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CONTROL PANEL TECHNICAL DESCRIPTION

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The purpose of this thesis was to make a technical description for EAM control panel. Thesis was done by Wärtsilä Finland Oy assignment and as a result was control panel connect different actuators technical description. Work was done for Power Plants Product and Technology department needs. Actual technical description are included into appendix of this thesis. Content is confidential and destined only for Wärtsilä internal use.

During of the thesis writing process , I explored power plants technology and application. Engine Auxiliary Module (EAM) control panels are important part of power plants technology and hereby part of electricity production process. Earlier have been noticed, that general technical description which covers all processes do not exist. Intension of this thesis was made that technical description.

As a result of this thesis, control panel general technical description were created and it is already internal use in the company. For description were satisfied and I hope it will responding to future challenges whit little upgrades.

Control panel technical description

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Opinnäytetyön aiheena oli tehdä toiminnallinen kuvaus EAM ohjauskeskus. Työ tehtiin Wärtsilä Finland Oy:n toimeksiannosta ja työntuloksena saatiin ohjauskeskukseen kytkettyjen eri toimilaitteiden toiminnallinen kuvaus. Työ tehtiin Power Plants Product and Technology-yksikön tarpeisiin. Varsinainen toiminnallinen kuvaus on sisällytetty liitteeseen, jonka sisältö on luottamuksellinen ja tarkoitettu ainoastaan Wärtsilän sisäiseen käyttöön.

Työn aikana sain tutustua Wärtsilän voimalaitos tekniikkaan ja sovelluksiin osana kirjoitusprosessia. EAM ohjauskeskus on tärkeä osa voimalaitoksen hallintaa ja täten osana isoa prosessia sähköntuotannossa. Aikaisemmin oli huomattu yleisen, kaikki prosessit kattavan toimintakuvauksen puute. Tämän opinnäytetyön tuloksena oli luoda sellainen.

Tämän lopputyön tuloksena saatiin ohjauskeskuksen kattava toiminnallinen kuvaus, joka on jo yrityksen sisäisessä käytössä. Työn tulokseen oltiin tyytyväisiä ja toivon sen vastaavan tulevaisuuden haasteisiin pienillä päivityksillä.

FOREWORD

This thesis were done in Satakunta University of Applied Sciences, Pori. Thesis was done by Wärtsilä Finland Oy assignment. It was written to Product and Technology-department were I had worked two summers before.

I would like to thank Mr. Rami Berg from the Product and Technology department who was the initiator of this thesis and operated as my supervisor.

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1 INTRODUCTION

The purpose of this thesis was to write a technical description for Engine Auxiliary module (EAM) control panel. The work was started with a study of power plant processes which the control panel is controlling. Then plan was to investigate about what descriptions are available and can be utilized. After this investigation a general technical description could be written.

The power plants delivered by Wärtsilä are constructed of different prefabricated modules as far as possible, this to minimize the site work. One of the most essential parts in a power plant is EAM module and its control panel. Module electrification were developed for high demand of customer and for easy and fast installation.

(Wärtsilä modularity and flexibility article)

The primary function of EAM control panel is to handle the main controls of the engine auxiliary module which is connected to a gas or diesel engine. Beside this the panel is also controlling and supplying power to several other smaller auxiliary units which is related to the engine operation.

There is not available general technical description to cover all functions. Intention was to make such a description. The structure of the technical description were condensed text. Only the most important information was written to description. Links to the company data management system were included for more information.

Main result of this thesis is the technical description, which covers all functions of control panel handles. Description is already in use and shared for the company internal use.

2 GENERAL INFORMATION ABOUT WÄRTSILÄ

Wärtsilä is a global leader of delivering in power solutions for the marine and energy markets. Wärtsilä power solution based on engine technology and are developed to correspond a modern-day challenges. Main focus are maximizes the economic performance same time with environmental values in customer vessels and power plants. This is make possible by improving technology and total efficiency.

Wärtsilä net sales was totaled 4.7 billion EUR in 2013. Company provide employment for 18 700 persons. Wärtsilä operated in 70 countries and more than 200 locations around the world.

(Wärtsilä annual report 2013)

2.1 Power Plants

Wärtsilä Power Plants is a global provider of flexible base load power plant. Wärtsilä provided gas and liquid fuel based power plant up to 600MW. Company has a unique solutions for peaking, reserve and load-following power generation, as well as for balancing intermittent power production. Wärtsilä power plant is supplying LNG distribution system and terminals too. Power plant are designed to high efficiency, flexible and low emission.

(Wärtsilä annual report 2013)

2.2 Ship Power

Wärtsilä Ship Power is supplying product to marine and oil and gas industry. Main business area covers ship design, engines, generation sets, reduction gears, propulsion equipment, automation and power distribution systems and solution for marine industry.

(Wärtsilä annual report 2013)

2.3 Services

Wärtsilä Services support customers their whole lifecycle by optimizing efficiency and performance. Service solution cover basic support, installation, upgrades and environmental solution. Service operate in service station, workshops and ship repair centres.

(Wärtsilä annual report 2013)

3 CREATING OF THE DESCRIPTION

3.1 Purpose of the technical description

The main purpose of the technical description is to find easily information of technical solution of electrical point of view. Most of the time, this description gives needed information for electricians, designers and subcontractors.

Appendix document was created needs from Wärtsilä Power Plants, Auxiliary Technology and it will be shared only for internal users, subcontractors and some in case for third party use. The appendix contains confidential information about Wärtsilä Power Plant EAM control panel and it will not be published in public.

3.2 Requirements of description

The technical description was written in English and this thesis too, because of the Wärtsilä in-house language is English.

Description requirements were to make a general technical description to all processes that the control panel can handle. Some of the complicated processes had already functional description available in company's data management system and those can be used as a reference in the description.

The length of the every section were agreed to be approximately A4 page, but there were some case specific clearance. Pages demands where set on 20-30 pages and written down to the company specific word-template. Figures were added in to technical description, if seen necessary.

The technical description contains accurate information of all process, so the appendix will be only for company internal use.

3.3 Start-up of description

Starting point for the technical description was to became familiar of topic. I had knowledge of this field because of my former employment contracts in Wärtsilä Power Plants technology. As my earlier assignment where consisted of module electrification and development tasks.

First task in the technical description was to find out right document template and surveying the headers. Most of the headers were known by name, but some of them were unknown.

Next challenge was find out right documents from Wärtsilä data management-system. There were more than three million files and my need was somewhere 20 documents. It was a challenge to find out all needed information.

3.4 Information catering

Almost half of this work was about find out all required information about all available processes. All material was available in the company data management system and correct documents were not easy to find. I had used the data management system before and for it closely related search tool occasionally. Basis for information searching were familiar to me before I started work with this thesis.

On the beginning, I start it to scan all controlled modules and units for this thesis. That made the basis of the description. After I got of the document done and accepted in my supervisor, I start searching information about processes.

I started the searching by looking all topics trough. After this I had knowledge to write something to description. My plan was to find out at first easily recovering documents, exploring them and start writing description.

Some of required process description were very hard to find and I needed to ask my supervisor to help me. They were included in some another process descriptions or they were not been done. Some of the contents was not even in the data management system and I had to got them in another way.

This phase take lot of effort and writing time. I was finished it somewhere in February. I had decided to make a description to be a proud of, so I did not want to take short cut for this.

I think before this part of work that I can find and produce all information easy, but it was harder than I expect. I used lot more time to searching that I considering before. For few line text were required hours searching of information. After this experience I can now find information faster than before.

3.5 Writing of the description

Writing was done mostly in the company office at Vaasa. Main reason for this was, to be able to ensure facts from my supervisor. There were lot of outdated information in data management system and it was delaying the writing project. My biggest concern was to prevent to write wrong information to the description.

Writing project started by creating the description document and making the headlines in to it. After I found out first process descriptions, I started writing. The first thirdly percentage of writing project were very easy. I was able to find out good functional descriptions to use base on.

Some of the process description were never put in to data management system and I had to get them by another way. Part of important information were only in a one employer computer and was very hard to get to my computer.

At the end, all required material were found by help of supervisor and writing process were finished in the halfway of March.

The technical description includes lot of information and to ensure that text is correct, I sent the description often to my supervisor.

Writing was done irregular, because I was performing school at same time. There was lot of exams and homework to do and this thesis was extra work because I was willing to graduate in three years.

4 CONCLUSIONS

Final result is the technical description, which is informative and detailed description of complicated processes for internal use. Most of the information needed lots of effort of searching the right documents. Technical description included hyperlinks to the company data management system, if was more information were needed. In some cases hyperlinks were not valid and they were not included to the description.

In my opinion I succeed very well from the task what was given. I got all required help from my supervisor. He helped me to find missing information and right sources. I had lot of benefits about my earlier working experience with module electrification. Most of the components were familiar for me and rest of them are now well-known. I thinks this will help my job seeking after graduation.

My personal development during this thesis were in English skills, project management, scheduling and knowledge of Power Plant utilized technology. Furthermore the company's design handbook are well learned during the technical description.

The technical description is already use and hopefully it will serve the company and subcontractor for many years.

Data management search tool was not too good to use and I always found out more than two hundreds unnecessarily files for the one necessary. That could be one development point for the company, to create better search tool for data management.

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