KOKKUVÕTE

Lõputöö peamiseks eesmärgiks oli Ridas Yacht & Composites poolt ehitatava luksusjahi Zaca115 reaalsusele vastava kolmemõõtmelise mudeli loomine. Mudelit kasutatakse nii ehituse kui ekspluatsiooni järgus, et lihtsustada keerulistest sõlmedest aru saamist ning luua tõetruu visualisatsioon jahi üldisest välimusest. Üldmudeli modelleerimise käigus lahendati ka tehnilisi probleeme, mis olid tingitud kas standardite ja nõudmiste muutumisest, esialgse kontseptsiooni puudustest või sellest, et muudatustest tõttu ei olnud jõutud kõiki lahendusi planeerida. Sellest tulenevalt käsitleti lõputöös ka Zaca115 süsteemide planeerimist ja Zaca115 arendamist.

Lõputöö kirjutamise hetkeks oli modelleeritud ligikaudu 90% tervest jahist, kusjuures jahist endast oli reaalselt valmis ehitatud umbes 70%. Zaca115 on planeeritud vette lasta 2018 aasta augusti lõpus, kuid jahis asuvate seadmete, torustike ja muude detailide kohta on info juba praeguseks mudelis olemas. Kolmemõõtmelises mudelis on kokku üle 110 000 detaili ning töö kirjutamise hetkeks oli seda töö autori poolt modelleeritud üle 8 kuu. Jahi mudel on kui metaandmete kogum, millest on võimalik rikete ja probleemide korral lihtsalt järgi vaadata riket sisaldav süsteem ning vahetust vajavate komponentide andmed.

Planeerimise osas leiti 3D simulatsiooni teel suurim võimalik tender, mis jahis olevasse garaaži mahuks ning analüüsiti tenderi garaaži saamise etappe. Lisaks planeeriti kõikide jahis asuvate elektrikilpide asukohad tuginedes nende otstarbele ning ligipääsule peale jahi valmimist. Konstrueeriti ka jahi mootori ning kahe generaatori heitgaasitorustikud vastavalt klassiühingu nõuetele.

Zaca115 arendamise osas käsitleti jahi katusealuse, ehk bimini edasiarendust koos selle küljes asetsevatele seadmetele korpuste projekteerimisega. Bimini all asuvale tuuleklaasile projekteeriti uus lahendus, sest väliteki uste konstruktsiooni muudeti ning varasem tuuleklaasi korpus ei oleks sobinud. Lisaks projekteeriti juhtsillale konsool ning paigutati sellele klassiühingu nõuetele ja kasutajaergonoomikale tuginedes juhtsilla seadmed. Projekteeriti ja kujundati ka jahis asuvad kontrollpaneelid, mis asetati sild 1 ja sild 2 konsoolidesse. Välitekile projekteeriti veel käsipuud ning disainiti istmete madratsid ja nende kinnitamise lahendus. Bimini külge planeeritud valgustite vajaliku arvu ja tüübi leidmiseks viidi läbi valgusarvutused. Valgusarvutuste tulemusena hoiti ehitamise ning materjalide pealt kulusid kokku.

Viimasena loodi jahi välitekist virtuaalreaalsussimulatsioon, et kontrollida tehtud lahenduste sobivust ning ergonoomikat. Virtuaalreaalsussimulatsioon loob kasutajas tunde nagu ta asuks mudelis välja toodud asukohas ning aitab loodud lahendusi paremini ja ruumilisemalt hinnata.

Kuigi jahi kolmemõõtmeline mudel on peaaegu valmis, tuleb selle alusel klassiühingule veel enne jahi vette laskmist mitmeid jooniseid ja lahenduste seletusi luua. Lisaks võib ka jahti edasi ehitades ette tulla probleeme, mida on tänu mudeli olemasolule lihtsam lahendada.

SUMMARY

The main objective of the thesis was to create a lifelike 3D model of luxury yacht Zaca115, that is built by Ridas Yacht & Composites. The model is being used during the building and exploitation stages to make it easier to understand difficult areas and to create a lifelike visualisation of the yacht.

About 90% of the 3D model was finished during the writing of this thesis and about 70% of the yacht was actually built. Zaca115 is planned to be put in water at the end of August 2018. However, the information about the majority of machines, gadgets pipes and other details can already be seen from the model. The 3D model contains over 110 000 details and during the writing of this thesis, it had been modelled for 8 months by one person. The model acts like a set of metainformation, that can be used during break-downs, in order to easily check the information about the detail that needs to be changed as well as see what system is effected by the break-down.

Various different mechanical problems were solved during the modelling process. Most of them were caused by the changes in regulations and standards or flaws in the original design. Therefore, Zaca115 systems planning and development is described as well.

In the planning paragraph, finding a suitable tender with the help of a 3D animation is described as well as analysing the steps of getting the tender into the garage. Furthermore, planning the location of all electrical cabinets relying on their type and accessibility after the yacht is built, is described. The exhaust pipe system of the generators and main engine was also constructed in accordance to classifications.

The development paragraph of Zaca115 involves bimini development and designing of housings for the equipment that is supposed to be mounted on the bimini frame. A new design was made for the windshield of Zaca115 because the construction of outside watertight doors was changed and the old design did not fit anymore. Additionally, the main bridge console was designed in accordance to classifications with finding the most ergonomic layout for the equipment. The control panels that are used on bridge 1 and bridge 2 were also designed. Railings were designed for freeboard deck together with new backrests for sitting areas. In order to find the number of necessary down lights that are mounted to bimini, a luminance simulation was executed, resulting in less required ligts and saving money.

Lastly, a virtual reality simulation was made in order to test the ergonomics and visual design of the new solutions. Virtual reality simulation makes the user feel like he/she is actually at the displayed area, giving a better and more isometric understanding of the surroundings and details.

Even though the 3D model of the yacht is almost finished, a lot of classification drawings are still to be created before handing over the yacht to the owner. There may also rise various different unforeseen problems while building the remaining of the yacht that can be solved easier with having a 3D model.