Yue WU

4rd EMship cycle: October 2013 – February 2015

Master Thesis

Concept Design of a Station Keeping Vessel Dedicated to Maintenance of the Far Shore Wind Farm

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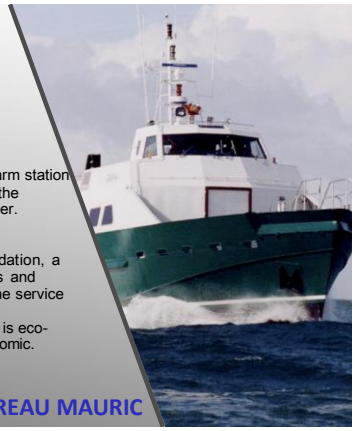
Internship tutor: Chief Engineer of studies Mr. Vincent Seguin, Bureau Mauric, Nantes, France
Reviewer: Professor Prof. Dario Boote, University of Genoa, Italy

Szczecin, February 2015

My Mission of Internship:

To design a far shore wind farm station keeping vessel according to the requirements to the ship owner.

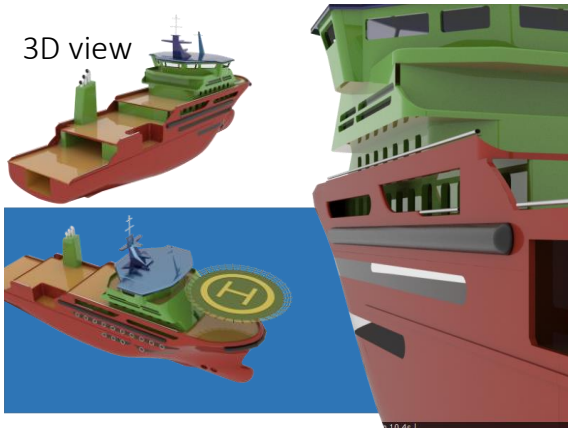
It provides comfort accommodation, a safer transport for technicians and warehouse facilities during the service period.
At the same time, the design is eco-friendly and reasonably economic.

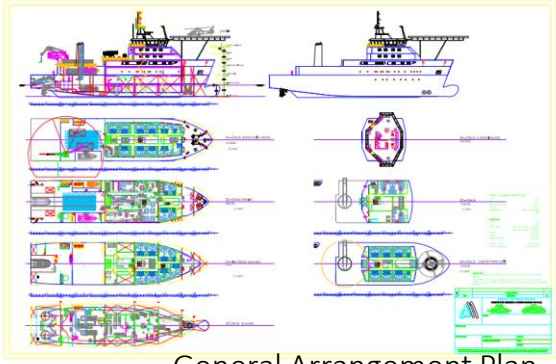


BUREAU MAURIC

Principal Particulars		
Length overall	75	m
Beam overall	17	m
Draught	4.6	m
Displacement of light ship	1925	tonnes
Maximum speed	13	knots
Service speed	12	knots
Accommodation capacity	59	persons
Operation time every day	7	Hours
Capable to stay in the wind farm for minimum	30	days
Noise-vibration comfort class	3	
Tank capacity (approx.)		
Fresh water	400	m^3
Fuel oil	600	m^3
water ballast	700	m^3

3D view





General Arrangement Plan

The Main Function of the Vessel

a) This vessel is designed for far shore perform corrective and preventive maintenance and to transport and storage equipment to the wind turbines.

b) This vessel is designed for a deep water operation and it'll maintain a good performance in any extreme nature condition.

d) This vessel will be able to help out finishing the research mission under the water.

e) This vessel have enough weather deck space for repairing wind turbine component by technician.

f) To be able to embark and debark of technicians and material easily from the vessel to the deep sea wind turbine.

g) This vessel will save energy and protect the maritime environment.

h) This vessel can put out fire on the deck or on the wind turbine.

My Work Steps

1. learning and analyseing all the data;

2. Drawing the main homologous type vessels of my design and bringing it all together;

3. learning about the special system and the machines in the vessel;

4 Defining the specification of the vessel;

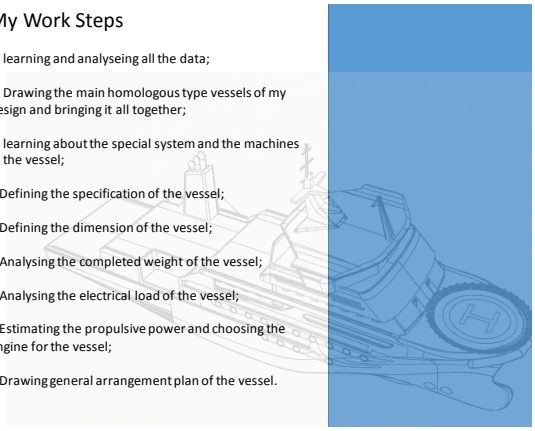
5 Defining the dimension of the vessel;

6 Analysing the completed weight of the vessel;

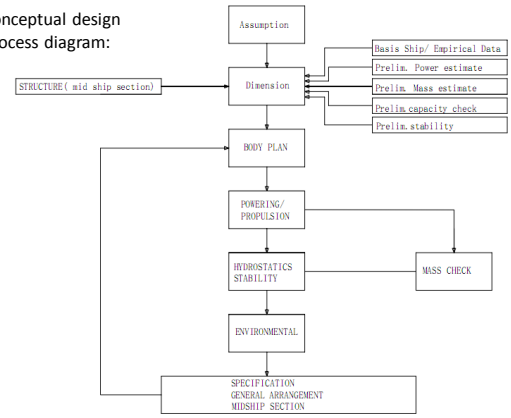
7 Analysing the electrical load of the vessel;

8 Estimating the propulsive power and choosing the engine for the vessel;

9 Drawing general arrangement plan of the vessel.



Conceptual design process diagram:



RELATIVE RULES

• DNV (Det Norske Veritas) related to vessel serves for wind turbine offshore.

• The BV rule of Steel Ship NR 467 related to HULL, MACH, Special Service, Unrestricted navigation, AUT-UMS, DYNAPOS AM/AT-R, ALM, COMF3.

• All the living facilities will be according with ILO 1966 and subsequent amendments.

• General design and safety will be compliant with SOLAS 1974 and subsequent amendments.

• The exhaust emission system relate to Marpol 73/78 and subsequent amendments

BUREAU VERITAS

IMO

DNV

Diesel electrical propulsion system:

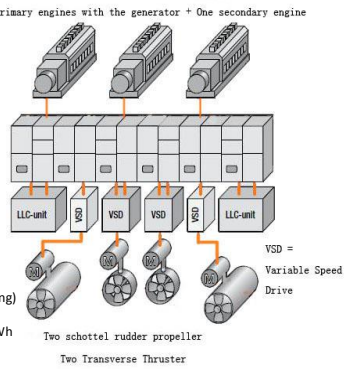
Two MAN Diesel 8L27/38 as primary engine;

One MAN Diesel 5L27/38 as secondary engine;

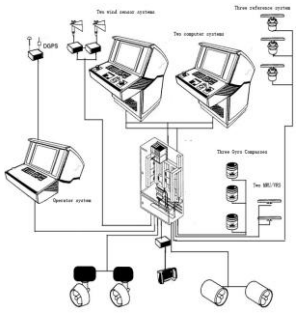
Two 2500 KVA electric motors;

Service speed :12 knots.

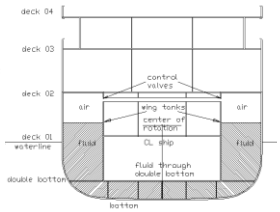
Fuel oil Consumption to ISO conditions
MCR (maximum continuons rating) 85% : 180 g/kWh
Lube Oil Consumption : 0.8 g/kWh



Dynamic Positioning (DP) Systems :



U-Tank stabilization system:



CONCLUSION

The MFWSV is a new kind of service naval designed to operate in far wind farms where significant wave heights reach up to 3.25 meters and the water depth is about 50 m.

It is vary from the current wind farm supply vessels, it offers the best services for maintaining of far shore wind farm.

It is design to environment friendly, in the same time, construction prix economic.