

KATEDRA PODSTAW KONSTRUKCJI MASZYN

Wydział Mechaniczny Technologiczny

Politechnika Śląska

PRACA DOKTORSKA

**Optymalizacja parametrów
konstrukcyjno-funkcjonalnych mobilnej
platformy eksploracyjnej**

Andrzej JAŁOWIECKI

PROMOTOR

dr hab. inż. Marek WYLEŻOŁ, Prof. PŚ

Gliwice, 2024

Abstract

The dissertation , " Optimization of the structural and functional parameters of the mobile exploration platform" presents the author's achievements in the implementation of the optimization process of the chassis system of the mobile exploration platform. In the paper, the author presented the results of the conducted literature review in the field of methods of optimization of the design and construction of a mobile driving platform adapted for participation in the Rover Challenge class competitions.

The main part of the work was devoted to the description of the work related to the optimization of individual systems of the Phoenix III mobile platform. Various optimization and conceptualization methods were presented to achieve the main goal of the optimization carried out - weight reduction and increase in performance properties. In addition, the author set himself the goal of achieving a unique design for this type of technical object. These goals were achieved mainly through the use of modern materials such as carbon-epoxy composite and technical polymers.

The paper presents a comparison of the original design of the Phoenix III platform with the design obtained through optimization. Physical properties (weight, dimensions) as well as operational properties (stability, vibration level) were compared. All comparisons show that the new structural form of the Phoenix III platform achieves better results, which should translate into better performance during competitions.

Key words

Optimisation; Mobile exploration platform; Computer Aided Design CAD; Composite materials; Martian Rover