

SUMMARY

The thesis scope was to investigate the possibility of using aluminium profiles in automotive industry, particularly building a frame for electric vehicle.

The aluminium profiles are very popular nowadays. It is widespread mostly in machine tool industries, supplying lines, rooms, window frames etc. The shape of profiles and different fasteners gives an ability to create a frame for almost any static construction. So, it is a useful product with a lot of advantages.

During the process the most common electric vehicles had been overviewed, such as electric scooter, skateboard, bicycle, motorcycle and electric cars with three different frame types. To make the construction more flexible, namely give an opportunity to modify the assembly according to the user requirements or needs, the car space frame was chosen. Additionally, motorcycle accompanying parts were taken for the construction design. There eight different placement of wheels, engine, and passenger seat had been reviewed. And a base for the space frame creation became the version with two front steering wheels and one rear drive wheel placed on motorcycle arm. The engine is also located behind the passenger seat.

Due to the fact that aluminium profiles are widespread, there are several suppliers in the Europe Union. Each of them has its own advantages from wide line of products to exclusive online engineering program for frame creation. For three-wheeled electric vehicle frame was chosen one of them, who has a distributor in Estonia. Four profiles with different shapes and various fasteners were taken for the modeling.

Each step of the frame creation was described. The base bottom part consists of large heavy profile 45 x 90 mm, because have to hold the rest of construction. But this section of frame does not have critical points between assembled parts in comparison of cross beams under the seat. These beams were calculated in worst case, namely when one side is not fastened to the base frame. The results of calculation showed that the construction is strong enough to withstand the weight of passenger in unlikely worst-case situation.

Thereby, the investigation of usage aluminium profiles revealed that it also can be used for more different interesting projects such as automotive industry not only for separate components, but for the whole frame construction as well. With good imagination one kit of aluminium profiles can be very flexible and used for wide line on various vehicle frames, furthermore, can be used to train and obtain basic knowledge about transport technology, mechanics, measurements and assembly.