames on basis of selected qualities of construction materials.

A great part of the amount of carried goods and utilitarian meaning of goods-vehicles force for research of new construction and material solutions. Worked out, in the late years, high-strength steel qualities applied into passenger-vehicles, have no wide range use in goods-vehicles, caused by, among others, deficiency of wide researching programs.

A target of this work was to develop a dependence allowing to determine the load capacity or the mass-change of vehicle-frames by using of high-strength steel instead of hitherto applied unalloyed steel. Investigations, we made, had to isolate real strength-indexes of steel and to define their effects into useful properties, as curb weight or load capacity.

Investigations were made in two groups: preliminary and principal. Within the framework of preliminary investigations there were made tensile tests, process engineering tests (bending and perforating) and stability examination. Results of preliminary investigations had in view the determination of true properties of tested steel as well as process engineering guidelines which were used at the preparatory and executive stage of physical models for principal investigations. Results of bending- and perforating tests proved the suitability of high-strength steel for using in cold forming process and made also possible the determination of basic process engineering parameters, indispensable during producing of structural components. Stability examinations, which were made, allowed to determine differences of critical (destructive) forces of tested samples.

The main target of principal investigations was the basic useful properties determination (curb weight and load capacity) of vehicle carrying structure dependent of applied construction material. Principal investigations were made on designed models of supporting structure (frames) of trailers. Research was made for two load conditions, bending and bending with frame torsion. There were two construction materials applied: steel S355 and high-strength steel 600DP.

On the basis of experimental- and simulative tests was found an essential effect of yield point and Poisson's ratio for obtained results. These relations were used to work out methods which allow to forecast a mass-change or load capacity in case of application of high-strength steel.