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DEVELOPMENT OF THE STAND FOR MEASUREMENT MODEL ENGINE THRUST

The work introduces the results of the development and creation of the stand for measurement engine thrust according to the necessary requirements. The paper describes the structure of the stand and the principle of its operation.

Keywords: *model engine, stand, thrust.*

Today, with the rapid development of science and technology the rocket modeling allows identifying and solving a number of problems related to aerodynamics of flight and strength of this rocket, and also develops an engineering approach to problem solving. During creation of the rocket's model and carrying out tests a considerable role is played by development of its design and assembly, but also it is important to provide raising of the model, to calculate its weight correctly, rise height, possible deviations from the main shaft of flight and other parameters. For this purpose it is necessary to know a

number of characteristics of the solid propellant engine used in the model. Of all characteristics a tractive effort has the greatest value. [1, p. 62]

The purpose of this work is the development and creation of the optimum system for measurement of the practical tractive effort. The following requirements are imposed to such system: compactness, ease, simplicity of a design and, as a result, a possibility of transportation as tests of the engine are made just before starts of a model.

According to the purpose and requirements the installation which components are represented in the figure 1 was created.

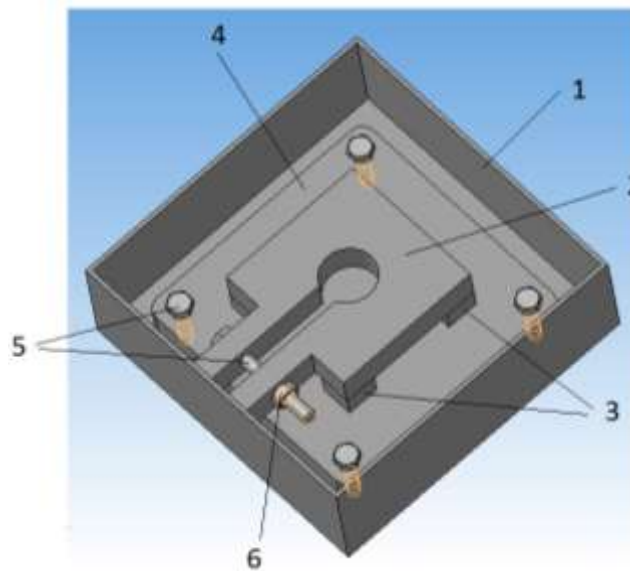


fig. 1: 1- base, 2 - loose strap, 3 - legs, 4 - engine support, 5 - bolts, 6 - nut

The base 1 represents a bowl of mechanical scales. As its main material is plastic, there is a big risk of its fusion at considerable heating of the engine. For prevention it, and also for avoiding of offsets which can arise during the tests on a bottom of the engine support 4 is established. Its immovability is provided by accession with its bolts 5. In an engine support special chases where in a consequence legs 3 are located. The loose strap 2 is established on them and it is fastened with screws. The through bore, which is in advance cut out in it, has the diameter equal to the diameter of the engine. The loose strap serves for fixing of

the engine in motionless position as the probability of its shift at fuel combustion is high. [2, p. 54-55]

The stand is developed not for the concrete engine. Diameters of the engine are possible to vary, replacing a loose strap with another with a bore of bigger or smaller diameter.

As the material for elements 2, 3, 4 - the wood is used. Such decision is caused by availability and low cost of the material, simplicity of processing, and rather small weight does possible transportation of all the system.

The engine is mounted on clamp nozzle up and clamped with the bolt 5. Pre-made calibration weights given the built-in stand and engine. Observing the safety for the fuel ignition system a remote start is used. [3, p. 81]

Then, the obtained results are compared with the previously calculated theoretical values. They should be the same. The obtained values allow us to determine other characteristics of the engine for a more accurate calculation in the program.

Thus, the created system satisfies a goal and conforms to the imposed requirements: the design is simple, compact and transported. During several made experiments the developed stand allowed to find rather exact value of pull-rod.

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