

SUMMARY

The aim of this thesis was to design the reduction gearbox with required parameters for satellite ground station testbed. In the introductory part the small review of reduction gears is made, and the main focus of the thesis is established.

In the next chapter prior the design development of reduction gears the theoretical background was checked in order to identify the crucial parameters needed to design the appropriate gearbox. Also, the overview of existing gears and gear trains is done including a short comparison of helical, bevel, and worm gears, and spur gear's detailed review. Based on read literature the decision was made regarding choosing the most suitable for the application in testbed. In the same chapter the method of printing the gears was discussed and things to consider for developing the model of reduction gear set. As a result of this chapter the planetary gear is set to be the gear type to implement in the development for the testbed.

The next step was to make a prototype of the gears. Starting with the examination of existing setup – motor and limit switches that were previously chosen. The flange of the motor, motor's shaft length and diameter, and proximity of floor surface of the testbed were the driving factors for determining the size and shape of the gear set. The configuration of the planetary gear set was chosen to be with ring gear fixed, sun gear was input shaft, planet carrier – output shaft. The following steps were the calculation of the gear ratio for every stage of gear set, which number is 3. The generation of the gears followed in Autodesk inventor.

The outcome of previous chapter is reduction gearbox with 3 reduction stages. The first stage ended up with reduction ratio of 4:1, the second with 3:1, and the last 6:1, giving the desired ratio of 72:1 as the outcome.

There were major challenges during the work starting with getting the right literature with needed information with basic overview on gears without advanced solutions and difficulties of setting the right value for gear generator to create gear that would work and mesh correctly in real life ending with choosing the right parameters for printing the gears.