

KOKKUVÕTE

Antud lõputöös on kajastatud mootorratta tuuleklaasi adapteri prototüübi arendamise ja analüüsimise protsesse. Esmalt on uuritud järelturul olemasolevaid tooteid, võrreldud neid ning tehtud järeldused, miks antud valikud ei sobi. Ühtlasi on nende põhjal koostatud nõuded uuele tuuleklaasi adapterile.

Järgnevalt on loodud kriteeriumid, mida peaks tuuleklaasi adapteri puhul järgima. Lähtudes nendest kriteeriumitest on tehtud prototüübid. Jooksvalt on läbi viidud erinevad katsed, millega on selgitatud puudujäägid või edendamist vajavad aspektid. Tehti ka vastavad muudatused. Samuti on mainitud ostutooteid, mida kasutati valmistamiseks ja funktsionaalsuste lisamiseks.

Konstruksiooni tugevuse määramiseks arvutati takistusjõud, mis esines suurima saavutatud kiirusega katsel. Selle põhjal on viidud läbi staatiline katse, mis simuleeris kiirtee katset lihtsustatud kujul, et oleks võimalik püstitada LEM-analüüs. Kontrollimaks, et esimeste katsete tulemused on usutavad, loodi lihtsam katse tuuleklaasita ja vastav LEM-analüüs. Läbi viidud katsete tulemuste võrdlemisel leiti, et läbipainete tulemuste kokkulangevus loeti piisavaks.

Määratud on adapteri, adapteri ja tuuleklaasi ning adapteri, tuuleklaasi ja lisade maksumus. Nende hindu võrreldi järelturutoodete hindadega. Leiti, et hind on kohati võrreldav. Kuigi lõputöös dokumenteeritud prototüübi hind on suurim, on sellel lisafunktsionaalsused, mida teistel toodetel ei ole ning tuleks eraldi tekitada.

Viimaks on välja toodud erinevad edasiarendused. Mainitud on värvipüsivust, augukatte kinnitust, vastavust EN-regulatsioonidele, purustavat katset ja tuuleklaasi valikut. Prototüübi arendamiseks või prototüübist toote saamiseks tuleb kindlasti need punktid üle käia.

Lõputöös püstitatud kolmest eesmärgist said tehtud kaks: mootorratta tuuleklaasi adapteri prototüübi koostamise dokumenteerimine ja edaspidiste täienduste ettepanekud prototüübist valmis toote saamiseks. Eesmärk, mis jäi poolikuks, oli tugevusanalüüsi läbiviimine varuteguriga $[S] = 3$. Põhjuseks oli, et vastavat Euroopa Liidu määrust ei leitud, mille järgi oleks saanud vajalikku tugevusvarutegurit määrata. Osa edasiarendusest keskenduks just sellele.

Autor leiab, et mootorratta tuuleklaasi adapter on hästi koostatud, kuna on pikalt vastu pidanud katsetele erinevates oludes ning täidab oma eesmärgi. Samas teadvustab, et tegu ei ole lõpliku tootega, sest nii mõnigi aspekt vajab täiendamist.

SUMMARY

In this thesis, the development and analysis processes of a motorcycle windscreen adaptor prototype are outlined. First, existing aftermarket products were analysed, compared, and conclusions were drawn as to why these options were unsuitable. Based on this gathered information, requirements for the new windscreen adaptor were established.

Next, criteria that the windscreen adaptor should meet were created. Prototypes were made based on these criteria. Various tests were conducted to identify deficiencies or aspects needing improvement, and corresponding adjustments were made. Additionally, purchased products, that are part of the assembly and provide extra functionality were mentioned.

To determine the structure's strength, first, the drag force was calculated at the highest achieved speed during testing. Then, a simplified static test was conducted simulating a highway test to establish a finite element analysis (FEA). To verify the credibility of the initial test results, a simpler test without the windscreen and a corresponding FEA were created. Comparing the results of the conducted tests revealed that the deflection results were considered sufficiently consistent.

The costs of the adaptor, the adaptor with the windscreen and the adaptor with the windscreen and accessories were determined. These prices were compared with those of products found in the aftermarket. It was found that the price is somewhat comparable. Although the prototype documented in the thesis has the highest cost, it has additional functionalities, which are not present in other products and would need to be added separately.

Finally, various further developments are outlined: paint chipping, cover plate attachment, compliance with European Standards, destructive testing, and windscreen selection. To develop the prototype further or to turn it into a product, these points must certainly be reviewed.

Of the three objectives set in the thesis, two were accomplished: documenting the development of the motorcycle windscreen adaptor prototype and proposing further improvements to turn the prototype into a finished product. The objective that remained incomplete was conducting a strength analysis with a safety factor of $[S] = 3$. The reason was, that a relevant European Standard for determining the required safety factor was not found. For that reason, part of the further developments focuses on this topic.

The author believes that the motorcycle windscreen adaptor is well constructed, as it has endured various test under numerous conditions for a long time and fulfils its purpose. However, it is acknowledged that it is not a final product, as several aspects still need improvement.