
Design and production of a single-stage cylindrical gearbox model

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Abstract

The gearbox, as a highly complex mechanical assembly whose role is to adjust power and motion parameters of the drive machine to the needs of the corresponding working machine, is an almost indispensable element in modern mechanical systems. Within this paper, calculation, design, and production of a single-stage cylindrical gearbox with helical gears using additive technologies have been performed. Based on initial data, calculation and dimensioning of vital gearbox elements (gears, shafts, roller bearings, housing) were carried out. Subsequently, a 3D model was created in SolidWorks software. Finally, a physically functional model of the designed single-stage cylindrical gearbox was produced using 3D printing at the Faculty of Engineering Sciences in the Center for testing and calculation of mechanical elements and systems "Prof. Dr Vera Nikolić Stanojević". The created model can be used in the education of future mechanical engineers, as well as a functional model in case of lighter loads.

The functional model of a single-stage cylindrical gearbox with helical gears created by 3D printing is primarily intended for the educational process of high school students in the field of mechanical engineering, as well as for mechanical engineering students. The goal is to use the created model to familiarize students with the basic mechanical elements for power transmission and motion when the input and output shafts are parallel. Additionally, the created single-stage cylindrical gearbox can also be used as a functional model in case of lighter loads.