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TUGAS AKHIR
LS 1336



**EMERGENCY MAINTENANCE MODULE DESIGN
FOR HULL USING VISUAL BASIC 6.0**



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**MARINE ENGINEERING DEPARTMENT
MARINE TECHNOLOGY FACULTY
SEPULUH NOPEMBER INSTITUTE OF TECHNOLOGY
SURABAYA
2006**

**LEMBAR PENGESAHAN
TUGAS AKHIR**

**EMERGENCY MAINTENANCE MODULE DESIGN
FOR HULL USING VISUAL BASIC 6.0**

**TUGAS AKHIR
(LS 1336)**

**Diajukan Guna Memenuhi Sebagian Persyaratan
Untuk Memperoleh Gelar Sarjana Teknik**

Pada

**Jurusan Teknik Sistem Perkapalan
Fakultas Teknologi Kelautan
Institut Teknologi Sepuluh Nopember
Surabaya**


Surabaya, Januari 2006


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(LS 1336)

Sebagai salah satu syarat untuk mendapatkan gelar Sarjana Teknik pada Jurusan Teknik Sistem Perkapalan, Fakultas Teknologi Kelautan ITS, maka perlu diterbitkan Surat Keputusan Pengerjaan Tugas Akhir yang memberikan tugas kepada mahasiswa tersebut dibawah untuk mengerjakan Tugas sesuai judul dan lingkup bahasan yang telah ditentukan.

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ABSTRAK

Pemeliharaan darurat(emergency maintenance) pada lambung kapal memegang peranan yang penting untuk mengembalikan keselamatan dan performa dari suatu kapal. Pemeliharaan darurat pada lambung kapal meliputi keseluruhan aktivitas manusia untuk menghasilkan produksi yang meliputi banyak pihak yang saling terkait dan juga meliputi suatu kombinasi aktivitas yang keduanya mempunyai karakter operasional dan juga managerial, antara lain aktivitas: meninjau ulang, mensurvei, memeriksa, mengukur, pendeteksian, pengujian, perbaikan, persediaan material, pengumpulan data, meneliti, dokumentasi, pelaporan, pengujian, perekaman, dan verifikasi atau auditing.

Melihat banyaknya pihak yang terkait, banyaknya pekerjaan yang harus dilakukan dan juga standar mutu yang harus dicapai maka pemeliharaan darurat untuk lambung kapal akan menjadi kompleks dan memerlukan sebuah alat yang dapat membantu dalam pelaksanaan pemeliharaan darurat untuk lambung kapal. Berdasarkan situasi di atas kita menawarkan suatu alat dalam wujud perangkat lunak, yang diharapkan dengan adanya perangkat lunak ini pengambilan keputusan dan koordinasi mengenai pemeliharaan darurat untuk lambung kapal bisa dilakukan dalam satu meja(single desktop solution).

Perangkat lunak yang kita kembangkan akan kita beri nama Hull Emergency Maintenance Modul dimana Hull Emergency Maintenance Modul akan kita kembangkan menggunakan suatu bahasa program yang dibuat oleh Microsoft. Bahasa program ini dinamakan Visual Basic 6.0 sedangkan untuk mengembangkan Database Management System yang digunakan untuk mengolah basis data pemeliharaan darurat untuk lambung kapal kita menggunakan Microsoft SQL Server 2000 yang kompatibel dengan Visual Basic 6.0.

Kata kunci: *Pemeliharaan darurat lambung kapal, Hull emergency maintenance module, Visual Basic 6.0, Microsoft SQL Server 2000*

ABSTRACT

Hull emergency maintenance plays an important part to restore the safety and performance of ship. Hull emergency maintenance cover the overall activity of human being to yield the production, covering a lot of party which related each other and covering an activity and represent combination of operational character as well as managerial character, for example the activity is: review, surveying, checking, measuring, detection, examination, repair, material supply, data collecting, checking, documentation, reporting, examination, recording, and verification or auditing

Because the number of related party that involved, the number of a work to be done and quality standard that must be reached hence hull emergency maintenance will become complex and need a tool which can assist in execution of hull emergency maintenance. According the situation above we offer a tool in form of software, and is expected with the existence of this software the decision making and coordination between related party to execute hull emergency maintenance can be done in single desktop solution.

Software that we develop we called Hull Emergency Maintenance Module. This software will we develop constructively using programming language that made by Microsoft. This Programming language is Visual Basic 6.0, and to develop the Database Management System that used for managing the database of hull emergency maintenance we use the Microsoft SQL Server 2000 that compatible with Visual Basic 6.0.

Keyword: *Hull emergency maintenance, Hull Emergency maintenance module, Visual Basic 6.0, Microsoft SQL Server 2000*

PREFACE

Bismillahirrahmanirahim,

All of the honor, praise and glory belong to ALLAH, for HIS strength, power, mercy, love and all that HE has done unto me until I could finished my final project. Actually, I am nothing without HIM. My final project has the following title:

EMERGENCY MAINTENANCE MODULE DESIGN FOR HULL USING VB 6.0

This final project was arranged as a requirement of Bachelor Degree graduation in Marine Engineering Department, Marine Technology Faculty, Sepuluh Nopember Institute of Technology, Surabaya.

The author has realized this final project is a far way from perfection. Therefore, the author hope is a suggestion and development criticism will be given for this final project. For this opportunity, the author would give thank to every person that involved in finishing my final project.

1. Mr. DR. Ketut Buda Artana, ST, MSc. as my final project counselor who has given the precious motivation, direction, knowledge and all that I can't mentioned it one by one, unto me for my final project.
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4. Mr. A.A.B Dinariyana, ST, MES as my former college supervisor who has given the precious motivation, direction, knowledge, and all that I can't mention it one by one.
5. The Other Lecturer at RAMS Subject Coordinator who has given the precious motivation, direction, knowledge and all that I can't mentioned it one by one, unto me for my final project.

6. Mr. Ir. Soerjo Widodo Adji, MSc as a head master of Marine Engineering Department, Marine Technology Faculty – Sepuluh Nopember Institute of Technology, Surabaya.
7. Every Marine Engineering Department lecturers who have given the precious direction and knowledge as long as my study time in Marine Engineering Department.
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9. My Lovely Dad and Mom in Klaten City who have given an example how to survive and become conqueror in this life. Thank for your love, passion, attention, education and prayer every day for me. I'll never forget it.
10. My Lovely Brother, for your sharing that strengthens me until now.
11. My Lovely Girl Friend for your sharing and motivation that strengthens me to finish my Final Project.
12. My Friends in our beloved boarding house Mulyosari Utara Gg VI no 28 that became friend and brother and for the helping and support for me to finished this project work.
13. My Friend in Marine Engineering Department that i can not mention it one by one, thanks your for support and help .
14. My Friend in RAMS Laboratorium comunity that have give support and help for me to finished my project work.
15. Other related person that i forget to mention it.

And at the end the author hope that this final project can give benefit, knowledge and information to the everyone that read this final project.

Surabaya, January 2006

Author

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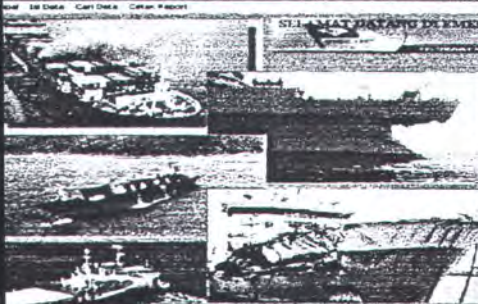
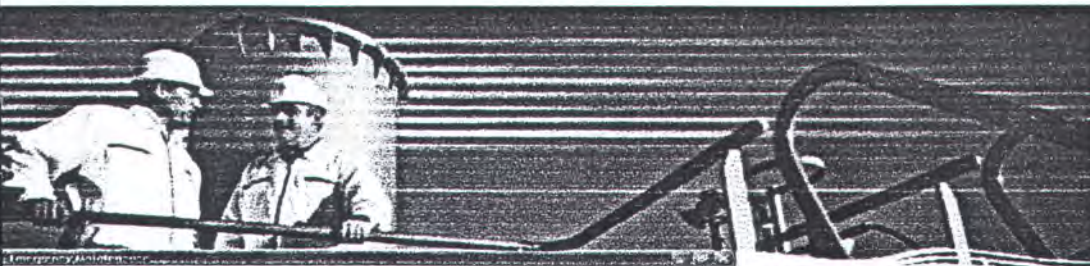
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CHAPTER I
INTRODUCTION



STUDI KASUS TENTANG PEREMERGENCY MAINTENANCE MODUL

Emergency Repair ID: 19001
 No. Register: 17/03/2001
 Nama Kapal: KARAKA JAYA NAGA 112
 Nama Perusahaan: PT PENGEMBANGAN ARMADA NAGA NASIONAL
 No. Kapal: 4430
 Call Sign: YBRI
 Flag: PERCENSI
 Jenis Kapal: 1500
 Draft (m): 10.0
 Clear Height: 14.100 m
 Shipping Date Of Survey: 1/3/2001
 Surveyor: S. S. S. S.
 Issuing Date Of Survey: 1/3/2001
 Surveyor: S. S. S. S.
 No. Of Loss Vess: 1
 Place Of Loss Vess: BANGALABASRI
 Date Of Loss Vess: 1/3/2001
 Certificate Number: 19001
 Issued On: 1/3/2001
 Approved Date: 1/3/2001
 Expiration Date: 1/3/2001
 Issued By: S. S. S. S.
 Approved By: S. S. S. S.
 Expiration Date: 1/3/2001

Material ID & Repair Detail ID: MRD0012001

Material ID	Repair Detail ID	No. Item	Description	Unit	Quantity	Location	Quantity	Cost
MRD0012001	1	1	D/PLY/SHELL/FS-30	1750x1300x10 mm	13 SHEET	1750x1300x10 mm	13	20000
MRD0012001	2	2	D/PLY/STERN/FS30	3100x1050x10 mm	2 SHEET	3100x1050x10 mm	2	20000

EMERGENCY REPAIR WORK DETAIL REPORT

Repair Work Detail ID (PVO)	No. Item	Repair Object	Repair Method	Repair Detail
PVC0012001	1	D/PLY/SHELL/FS30-30	RENEWED SHELL PLATING	
1/3/2001	36.00	1750x1300x10 mm	1750x1300x10 mm	13 SHEET
Planned Work Time	3	Real Work Time	3	11.00
Labour	3	Labour Cost/Qty	40000	
Material Specification	Material Demand Quantity	Material Supply Quantity	Material Cost Quantity	
PVC0012001	1750x1300x10 mm	1750x1300x10 mm	1750x1300x10 mm	13 SHEET
3000000	1000000	3040000		
PVC0012001	2	D/PLY/STERN/FS30-30	RENEWED STERN PLATING	
1/3/2001	11.00	3100x1050x10 mm	3100x1050x10 mm	2 SHEET
Planned Work Time	3	Real Work Time	3	12.00
Labour	3	Labour Cost/Qty	40000	
Material Specification	Material Demand Quantity	Material Supply Quantity	Material Cost Quantity	
PVC0012001	3100x1050x10 mm	3100x1050x10 mm	3100x1050x10 mm	2 SHEET
3000000	1000000	4040000		



ITS
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 Sepuluh Nopember

CHAPTER I INTRODUCTION



CHAPTER I

INTRODUCTION

1.1 Motivation

1.1.1 Few scenes from hull emergency maintenance situation

Hull emergency maintenance plays an important part to restore the performance and safety from a ship. Hull emergency maintenance of the ship also cover entire aspect activity of human being to yield the production that include a lot of related party and represents a combination of activity that both having the character of operational and also managerial that consisted by the activity: review, survey, check, measure, detection, examination, repairing, material supply, data collection, analyze, documentation, reporting, testing, recording, and auditing or verification. Hull emergency maintenance also have the quality standard which must be fulfilled, where in this case quality standard that expected to be fulfilled will related by regulation class from the ship and also the regulation from the shipping company itself.

Because the number of party that be concerned, the number of a work to do and also to reach of quality standard that expected, hull emergency maintenance work will become complex and require the good planning so can reach a maximal result. Though emulation in industry maritime in this time progressively mount, according to *Artana, (2005)* maritime industry require a new solution to:

- Improving productivity and lesser the operating expenses
- Improving quality and reliability from ship
- Fulfilling international regulation which progressively tighten

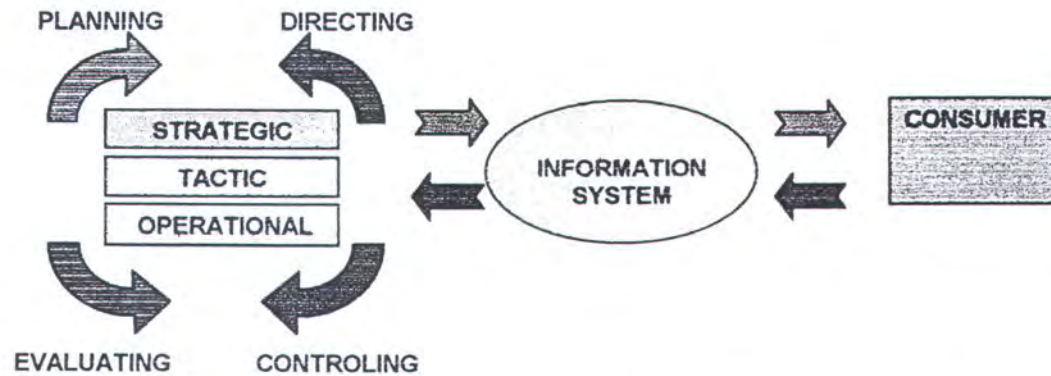
Seemly more and more challenge which must be faced in executing hull emergency maintenance, hence there is have to be made a tool that makes the coordination from the relevant party's become easier so the hull emergency maintenance can execute more effective, with the development of information technology we can use that technology to develop that tool.

Kriteria	Masa Industrialisasi	Masa Transisi	Masa Knowledge
AKSI	Sekuenstrial dan lambat	Sekuenstrial tapi cepat	Cepat
KEPUTUSAN	Dibuat oleh Top Manajemen	Dibuat oleh Top Manajemen	Hasil Kolaborasi dari para spesialis
SPE SIALISASI KNOWLEDGE	Staff ahli	Manajemen Garis	Knowledge disimpan dalam repositori elektronik
INFORMASI	Manajemen tingkat tengah sebagai pelaksana	Arus ke arah muka yang terbatas, disalin ke bawah	Akses langsung oleh semua bagian
DATA	Disimpan dalam bentuk kertas; dengan akses terbatas	Disimpan dalam bentuk kertas; akses lebih luas	Aksesibilitas darimana saja; kapan saja melalui jaringan
SUMBER DAYA UTAMA			
INFRASTRUKTUR	Jalan, kereta, bandara	Sistem Telepon	Jaringan Digital
PENDIDIKAN/ TRAINING	Tidak ada/knowledge tidak diharapkan	Lebih luas/sejak manajemen tingkat tengah tidak ada	Tinggi hampir semua keputusan diambil oleh pegawai
PROSES BANTUAN	Alur Perakitan	Mesin Fax	E-mail, Groupware
KNOWLEDGE	Tertap pada grup kecil-top manajer dan staf	Proses belajar sendiri oleh karyawan	Proses belajar yang berkelanjutan didukung oleh perusahaan
KECEPATAN	Lambat, informasi tidak real time	Lebih cepat, pekerja bekerja lebih lama	Cepat, koneksi digital realtime

Picture 1.1 Information technology exploitation in every era (leebert in wiryana, 2005)

1.1.2 Ideal state of hull emergency maintenance activity

Based on situation above we offer a peripheral which is in the form of software, so with this software is expected the coordination and decision making of concerning hull emergency maintenance can be done in one desk (single desktop solution). We realize for the big shipping company they already had a system to facilitate them to conduct the preparation in executing hull emergency maintenance, but for small and middle company a lot of them not yet had a system which can solve hull emergency maintenance problems in one desk (single desktop solution). In small and middle shipping company usually the coordination between a related party in hull emergency maintenance activity still use a manually hand written data transfer. This situation made the preparation for hull emergency maintenance execution take a lot of time to do. Because that reason we try to develop our system and we expected this system can become a product which can be sold for shipping company.



Picture 1.2. Relation between information system and the environment (Daihani, 2001)

Software that we develop we called it hull emergency maintenance module. Hull emergency maintenance module will be develops constructively using a programming language that made by Microsoft, this programming language called visual basic 6.0. We chose this program because software growing tends to be oriented by operating system of windows so that software we developed is design to be work under windows system. Visual basic 6.0 also has excess as high level programming language so that is easy to understand and it can say that visual basic is very structured language program. In visual basic, programmer do not only focused just at program structure, but we can develop the creativity to design more communicative and interesting program appearance for the user (www.tricom.com) and for the database management system we use Microsoft SQL Server 2000 that compatible with Visual basic 6.0.

1.2 Hypothesis and scope of problem

1.2.1 Hypothesis

An hull emergency maintenance consisted of a work that include entire aspect activity of human being to yield the production, hull emergency maintenance also entangle a combination work which complex enough and claim a high quality standard which must be reached so the shipping company can compete in industrial maritime which progressively become more competitive. With the growth from information technology at this time, we can use help from information technology to make the hull

emergency maintenance working faster and accurate. In this research we will made a so called software hull emergency maintenance module to facilitate the hull emergency maintenance preparation and execution work becoming a one desktop solution. Based on description above we can submit some hypothesizing, there are:

1. Hull emergency maintenance module software will facilitate (make easier) in preparing and execution of hull emergency maintenance working
2. With the existence of hull emergency maintenance module software we will get some of the advantage for example: assisting management to draw up the execution of hull emergency maintenance and chosen the right person to executing the hull emergency maintenance job

1.2.2 Scope of problem

Considering the time limitation and to clarify the problem of this final project hence we need to make definition of the following assumption and scope of problem, there are:

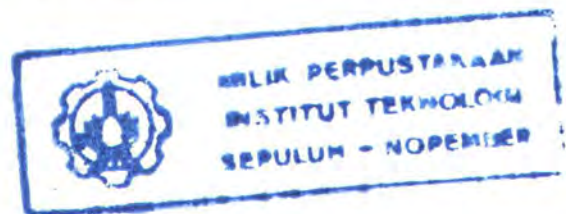
1. Hull emergency maintenance module is designed for the Meratus Shipping Company
2. Hull emergency maintenance module will relate at Class regulation released by Biro Klasifikasi Indonesia and procedure from Meratus Shipping Company

1.3 The aims and benefits of the research

1.3.1 The aim of the research

The aim of this research is:

1. Make software which can assist the hull emergency maintenance process for Meratus Shipping Company
2. Make application for the hull emergency maintenance module into hull emergency maintenance process, so is expected we get an efficient and effective result



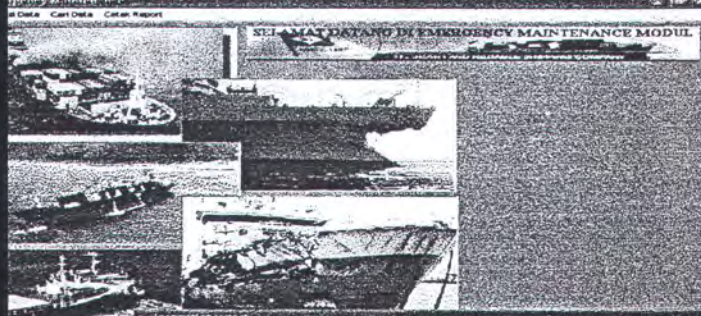
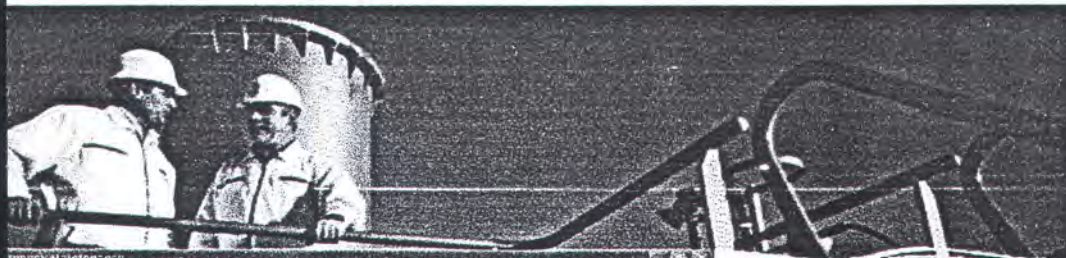
1.3.2 The benefits of the research

With this hull inspection module software we will be got some benefit, that is:

1. Manage hull emergency maintenance data in a paperless, PC-Windows based electronic format
2. Allows access to that data from multiple locations
3. Display timelines of hull emergency maintenance data, eliminating the need to view individual listings of hull emergency maintenance items
4. Provides an historical record of past hull emergency maintenance dates, location and items that carried out
5. Offers easy updating of the database
6. Prints customized status reports to suit a user needs.



CHAPTER II
THEORETICAL BASED



SELAMAT DATANG DI EMERGENCY MAINTENANCE MODUL

Report ID: MR00012001
 No Report: 0004-SP/01/2003
 Ship Name: CARAKA JAYA NAGA 112
 Ship Owner: PT PENGEMBANGAN ARMADA NIAGA NASIONAL
 Ship Number: 4435
 Call Sign: YC981
 Ship Flag: INDONESIA
 Gross Tonnage: 3256
 Net Tonnage: 1670
 Class: IA 100 IP ECC
 Date of Delivery: 1/3/2001
 Loading Date of Delivery: 5/5/2003
 Number of Condition Points: 1/10/2001
 Type of Inspection: OCCASIONAL SURVEY
 No. of Loss Vess: 4
 Place of Loss Vess: DANJANMASARI
 Date of Loss Vess: 12/9/2001
 Certificate Number: 1

Inspection	Remarks	Ship Name	Ship Owner	Rep. Number	Call Sign	Date of Loss
2003	0004-SP/01/2003	CARAKA JAYA NPLT PENGEMBANG 4435	PTPN-04 INDONESIA	4435	YC981	12/9/2001
2002	0001-SP/01/2003	CARAKA JAYA NPLT PENGEMBANG 4435	PTPN-04 INDONESIA	4435	YC981	12/9/2001

Material ID: MR00012001

Material Name: SHELL PLATING
 Material Code: PS 36-35
 Material Quantity: 1700x1300x10 mm 1 SHEET
 Material Unit: 1 SHEET

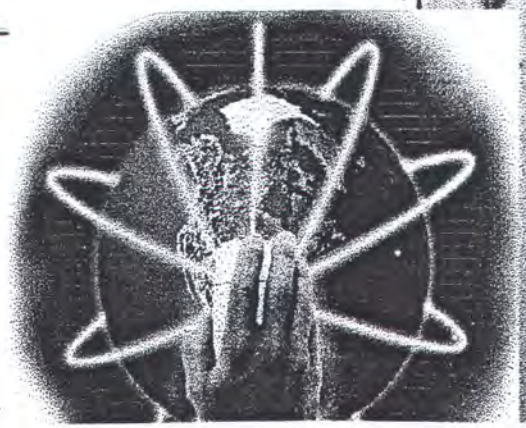
Material ID	Material Name	Material Code	Material Quantity	Material Unit	Material Cost
MR00012001	D/PLY/SHELL/PS36-35	PS 36-35	1700x1300x10 mm	1 SHEET	20000
MR00012001	D/PLY/STERN/PS36-35	PS 36-35	3100x1050x10 mm	1 SHEET	30000

EMERGENCY REPAIR WORK DETAIL REPORT

Report Work Detail ID (NO)	No Item	Repair Object	Repair Method	Repair Detail
MR00012001	1	D/PLY/SHELL/PS36-35 SHELL PLATING	RESERVED SHELL PLATING	
1/3/2001	08:00		1/3/2001	31.00
Planned Work Time	3	Leadwork	3	40000
Material Specification	Material Demand Quantity	Material Supply Quantity	Material Used Quantity	
1700x1300x10 mm 1 SHEET	1700x1300x10 mm 1 SHEET	1700x1300x10 mm 1 SHEET	1700x1300x10 mm 1 SHEET	
Material Cost/Qty	Material Demand Cost/Qty	Material Supply Cost/Qty	Material Used Cost/Qty	
2000000	1000000	2000000	2000000	
MR00012001	2	D/PLY/STERN/PS36-35 STERN PLATING	RESERVED STERN PLATING	
1/3/2001	11:00		1/3/2001	13.00
Planned Work Time	3	Leadwork	3	40000
Material Specification	Material Demand Quantity	Material Supply Quantity	Material Used Quantity	
3100x1050x10 mm 1 SHEET	3100x1050x10 mm 1 SHEET	3100x1050x10 mm 1 SHEET	3100x1050x10 mm 1 SHEET	
Material Cost/Qty	Material Demand Cost/Qty	Material Supply Cost/Qty	Material Used Cost/Qty	
3000000	1000000	4000000	4000000	



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CHAPTER II THEORETICAL BASED

CHAPTER II

THEORETICAL BASED

2.1 General

Theoretical based represent basic theory for finishing the problems that we analyzed or try to solve. Theoretical based cover everything that relate to the basic theory to solve this final project.

2.2 Maintenance Management

According to BS3811: Glossary of General Terms used in Maintenance Organization that released by England institute of standard, express that maintenance is a combination from various action that conducted to take care of a tool in or improve; repair it to come up with an acceptable condition (*Corder, 1996*)

According *Corder, (1996)* the standard quality determined by organization that conducting maintenance. This matter differs from one organization to another depend by its industry condition and good match for value specified by pursuant from high standard.

The main maintenance target can be defined clearly as follows

1. To lengthen the age of asset usefulness. This matter is important especially in developing countries because in developing country they lack of capital resource for the replacement of tool. In developed countries sometime more beneficial to change compare than maintaining the tool
2. For guarantee optimum availability of equipments that installed to produce or service, and get the investment profit (return of investment) as maximum as possible
3. To guarantee the readiness of operational from entire equipments that needed in every state of emergency condition, for example reserve unit, unit of fire company and rescuer etc
4. To guarantee the safety of person that use the tools

Work of maintenance can be planned or unplanned. There's only one maintenance form which not unplanned that is emergency maintenance, that

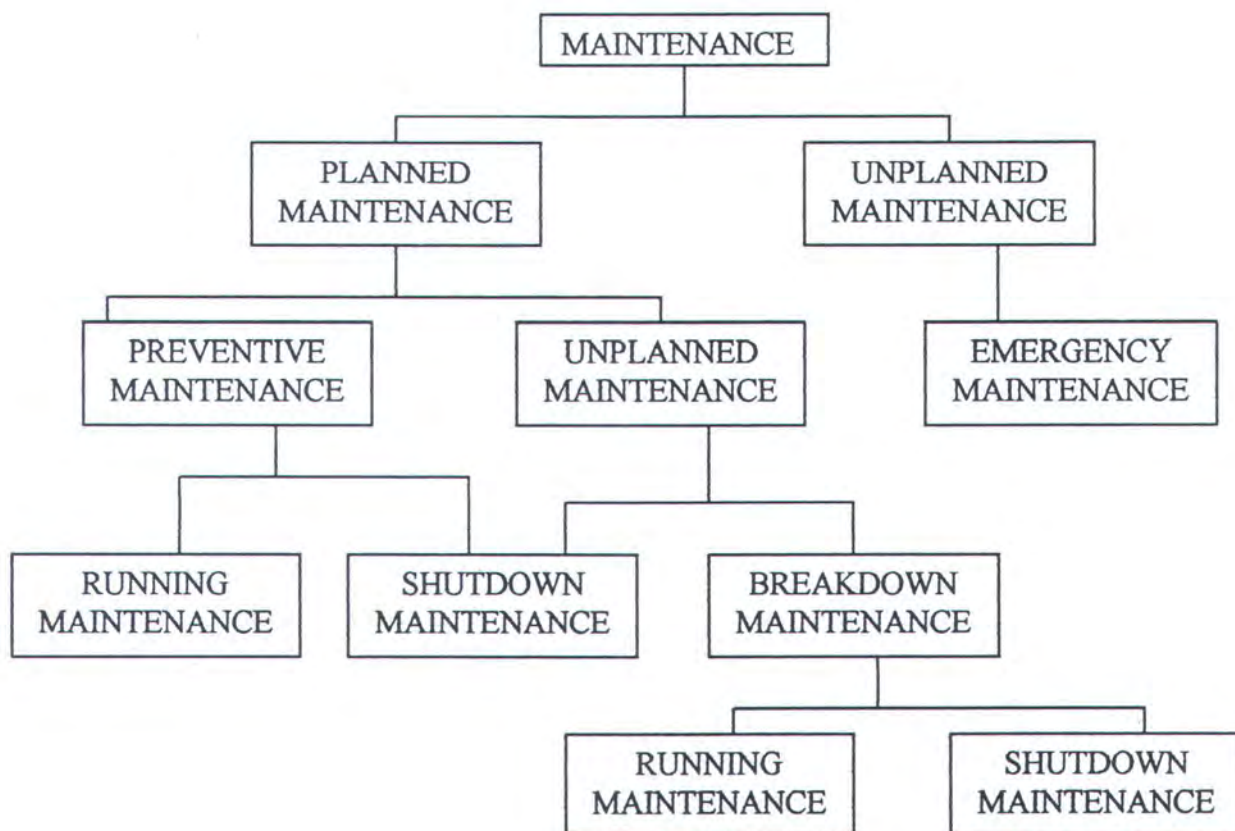
defined by maintenance where need an immediately executed to prevent the serious effect, for example loss of production, big damage at equipments or for the safety of the worker.

Planned maintenance is divided in to become two especial activities that are preventive and corrective this two is defined clearly in BS381.

The main part preventive maintenance that covers the inspection based to activities seeing, feel, listen and minor tuning that found require to be changed at the time of inspection

Corrective maintenance cover the minor repair especially to short-range which possible arise among inspection, also planned overhaul for example annual overhaul, an extension that planned in long term detail as result from prevention activities. The purpose of prevention activities is not just to lessen the emergency maintenance, but also to lessen the corrective maintenance.

The relationship from kind of maintenance is described in picture below:



Picture 2.1 Relation between kinds of Maintenance (Corder, 1996)

2.3 Emergency Maintenance

Unplanned maintenance is type of maintenance which is not planned previously so that in this case is difficult to estimating the damage of the equipments that operating

The maintenance activity which include of this type is emergency maintenance. Emergency maintenance is maintenance that conducted to prevent the serious effect that probably happens.

2.4 Kind of Maintenance in Ship

Maintenance at ship is all action that conducted to maintain the ship condition so that ready to operate and seaworthy as according to the regulation of class and harbor-mastership. The maintenance for ship can be divided as:

1. Routine maintenance

Routine maintenance is maintenance that conducted periodically for ship construction and also ship machinery

2. Running repair

Is repair that conducted at the time of ship is being operating. The purpose of running repair is to take cut the time of docking execution and also for the efficiency of expense

3. Docking

Docking of ship is executed according to the regulation from the class.

2.5 Survey and Docking Regulation According to BKI (Biro Klasifikasi Indonesia)

Survey and docking regulation according to BKI is:

2.5.1 Periodical Survey

A. Annual surveys (seagoing ship)

According to *BKI, (2004)*:

- a. Annual survey is survey that must be conducted for the hull, including the anchoring equipment and the machinery, including the electrical plant and where applicable for special equipment class at intervals of 12 month as form date of commencement of the class period indicated in the certificate

- b. Survey period (time window): the survey has to be carried out within ± 3 months, counted from the day at which the current class period will complete one year of validity. For ship with accommodations for more than 12 passengers, the annual survey has to be carried out by no later than due date entered
- c. Hull survey
1. Hull above load line include covering equipment (whether deck, hatch cover, small hatch, watertight door, window, air pipes, overflow pipes with their means of closure, relevant shell doors and other openings, ventilations with their means of closure, bulwark, guard rails, freeing port, side scuttles and deadlights, chutes and other opening with their means of closure, cargo hold, second deck, engine room etc, scuppers, sanitary discharge, valve on discharge line and their control, superstructure, deck houses and their means of closure, general condition of mast head, foundation of mast head and foundation of crane etc)
 2. Anchoring and mooring equipment
 3. All watertight doors and watertight bulkhead (if available)
 4. Efficiency from manually and automation operation system from fire door (if available)
 5. Protection from fire and escape route
 6. On ship equipped for carriage of containers, the annual survey shall include random checks of:
 - Condition and origin/identity of (loose) lashing/securing elements, against documentation on board (approved container stowage plan)
 - Condition of container support welded into the ship structure or the hatch covers

B. Intermediate surveys

According to *BKI, (2004)*:

- a. The intermediate surveys falls due nominally, 2.5 years after commissioning and each class renewal and may in the case of sea

going ships be carried out on the occasion of the second or third annual survey

- b. The item that must be survey basically is same with annual survey, with an addition:
 1. Ballast tank in ships aged 5 to 10 years, selected sea water ballast tank are to be examined for corrosion damages and/or damages to their coatings. Depending on the survey result, and in particular ion the case of poor coating condition, if soft coating has been applied, or if when built, the tanks were not provided with effective corrosion protection, the survey is to be extended to additional tanks of the same type.
 2. If the coating in sea water ballast tank except the double bottom tanks is found to be poor condition, but is not renewed, if soft coating has been applied, or when built the tank were not provided with effective corrosion protection, or if corrosion respectively other defect are found, maintenance of class is to be subject to the tanks in question being examined at annual intervals, and thickness measurements carried out as considered necessary. Also in case of the double bottom tanks, annual surveys may have to be carried out
 3. Ballast tank in aged ten years and over, during the intermediate survey, all sea water ballast tank are to be examined for damages to the hull structural elements and to the coating
 4. Cargo holds: depending on the ship's age and on the cargo carried, selected cargo hold are to be closely examined in accordance with the Surveyor's instruction
 5. The hatches, bulkhead doors ramps, bow visors, bow, side and stern doors, etc. of all ships are to be additionally crack tested. Essentially, the crack test will cover:
 - Main joining welds and their interfacial areas both on the vessel's hull and on the visors and/or doors

- Highly stressed areas in the way of the centers of rotation of the hinges, at the Surveyor's discretion
- Highly stressed areas of the locking devices and their stoppers, at the Surveyor's discretion
- Repair welding

For crack detection and dye penetrant method or the magnaflux method are to be employed, and a test protocol is to be prepared

C. Class renewal surveys

According to *BKI, (2004)*:

- a. Class renewal surveys are to be carried out at the end of class period for the ship's hull, including the anchoring equipment, and the machinery, including the electrical plant, and, for any special equipment classed
- b. A class renewal survey may be carried out in several parts. The class renewal survey may be commenced at the 4th annual survey and must have been completed by the end of the class period. The total survey period must not exceed 15 months
- c. The class renewal survey is a rule to be held when the ship is in dry dock or on a slipway; unless a dry docking survey has been carried out within the admissible period. The ship is to be placed on blocks of sufficient height so that the keel, the bottom plating and the rudder can be examined
- d. Hull survey at Class Renewal I (Age of ship up to 5 years)
 1. Hull below load line (bottom plate, side shell, bow, sea chest and their equipment, rudder and their equipment, measurement for main rudder bearing room etc)
 2. Hull above load line with their means of closure (side shell, whether deck, hatch cover, small hatch, watertight door, window, air pipes, overflow pipes with their means of closure, ventilation with their means of closure, bulwark, freeing port, guard rail, overflow pipes with their means of closure, relevant shell doors and other openings, ventilations with their means of

closure, bulwark, guard rails, freeing port, side scuttles and deadlights, chutes and other opening with their means of closure, cargo hold, second deck, engine room etc, scuppers, sanitary discharge, valve on discharge line and their control, superstructure, deck houses and their means of closure, general condition of mast head, foundation of mast head and foundation of crane etc)

3. The sea water ballast tanks are to be inspected at the surveyor's discretion. Fuel oil, lubricating oil and feed water tanks need not to be emptied, if their tightness can be verified by an external examination while they are completely filled and there is no reason for doubt as to their unobjectionable condition
4. Anchoring and mooring equipment
5. All watertight door and water tight bulkhead (if available)
6. Efficiency from manually and automation operation system from fire door (if available)
7. Protection from fire and escape route
8. The engine room structure is to be examined particular attention to be given to tank top, shell plating in way of tank top, brackets connecting side shell frames and tank top, and engine room bulkheads in way of tank top and bilge well. Where wastage is evident or suspected, thickness measurement are to be carried out
9. On ship equipped for carriage of containers, the following scope of survey is required for class renewal:
 - Checking for cracks and deformations of the container supporting elements (welding elements) in the inner bottom and in hatch covers, of supporting legs arranged on deck, if any, and of the entire hatch covers
 - Hatch covers: checking of condition and operability of supports and stoppers

- Survey of guide rails and supporting frames if fitted (connection to hull, deformations)
 - Random checking of the (loose) stowage and lashing elements, comparison with the certificates kept in the ship's file
10. Tightness test: each compartment of the double bottom and all tanks, the boundary bulkheads of which form part of the main structure of the ship, are to be subjected to a pressure test. Fuel, lubricating oil and feed water tanks may be tested by filling with the respective liquid
11. Thickness measurement: if the surveyors has reason to suspect premature inadmissible corrosion, he may require the rust to be removed from parts of the structure and thickness measurement to be performed
- e. Hull survey at Class Renewal II (Age of ship 5 to 10 years)
1. The requirements of Class Renewal II are identical to those of Class Renewal I, however the requirement listed below are to be observed additionally
 2. The structural parts behind ceilings and insulations are to be examined as required by the Surveyor
 3. For anchor and chain cables must be calibrate, and to be ranged so that they can be examined for wear and damages through out their length
 4. All tanks are to be examined internally, lubricating oil, fuel tank and feed water tanks are to be subjected to random examinations as required by the surveyor
- f. Hull survey at Class Renewal III (Age of ship 10 to 15 years)
1. For Class Renewals III and subsequent ones the requirement of Class renewal II are to be complied with, however the requirements listed below are to be observed additionally
 2. Ceilings and insulations of holds are to be removed, where necessary, to enable the condition of the bottom structure and

the inner surfaces of the shell plating of the tank tops to be assessed. For Class Renewal IV and subsequent ones the bottom ceiling of cargo holds are to be completely removed and tank top is to be carefully cleaned, such as to enable proper assessment of their condition

3. The wall lining underneath windows in the outer shell is to be lifted as required by the surveyor so that the structure behind may be examined
 4. All tanks are to be examined internally. The fuel, lubricating oil and feed water tanks are to be examined internally and tested to the maximum working overpressure, at the Surveyor's discretion.
 5. The rudder body is to be examined. The connections to the rudder stock and (if fitted) to the pintle and pertinent securing devices are to be inspected. As far as accessible, the rudder stock is to be surveyed. If deemed necessary in view of the findings of the external inspection, the stock is to be dismantled. In way of the bearings, as far as accessible, stock and pintle are to be examined for corrosion
 6. The mean diameter of the anchor chain cables is to be determined on at least 3 links per length. The weight of the anchors is to be checked
- g. Hull survey at Class Renewal IV (Age of ship over 15 years)
1. For Class Renewals IV and subsequent ones the requirement of Class renewal III are to be complied with, however the requirements listed below are to be observed additionally
 2. The bottom ceiling of cargo holds are to be completely removed and tank top is to be carefully cleaned, such as to enable proper assessment of their condition
 3. All tank are to be tested by filling with water to the level of overflow pipe

Class renewal survey [No] and ship's age [year]			
I. Age ≤ 5	II. $5 < \text{Age} \leq 10$	III. $10 < \text{age} \leq 15$	IV. Age > 15
Suspect Areas throughout the vessel			
	One transverse section abreast a cargo space within the amidships 0,5 L	Two transverse section in way of cargo spaces within the amidships 0,5 L	Three transverse section in way of cargo spaces within the amidships 0,5 L
		All cargo hold hatch covers and coamings (plating and stiffeners)	
		All exposed main deck plating within 0,5 L amidships	All exposed main deck plating full length
		All wind and water strakes within 0,5 L amidships	All wind and water strakes full length
		Internals in forepeak tank	Internals in fore peak and after peak tanks
		Lowest strakes in way of twin decks selected transverse bulkheads in cargo spaces together with internal way	Lowest strakes and strakes in way of twin decks of all transverse bulkheads in cargo spaces together with internal in way
			Representatives exposed superstructure deck plating (poop, bridge, and forecastle deck). All keel plate's full length. Also, additional bottom

			plates in way of cofferdams, machinery spaces and aft end of tanks
			Plating of sea chest. Shell plating in way of over board discharges as considered necessary by the surveyors

Table 2.1 Minimum Requirements for hull thickness measurement at Class Renewal Surveys (BKI, 2004)

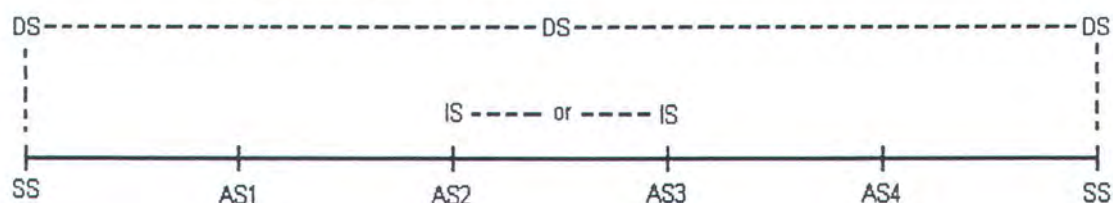
D. Dry docking surveys

According to *BKI, (2004)*:

- a. Dry docking surveys serve the purpose of periodical checking of the under water hull (bottom survey), of the openings and closures in the shell related to the machinery, and of externally arranged component of the steering and propulsion system
- b. Seagoing ship carrying the character of class A 100 is within a 5 years class period to be twice subjected to a dry docking survey. The first dry docking survey has to be carried out on the occasion of the 2nd or by no later than 3rd regular annual survey. As a matter of principle, class renewal includes a dry docking survey, which is then accepted as the 2nd regular dry docking survey. The maximum interval between two successive dry docking surveys is not to exceed 36 months. The following dry docking survey is then to be held latest after 24 month.
- c. Seagoing ship having a character of classification A 90 to be subjected to dry docking surveys at interval 18 months
- d. Seagoing ships with accommodation for more than 12 passengers are to be presented for dry docking survey at intervals of 1 years

e. Hull surveys at dry docking surveys:

1. Inspection of bottom plate, side shell and the component that stick at side shell, sea chest, rudder, ruder stock, sanitary pipe and water drain pipes include all covering. For the third Class renewal surveys and subsequent ones all shell plates must be take measure for the plate thickness
2. Inspection of steering gear, include ruder, ruder flens coupling, ruder bolt, ruder stock, pintle, ruder bearing and room for main rudder
3. Inspection of equipment that stick at side shell like bilge keel, shaft bracket etc.
4. Inspection of sea chest and sea chest strainer
5. Other inspection like bow thruster tunnel etc
6. Inspection of anchoring, anchor chain cables and their equipment (anchor and anchor chain cables must be calibrated), mooring equipment, chain locker etc.



DS = Docking Survey

SS = Special Survey (Class Renewal Survey)

AS = Annual Survey

IS = Intermediate survey

— = 1 year periods

Picture 2.2 Periodical Survey diagram for maintenance the class (BKI, 2005)

2.5.2 Non Periodical Survey

A. Damage and repair surveys

According to *BKI, (2004)*:

Damage and repair survey fall due whenever the ship's hull, machinery or electrical installations and/or some special equipment classed have suffered a damage, which might affect the validity of the class, or if

damage may be assumed in consequence of an average or some other event

B. Voyage repair and maintenance

According to *BKI, (2004)*:

Where repairs to hull, machinery or equipment, which affect or may affect classification, are to be carried out by a riding crew during a voyage they are to be planned in advance. A complete repair procedure including the extent of proposed repair and the need for Surveyor's attendance during the voyage is to be submitted to and agreed upon by the BKI reasonable in advance. Failure to notify the BKI, in advance of the repairs, may result in suspension of the vessel's class.

The above is not intended to include maintenance and overhaul to hull, machinery and equipment in accordance with the recommended manufacturer's procedures and established marine practice and which does not require BKI approval, however, any repair as result of such maintenance and overhauls which affects or may affect classification is to be noted in the ship's log and submitted to the attending Surveyors for use in determining further survey requirement.

C. Conversion surveys

According to *BKI, (2004)*:

In the case of conversion surveys are to be conducted in accordance with the relevant approved particulars as in the case of new buildings

D. Occasional surveys

According to *BKI, (2004)*:

BKI reserve the right to require Occasional Surveys to be held independently of any regular survey. Such surveys may become necessary for examining a vessel's technical condition and are understood to form a part of the Society's Quality Assurance System

2.6 Computerized Maintenance Management System (CMMS)

The CMMS (in the best form) is an integrated system that helps the maintenance leadership manages all aspects of life in the department (*Levitt, 2003*). According to *Levitt, (1996)* the reason we computerized is the same

reason we manage maintenance in the first place. We computerized to lower or avoid costs, improve service, control cost, ensure uptime, improve quality, etc. we also computerized because running manually looks bad in the eyes of our peers and ourselves (called the “because factor” by Jay Butler in the *Maintenance Management*).

Some high-tech firms computerize for the last reason because maintenance is the final department of the organization that is still done manually. It is sobering to see the maintenance managers for some august high-tech organization explain that they cannot get PC’s and software to help their effort. This reinforces the belief that maintenance is a very low priority and cannot get attention or resources for improvement.

Many maintenance departments are grappling with the decision to computerize. It is actually a surface decision for a much deeper decision. A decision to computerize is also a decision to treat maintenance as a serious profession. The decision to computerize is also a decision to impose discipline on a group of mechanics (who are traditionally very independent and hard to control). The computer is a tool that maintenance managers imagine will allow them to predict effect, analyze, and eventually control what goes on in maintenance. This computerization decision and the deeper decision that it represents go to the core of the culture of maintenance in your facility.

2.6.1 A Unified Way to Look a Potential System

According to *levitt, (1996)* all CMMS are designed with four major sections or functions. It helps to separate these functions and view them one at a time. That for major section is:

1. *Part 1 – Daily Transactions*: this includes all data entry such as work order, packing slips/receipts of part, payroll information. A defect in this section of the package is usually fatal. It is usually very difficult to repair or reprogram this section for the vendor. The main reason that problems here are fatal is the amount of time your staff will spend facing this screens. The second reason is the defects here will adversely impact all other parts of the system and may limit the usefulness the system.

2. *Part 2 – Master files:* The master files are the fixed information about the assets, parts, mechanics, and organization. The master files structure reflects the designer's biases more powerfully than any other parts of the system.
3. *Part 3 – Processing:* The daily transactions are processed either in traditional batch mode or online. Processing updates the PM schedule, summarizes detailed repair data for reports and machine histories, and keeps all financial accounts current.
4. *Part 4 – Demands, Reports, and Inquiry Screens:* The demands on a maintenance system include reports and screens. There should be reports when there is a large amount of data or when analysis is required. Inquiries how you expect to use the system and then see how the system will behave.

The following three types of reporting are commonly available.

1. *Batch Level/Listing/Rehashing of Master files:* This is a structured listing of information already in the files. Report of this kind might include a listing of all assets in the finishing department with date of purchase. These reports are frequently required to answer corporate question about assets, employees or other fixed information. They can save hours over manual techniques. For the computer software vendor, these are the easiest program to write, and they assign the lowest paid programmers to the project.
2. *Comparison, Performance, Analysis, of Database in Relationship to Standards:* This type of report is very useful for bench marking in maintenance operation. Measures such as maintenance hours per manufactured unit (man hours per automobile assembled or per ton of steel rolled), maintenance dollars to parts dollars, percent overtime or percent emergency hours can reveal the actual condition of maintenance department. This type of reporting usually flows up to management in the summaries of benchmarks for the whole operation. In a shop running under the new paradigm, these benchmark numbers are made available and discussed with all maintenance personnel.

3. *Exception Reporting, Division of Report Exceeding Upper and Lower Parameters:* When you have specific questions about problem areas or opportunities for saving, you use the parameter-driven report from this group. You might think that the new equipment in the mold shop is breaking down more than the older equipment. An exception report comparing the two groups would give you the answer. Powerful maintenance systems have industry standard query languages (such as SQL) to allow all sort of ad hoc reporting when questions come up. The newest systems do not require the service of a programmer for these report (you design report as needed)

2.7 Data Modeling

2.7.1 Data Modeling Overview

According to *www.utexas.edu*, (2004):

The data model is one part of the conceptual design process. The other is the **function model**. The data model focuses on what data should be stored in the database while the function model deals with how the data is processed. To put this in the context of the relational database, the data model is used to design the relational tables. The functional model is used to design the queries that will access and perform operations on those tables.

Data modeling is preceded by planning and analysis. The effort devoted to this stage is proportional to the scope of the database. The planning and analysis of a database intended to serve the needs of an enterprise will require more effort than one intended to serve a small workgroup.

The information needed to build a data model is gathered during the requirements analysis. Although not formally considered part of the data modeling stage by some methodologies, in reality the requirements analysis and the ER diagramming part of the data model are done at the same time.

A. Methodologies

There are two major methodologies used to create a data model: the Entity-Relationship (ER) approach and the Object Model. In this final project we use the Entity-Relationship approach.

B. The Aim of Data Modeling

Data modeling is probably the most labor intensive and time consuming part of the development process. The goal of the data model is to make sure that the all data objects required by the database are completely and accurately represented. Because the data model uses easily understood notations and natural language, it can be reviewed and verified as correct by the end-users.

The data model is also detailed enough to be used by the database developers to use as a "blueprint" for building the physical database. The information contained in the data model will be used to define the relational tables, primary and foreign keys, stored procedures, and triggers. A poorly designed database will require more time in the long-term. Without careful planning you may create a database that omits data required to create critical reports, produces results that are incorrect or inconsistent, and is unable to accommodate changes in the user's requirements

C. Component of Data Modeling

The data model gets its inputs from the planning and analysis stage. Here the modeler, along with analysts, collects information about the requirements of the database by reviewing existing documentation and interviewing end-users.

The data model has two outputs. The first is an entity-relationship diagram which represents the data structures in a pictorial form. Because the diagram is easily learned, it is valuable tool to communicate the model to the end-user. The second component is a data document. This document that describes in details the data objects, relationships, and rules required by the database. The dictionary provides the detail required by the database developer to construct the physical database.

D. Database design Overview

Database design is defined as: "design the logical and physical structure of one or more databases to accommodate the information

needs of the users in an organization for a defined set of applications".

The design process roughly follows five steps:

1. Planning and analysis
2. Conceptual design
3. Logical design
4. Physical design
5. Implementation

The data model is one part of the conceptual design process. The other, typically is the functional model. The data model focuses on what data should be stored in the database while the functional model deals with how the data is processed. To put this in the context of the relational database, the data model is used to design the relational tables. The functional model is used to design the queries which will access and perform operations on those tables.

2.7.2 The Entity Relationship Model

According to *www.utexas.edu*, (2004):

The Entity-Relationship (ER) model was originally proposed by Peter in 1976 [Chen76] as a way to unify the network and relational database views. Simply stated the ER model is a conceptual data model that views the real world as entities and relationships. A basic component of the model is the Entity-Relationship diagram which is used to visually represent data objects. Since Chen wrote his paper the model has been extended and today it is commonly used for database design for the database designer, the utility of the ER model is:

- It maps well to the relational model. The constructs used in the ER model can easily be transformed into relational tables.
- It is simple and easy to understand with a minimum of training. Therefore, the model can be used by the database designer to communicate the design to the end user.
- In addition, the model can be used as a design plan by the database developer to implement a data model in specific database management software.

E-R Diagram has some component that we must understand the component of E-R Diagram is:

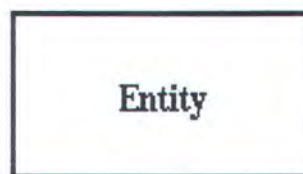
A. Entities

Entities are the principal data object about which information is to be collected. Entities are usually recognizable concepts, either concrete or abstract, such as person, places, things, or events which have relevance to the database. Some specific examples of entities are EMPLOYEES, PROJECTS, and INVOICES. An entity is analogous to a table in the relational model.

Entities are classified as independent or dependent (in some methodologies, the terms used are strong and weak, respectively). An *independent entity* is one that does not rely on another for identification. A *dependent entity* is one that relies on another for identification. An *entity occurrence* (also called an instance) is an individual occurrence of an entity. An occurrence is analogous to a row in the relational table.

Entities have some special type that type is:

- a. *Associative entities* (also known as intersection entities) are entities used to associate two or more entities in order to reconcile a many-to-many relationship.
- b. *Subtypes entities* are used in *generalization hierarchies* to represent a subset of instances of their parent entity, called the super type, but which have attributes or relationships that apply only to the subset.

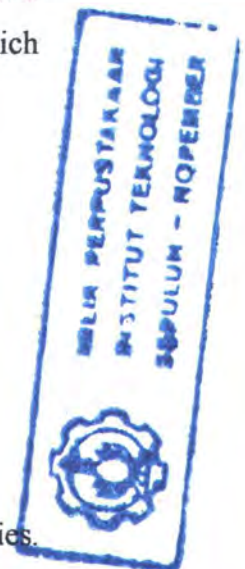


Picture 2.3 Entity Notation (www.smartdraw.com, 2005)

b. Relationships

A Relationship represents an association between two or more entities. An example of a relationship would be:

- Employees are assigned to projects
- Projects have subtasks



-Departments manage one or more projects

Relationships are classified in terms of degree, connectivity, cardinality, and existence.



Picture 2.4 Relationship Notation (www.smartdraw.com, 2005)

c. Degree of a Relationship

The *degree of a relationship* is the number of entities associated with the relationship. The n-ary relationship is the general form for degree n. Special cases are the binary, and ternary, where the degree is 2, and 3, respectively.

Binary relationships, the association between two entities are the most common type in the real world. A recursive binary relationship occurs when an entity is related to itself. An example might be "some employees are married to other employees".

A ternary relationship involves three entities and is used when a binary relationship is inadequate. Many modeling approaches recognize only binary relationships. Ternary or n-ary relationships are decomposed into two or more binary relationships.

d. Connectivity and Cardinality

The connectivity of a relationship describes the mapping of associated entity instances in the relationship. The values of connectivity are "one" or "many". The cardinality of a relationship is the actual number of related occurrences for each of the two entities. The basic types of connectivity for relations are: one-to-one, one-to-many, and many-to-many.

A *one-to-one* (1:1) relationship is when at most one instance of an entity s associated with one instance of entity B. For example, "employees in the company are each assigned their own office. For each employee there exists a unique office and for each office there exists a unique employee.

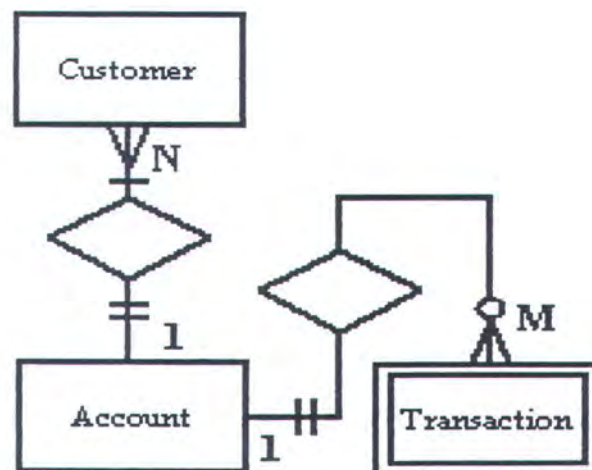
A *one-to-many* (1:N) relationship is when for one instance of entity A, there are zero, one, or many instances of entity B, but for one instance of entity B, there is only one instance of entity A. An example of a 1: N relationships are:

- a department has many employees
- each employee is assigned to one department

A *many-to-many* (M:N) relationship, sometimes called non-specific, is when for one instance of entity A, there are zero, one, or many instances of entity B and for one instance of entity B there are zero, one, or many instances of entity A. An example is:

- employees can be assigned to no more than two projects at the same time;
- projects must have assigned at least three employees

A single employee can be assigned too many projects; conversely, a single project can have assigned to it many employees. Here the cardinality for the relationship between employees and projects is two and the cardinality between project and employee is three. Many-to-many relationships cannot be directly translated to relational tables but instead must be transformed into two or more one-to-many relationships using associative entities.



Picture 2.5 Connectivity and Cardinality Notation (www.smartdraw.com, 2005)

e. Existence

Existence denotes whether the existence of an entity instance is dependent upon the existence of another, related, entity instance. The existence of an entity in a relationship is defined as either *mandatory* or *optional*. If an instance of an entity must always occur for an entity to be included in a relationship, then it is mandatory. An example of mandatory existence is the statement "every project must be managed by a single department". If the instance of the entity is not required, it is optional. An example of optional existence is the statement, "employees may be assigned to work on projects".

f. Attributes

Attributes describe the entity of which they are associated. A particular instance of an attribute is a *value*. For example, "Jane R. Hathaway" is one value of the attribute Name. The *domain* of an attribute is the collection of all possible values an attribute can have. The domain of Name is a character string.

Attributes can be classified as identifiers or descriptors. Identifiers, more commonly called *keys*, uniquely identify an instance of an entity. A descriptor describes a non-unique characteristic of an entity instance.



Picture 2.6 Attributes Notation (www.smartdraw.com, 2005)

g. Direction

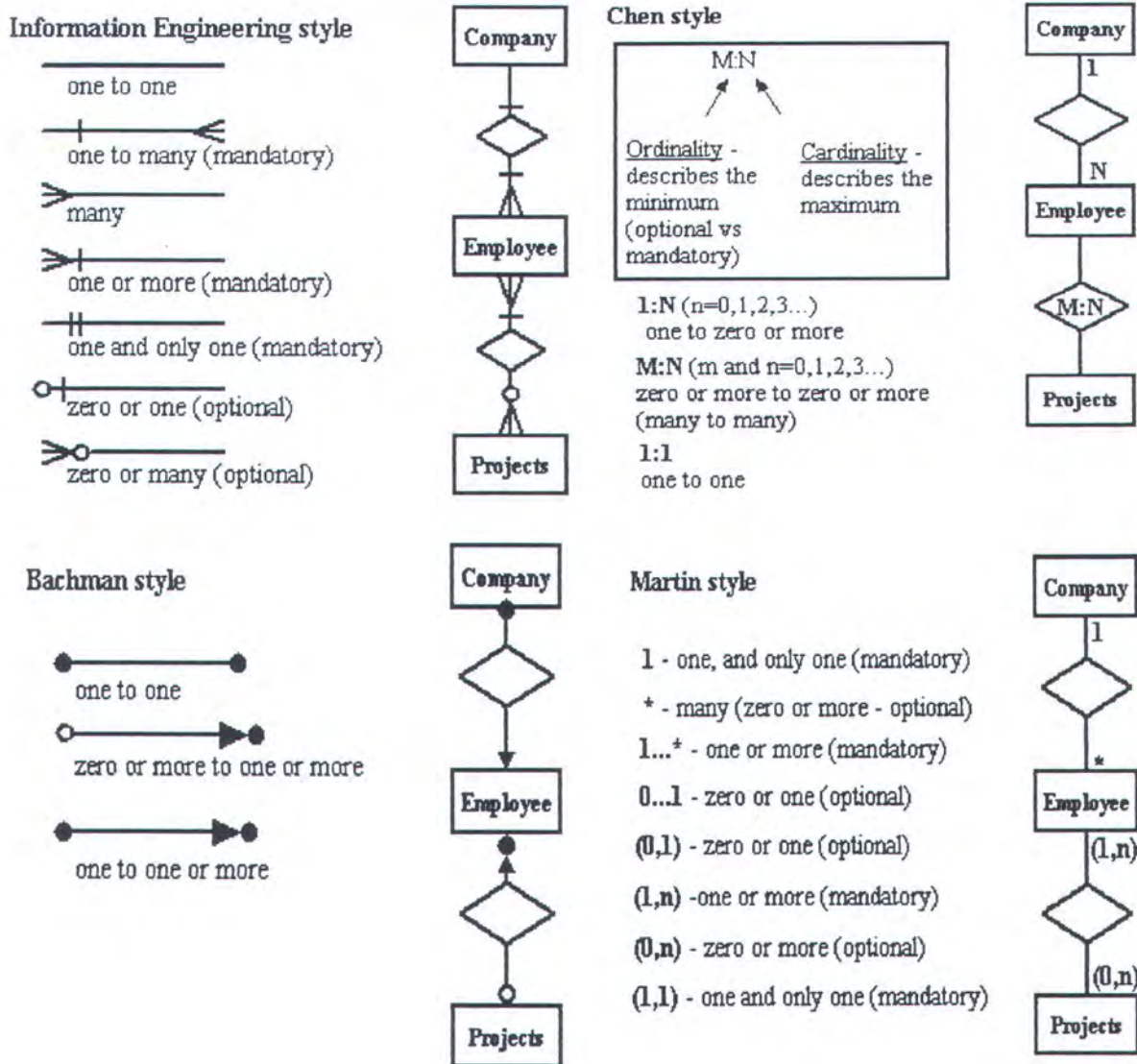
The direction of a relationship indicates the originating entity of a binary relationship. The entity from which a relationship originates is the *parent entity*; the entity where the relationship terminates is the *child entity*.

The direction of a relationship is determined by its connectivity. In a one-to-one relationship the direction is from the independent entity to a dependent entity. If both entities are independent, the direction is arbitrary.

With one-to-many relationships, the entity occurring once is the parent.
The direction of many-to-many relationships is arbitrary.

h. ER Notation

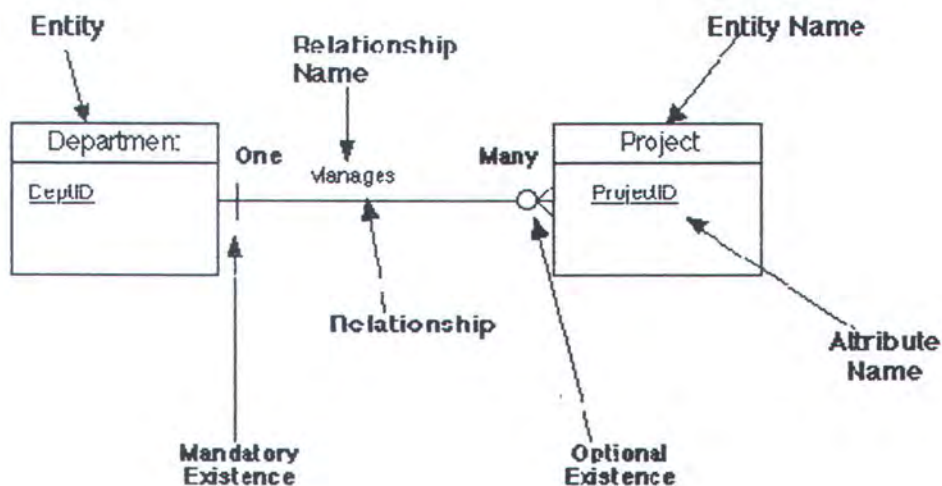
There is no standard for representing data objects in ER diagrams. Each modeling methodology uses its own notation. The original notation used by Chen is widely used in academics texts and journals but rarely seen in either CASE tools or publications by non-academics. Today, there are a number of notations used; among the more common are Information Engineering style, Chen style, Bachman style, and Martin style.



Picture 2.7 Styles of ER Notation (www.smartdraw.com, 2005)

All notational styles represent entities as rectangular boxes and relationships as lines connecting boxes. Each style uses a special set of symbols to represent the cardinality of a connection. For the example the symbols used for the basic ER constructs are (Martin style):

- Entities are represented by labeled rectangles. The label is the name of the entity. Entity names should be singular nouns.
- Relationships are represented by a solid line connecting two entities. The name of the relationship is written above the line. Relationship names should be verbs.
- Attributes, when included, are listed inside the entity rectangle. Attributes which are identifiers are underlined. Attribute names should be singular nouns.
- Cardinality of many is represented by a line ending in a crow's foot. If the crow's foot is omitted, the cardinality is one.
- Existence is represented by placing a circle or a perpendicular bar on the line. Mandatory existence is shown by the bar (looks like a 1) next to the entity for an instance is required. Optional existence is shown by placing a circle next to the entity that is optional.

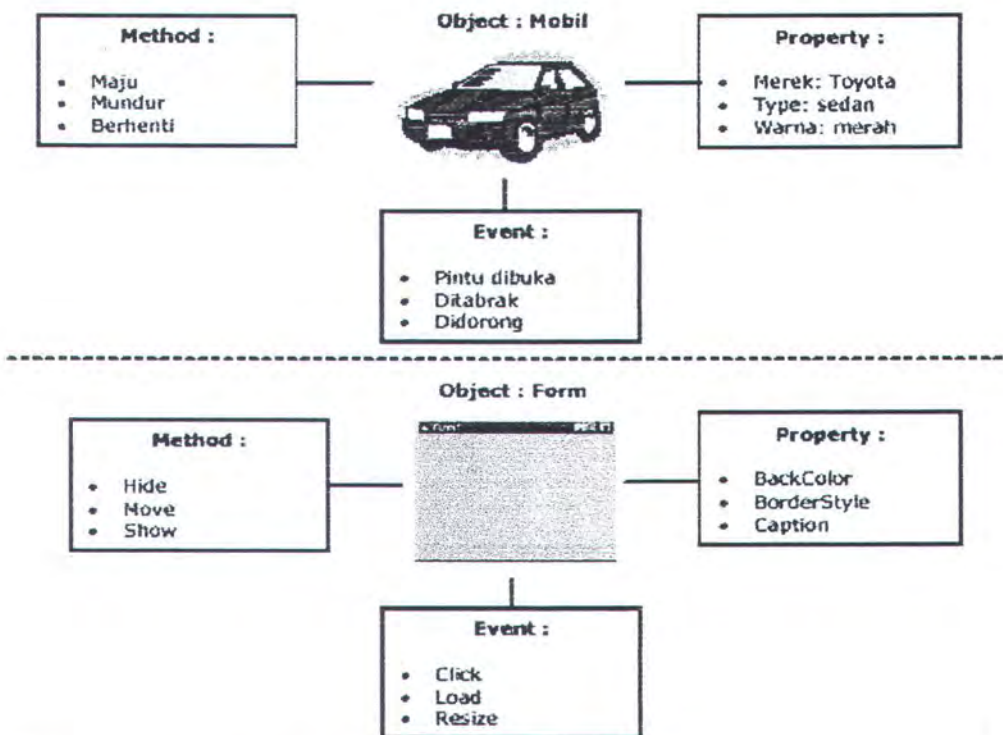


Picture 2.8 Example of Martin Style ER diagram notations (www.utexas.edu, 2004)

2.8 Software Development Using Microsoft Visual Basic 6.0

According to *www.ilmukomputer.com, (2003)*:

Visual Basic is one of computer language programming. Language programming is a command that understood by the computer to do certain duties. Visual Basic language programming that developed by Microsoft since year 1991, representing development from its predecessor that is BASIC (Beginners All-Purpose Symbolic Instruction Code) language programming that developed at 1950-an. Visual Basic is one kind of Development Tool that use to make assorted of computer program, especially a computer program that used Windows operating system. Visual Basic represent a language programming that supporting object (Object Oriented Programming = OOP). In object Oriented Programming (OOP), there is some term that we must understand that term is: property, method and event where the explanation shall be as follows:

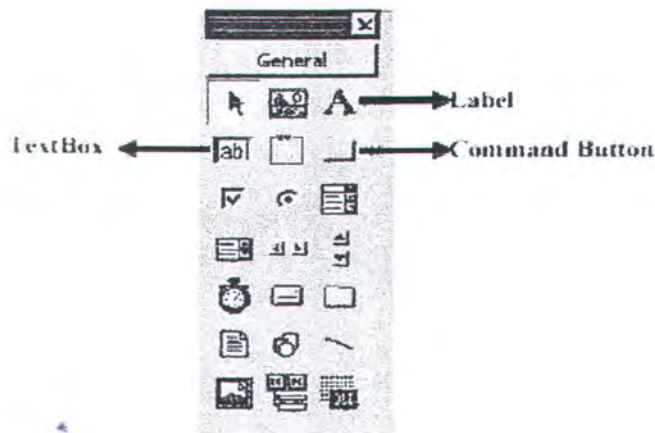


Object : Component in a program
Property : Characteristic owned by the object
Method : Action which can be done by the object
Event : Occurrence which can be experienced of by the object

Picture 2.9 Object, Method, Property and Event explanation

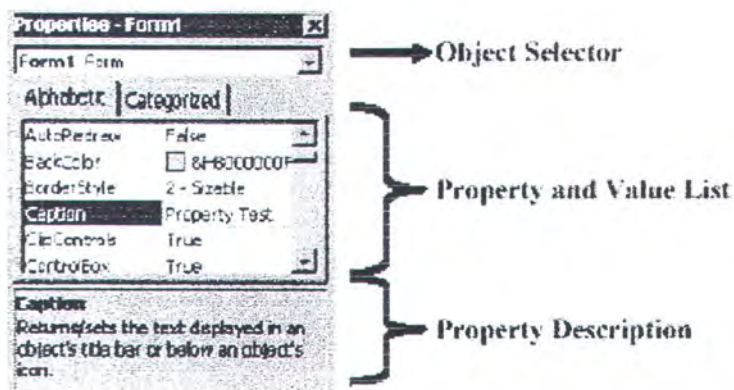
(*www.ilmukomputer.com, 2003*)

Window Form of Visual Basic has the character of the UI (User Interface), which we can develop by using a peripheral control of toolbox.



Picture 2.10 Visual Basic 6.0 Toolbox (www.ilmukomputer.com, 2003)

Besides by using Toolbox we also can arrange the appearance of our program by arranging Object Properties from the Form.



Picture 2.11 Visual Basic 6.0 Object Properties (www.ilmukomputer.com, 2003)

The example of form that have been editing:



Picture 2.12 Example of Form that have been editing (www.ilmukomputer.com, 2003)

Program that based on Windows have the character of event-driven, it's mean program that work based to the event that happened to the object in the program. For example, if a user clicking a knob hence program will give the "reaction" to the event click. The "reaction" that gives by Program will match according to the code program (algorithm) that made for event at certain object. The example of that code program (algorithm) is:

```
Private Sub Command1_Click()  
    Label2.Caption = Text1.Text  
End Sub  
  
Private Sub Command2_Click()  
    End  
End Sub
```

Picture 2.13 Example of Code Program (Algorithm)

(www.ilmukomputer.com, 2003)

Algorithm from this program will we develop according to ER diagram which we have made previously, and the table form will we make as easy as possible for the user that will used this program later.

2.9 Data Base Management System using Microsoft SQL Server 2000

According to www.ilmukomputer.com, (2003):

MS SQL Server [is] one of popular product of Relational of Database Management System (RDBMS) at this moment. The main function of MS SQL Server is as database server arranging all depository process and data transaction. The popularities MS SQL Server latterly start increasing and equivalent with the closest competitor like Oracle 9i and Oracle 10g. In this time the newest version of MS SQL is MS SQL Server 2000, while SQL Server 2005 still in phase of Beta version. Version 2000 owning complete feature to start develop and build the application from the small scale up to big enterprise level. SQL Server 2000 owning some version for example

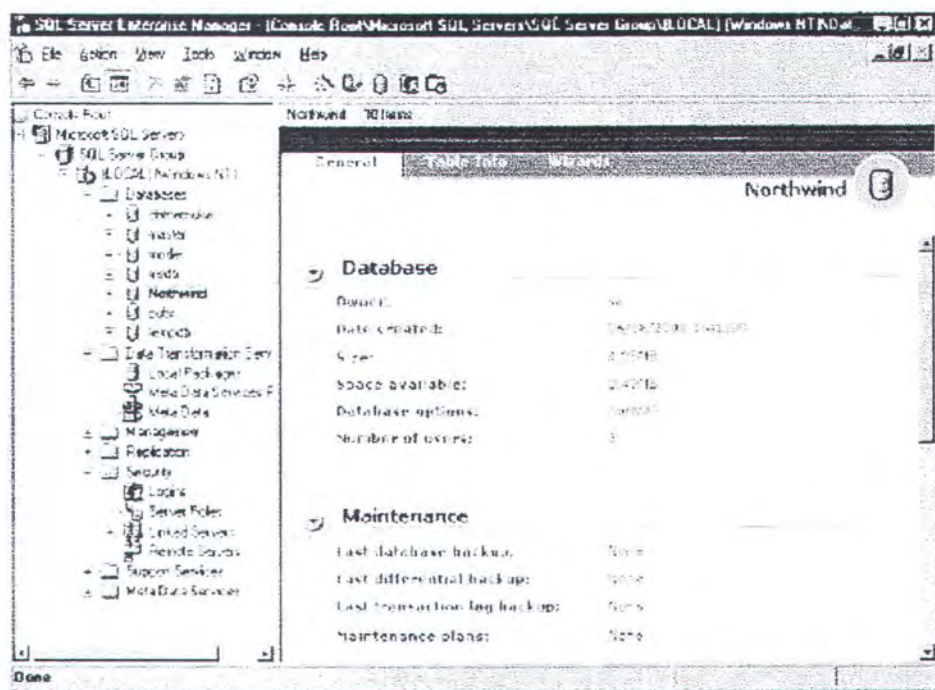
- SQL Server Personal Edition
- SQL Server Developer Edition
- SQL Server Enterprise Edition
- SQL Server of Standard Edition
- SQL Server Desktop Engine

- SQL Server for Windows CE Edition

Each version owns the difference in the case of maximum size measure database, RAM, number of connection, and also various feature continuation. Personal, Developer, and Desktop version earn to be install in OS Desktop like Windows 2000 Professional and Xp, while Enterprise and Standard version can only to be install in Windows 2000 / 2003 Server and also NT Server. Windows CE version commonly use for the PDA OF and Pocket PC.

2.9.1 Enterprise Manager from Microsoft SQL Server 2000

Enterprise Manager representing special and most often used interface by administrator database. These shares contain as big of fundamental function in arranging database.



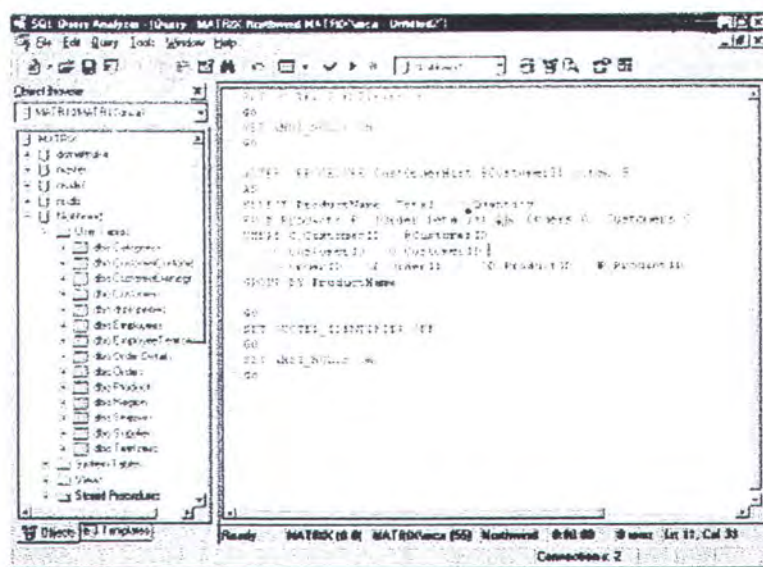
Picture 2.14 Microsoft SQL Server 2000 Enterprise Manager
(www.ilmukomputer.com, 2003)

In database folder presented various existing database. Master Database, model, msdb, and tempdb. This database represents the default system of database that needed by SQL Server to be function correctly. This fourth database may not be deleted or modification without knowledge answering the demand about SQL Server system, while Northwind and pubs is a sample

database which can be used to exercise the command of SQL and also administration job.

2.9.2 Query Analyzer from Microsoft SQL Server 2000

This tool represents the especial interface in conducting programming in MS SQL Server 2000. MS SQL Server 2000 used a language that call Transact SQL (T-Sql). You can make the command to take the data, sort the data, data manipulation and also conduct the certain calculation to a group of data in database. Script which has been made can be kept by as View and or Stored Procedure, as according to requirement in application.

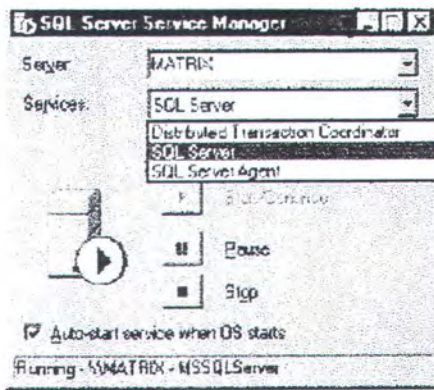


Picture 2.15 Microsoft SQL Server 2000 Query Analyzer
(www.ilmukomputer.com, 2003)

2.9.3 Service Manager from Microsoft SQL Server 2000

Service Manager is used to arrange the service that exist in SQL Server, that the service will be run or shutdown. A service manager also can be setup is to be walking automatically as Windows service, or run in manual. There are 3 services standard in every installation of default SQL Server that is:

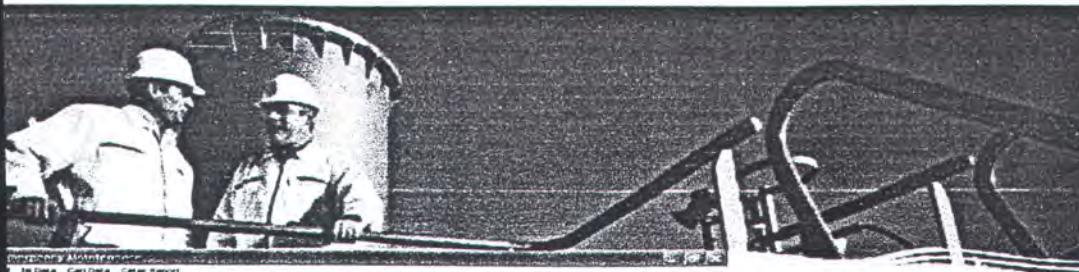
- Distributed Transaction Coordinator
- SQL Server
- SQL Server Agent



Picture 2.16 Microsoft SQL Server 2000 Service Manager
(www.ilmukomputer.com, 2003)



CHAPTER III
METHODOLOGY OF THE RESEARCH



SILAMAT DATANG DI EMERGENCY MAINTENANCE MODUL

Emergency Repair Work Detail Report

Requester Request ID: 19001
 Requester Name: DOKA SPM/2001
 Ship Name: PENGENSANGAN ARANG NAGA NATIONAL
 Ship Number: 8430
 Call Sign: 12181
 Ship Flag: INDONESIA
 Date: 1970
 Date From: 14/01/2001
 Date To: 17/01/2001
 Reporting Date Of Survey: 17/01/2001
 Reporting Date Of Survey: 17/01/2001
 Number Of Conditions Found: 1
 Type Of Condition: 0004 GULLY
 Name Of Last Visit: DANARASMAN
 Date Of Last Visit: 14/01/2001

Requester Detail ID: 190012001
 Requester Name: DOKA SPM/2001
 Ship Name: PENGENSANGAN ARANG NAGA NATIONAL
 Ship Number: 8430
 Call Sign: 12181
 Ship Flag: INDONESIA
 Date: 1970
 Date From: 14/01/2001
 Date To: 17/01/2001

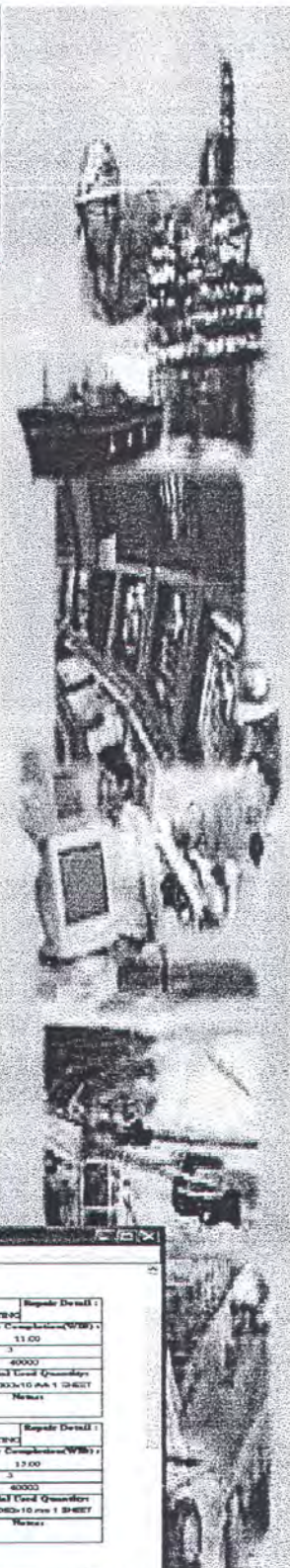
Material ID & Report Detail ID: 190001201

Material Name: D/PLY/SHELL/36-38
 Item Name: SHELL PLATING
 Location: 75 36-38
 Quantity: 1750x1050 mm 13 SHEET
 Material ID: 3000000
 Date Demand Material: 1/3/2001
 Approved Date: 1/3/2001
 Disburse Date: 1/3/2001
 Completion Date: 1/4/2001

Material ID & Report Detail ID	Item Name	Location	Quantity	Cost
190001201	D/PLY/SHELL/36-38 SHELL PLATING	75 36-38	1750x1050 mm 13	30000
190001201	D/PLY/STERN/36-38 STERN PLATING	75 36-38	3100x1050x10 mm 3	30000

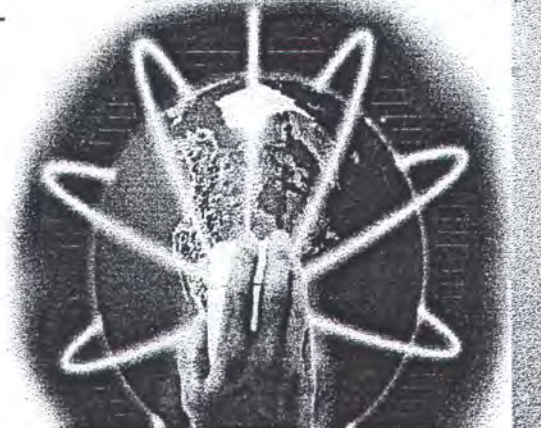
EMERGENCY REPAIR WORK DETAIL REPORT

Repair Work Detail ID (P/D)	No Item	Repair Object	Repair Method	Repair Detail
190001201	1	D/PLY/SHELL/36-38 SHELL PLATING	RENEWED SHELL PLATING	
Date For Issue/Work		Time For Issue/Work	Date For Completion/Work	Time For Completion/Work
1/3/2001		08.00	1/3/2001	11.00
Planned Work Time		Real Work Time		
3		3		
Labor		Labor Cost/Workshop		
40000		40000		
Material Specification	Material Demand Quantity	Material Supply Quantity	Material Used Quantity	
3000000	1750x1050 mm 13 SHEET	1750x1050 mm 13 SHEET	1750x1050 mm 13 SHEET	
Procurement Cost/Sp	Surcharge Cost/Sp	Total Cost/Sp	Name	
1000000	1000000	2000000		
190001201	2	D/PLY/STERN/36-38 STERN PLATING	RENEWED STERN PLATING	
Date For Issue/Work		Time For Issue/Work	Date For Completion/Work	Time For Completion/Work
1/3/2001		11.00	1/3/2001	13.00
Planned Work Time		Real Work Time		
3		3		
Labor		Labor Cost/Workshop		
40000		40000		
Material Specification	Material Demand Quantity	Material Supply Quantity	Material Used Quantity	
3000000	3100x1050x10 mm 3 SHEET	3100x1050x10 mm 3 SHEET	3100x1050x10 mm 3 SHEET	
Procurement Cost/Sp	Surcharge Cost/Sp	Total Cost/Sp	Name	
1000000	1000000	2000000		

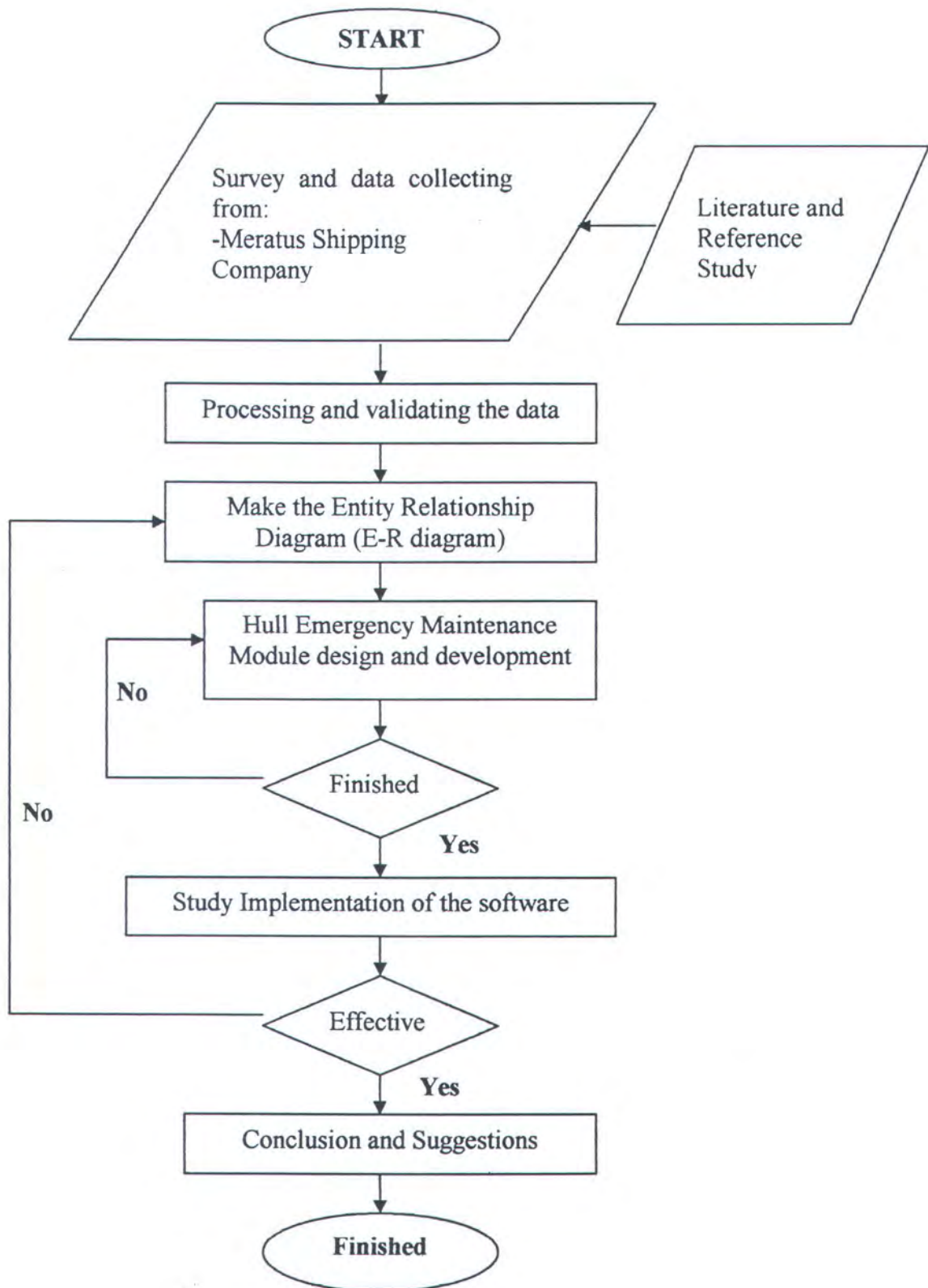


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CHAPTER III METHODOLOGY OF
 THE RESEARCH



CHAPTER III
METHODOLOGY OF THE RESEARCH



Picture 3.1 Methodology of the research flow chart

3.1 General

Methodologies represent a base framework which used as a reference to solve the problems that have been analyzed. These methodologies cover all action and stages that will be conducted for finishing this final project.

The method that we used in this final project is engineering research method. In this final project we develop software that we call Hull Emergency Maintenance Module to help to solve the hull emergency maintenance management problem that we found in Meratus Shipping Company. This software we develop using a Visual Basic 6.0 from Microsoft Company to build a user interface module, and we also use a Microsoft SQL Server 2000 to make the management database system for this software. We can see the flow chart that we used to develop this program is at **picture 3.1**. Methodologies that will we used as a reference of work sequences to finishing the problems will be explained more detailed in sub chapter in the following.

3.2 Idea formulation

The early idea for this research is inspiring from the hull emergency maintenance problem that we found in the Meratus Shipping Company. The hull emergency maintenance process still used a manually data transfer (paper based) so the hull emergency maintenance process are not optimal and need longer time. As global competition continue to increase the maritime industry need the new solution (tool) to optimize the inspection management process. With the growth of information technology we offer software which we give the name of Hull Emergency Maintenance Module so with this software it can help the Hull Emergency Maintenance process become optimal.

3.3 Survey and data collecting

To design and develop of Hull Emergency Maintenance Module we need available data that we will proceed to develop the data base for Hull Emergency Maintenance Module. The purpose of survey and data collecting is we must know about the business process for hull emergency maintenance activities in Meratus Shipping Company so with that business process we can develop our software compatible with Meratus Shipping Company. Data that we need to develop our module for example is Principal Dimension of the

ship, historical of hull emergency repair and hull emergency inspection data, data of ship route, data of material demand and supply material, data of repair list outsource, data from non conformity report, existing software for comparator etc. This data we get from the Meratus Shipping Company in fleet divisions. The method for survey and data collecting is:

1. Interview and consultancy with the Fleet Division from Meratus Shipping Company.
2. Take and record data and document example for hull emergency maintenance from the Meratus Shipping Company
3. Look for comparator software from Meratus Shipping Company (If available)

3.4 Literature and reference study

Beside the data from the Meratus Shipping Company we also need reference and study literature from book, internet and other relevant source to equipping our data, to develop our module and as basic theory to solve the problem so the result is accountable.

3.5 Processing and validating the data

Data that we get from phase of data collecting cannot directly we use to make the E-R diagram because data still in the form of raw data. So we need to process and to select the appropriate data as we needed.

To make and E-R diagram hence the business process data require to be learned and we must know about the working process and usher relationship between each division (information that required).

The step to make business process for hull emergency maintenance module is:

1. Defined the key maintenance area for Meratus Shipping Company
2. Defined the Hull Emergency Maintenance step and sequence
3. Make the Hull Emergency Maintenance business process for Meratus Shipping Company

3.6 The making of E-R Diagram

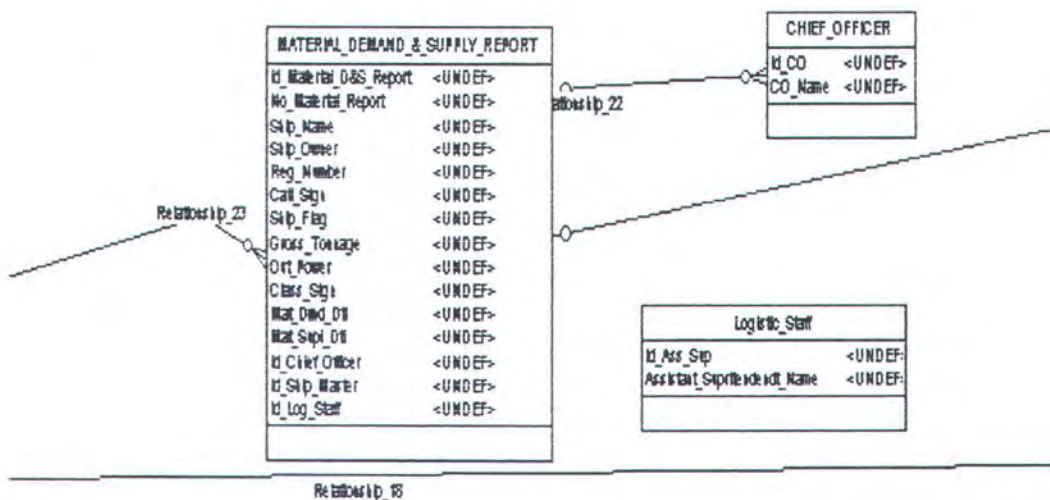
After we have been defined the task and sequence in hull emergency maintenance for each related person and unit in Meratus Shipping Company the next step is to make an entity relationship diagram (E-R diagram) for Hull Emergency Maintenance Module. E-R diagram is a tool to describe the data requirements and assumptions in the system from a top-down perspective. E-R diagram also illustrates the logical structure of a database. There are three basic elements in ER models:

1. Entities are the "things" about which we seek information.
2. Attributes are the data we collect about the entities.
3. Relationships provide the structure needed to draw information from multiple entities.

Developing an E-R diagram requires an understanding of the system and its components. The steps to build an E-R diagram are:

1. Define Entities: these are usually nouns used in descriptions of the system
2. Define Relationships: these are usually verbs used in descriptions of the system
3. Add attributes to the relations; these are determined by the queries, and may also suggest new entities, e.g. grade; or they may suggest the need for keys or identifiers. For the example above we can determine what questions can we ask? :
 - a. Which data is needed to monitor the ship?
 - b. Which information will be given to the ship manager?
 - c. Which report that will be given by class?
 - d. How much cost to supply material in repair work?
 - e. What methods that will be used by outsource to repair the damage?
 - f. Etc.
4. Add connectivity and cardinality to the relations. The connectivity of a relationship describes the mapping of associated entity instances in the relationship. The values of connectivity are "one" or "many". The cardinality of a relationship is the actual number of related occurrences for each of the two entities. The steps to add connectivity and cardinality are:

- a. Many-to-Many must be resolved to two one-to-many with an additional entity
 - b. Usually automatically happens
 - c. Sometimes involves introduction of a link entity (which will be all foreign key)
5. This flexibility allows us to consider a variety for the example above the questions such as:
- a. Which Ship need to be survey?
 - b. Which department will handle the material supply?
 - c. Which part of the hull needs to be survey?
 - d. Which test needs to perform in survey?
 - e. Etc.
6. Represent that information with in table. Generally E-R Diagrams can define in table:



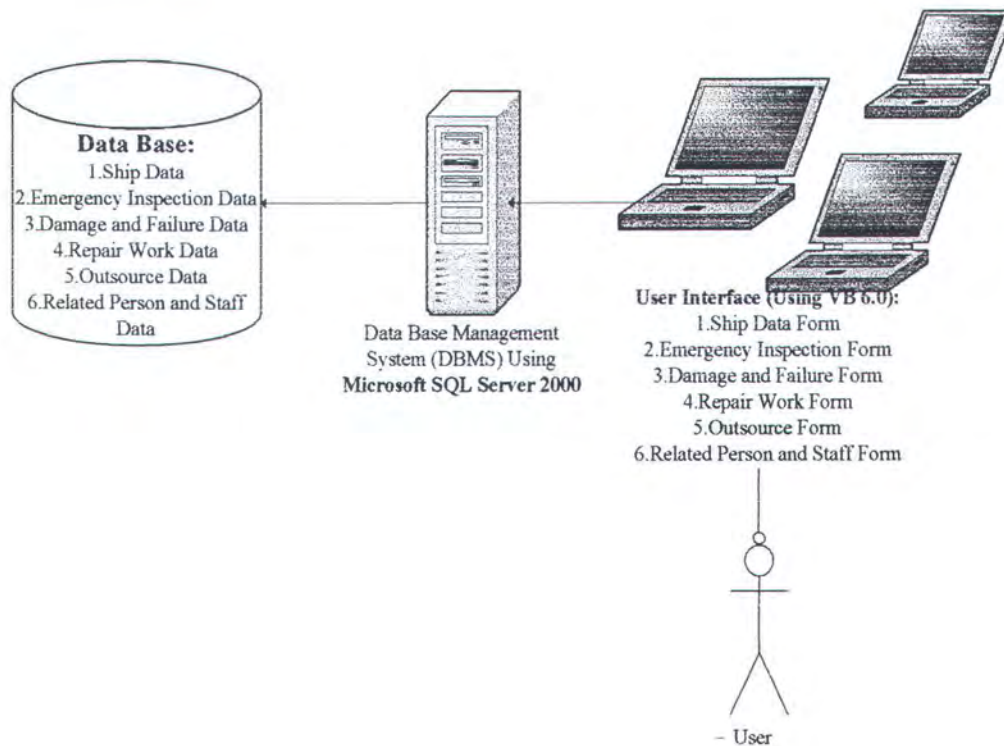
Picture 3.2 Table representation of E-R Diagram

3.7 Hull Emergency Maintenance Module Design and Development

Design and Development of this Hull Inspection module will be dividing in to 2 sub systems that is:

1. Database Design
2. User Interface Subsystem Design

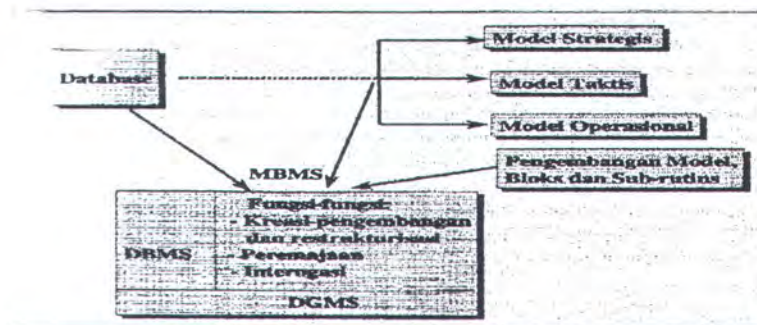
The relation between these two components can be seeing at this picture below:



Picture 3.3 Relation between 2 Subsystems in Hull Emergency Maintenance Module

1. Database design

Data subsystem represents the component of data store for system. Data kept in an organizational data base by a system that called database management system (DBMS). Through DBMS data can be taken and extract swiftly. In schematically, data subsystem can be described as following:



Picture 3.4 Data Base Subsystem

As for stages the steps to design of data subsystem shall be as follows:

a. Analysis step

At this phase is analyzed a relation that happened among entity

b. Logical database design step

At this step we adding an attributes to the entity and do the normalizing

c. Physical design step

At this step we will create a new table in form of physical.

In this research we use Microsoft SQL Server 2000 software to create database management system

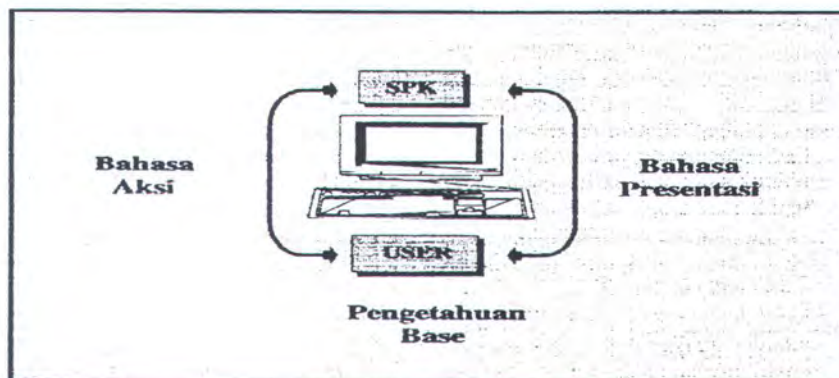
subcontractor				
	Column Name	Data Type	Length	Allow Nulls
PK	SubCon_ID	char	6	
	SubContractor_Name	varchar	40	✓
	City	varchar	40	✓
	Address	varchar	20	✓
	Contac_Person	varchar	30	✓
	Phone	varchar	15	✓
	Email	varchar	20	✓

Picture 3.5 Physical table form in Microsoft SQL Server 2000

2. User interface subsystem design

User interface subsystem is facility that capable to integrate the system with the consumer interactively. Through this system the entire system can be articulated and implementation so that consumer can communicate with the designed system.

In schematically, user interface subsystem can be described as following:



Picture 3.6 User Interface Subsystem

In this research we use Microsoft Visual Basic 6.0 software to create user interface subsystem.



Picture 3.7 User Interface Main menu create using VB 6.0

3.8 Study implementation of the software

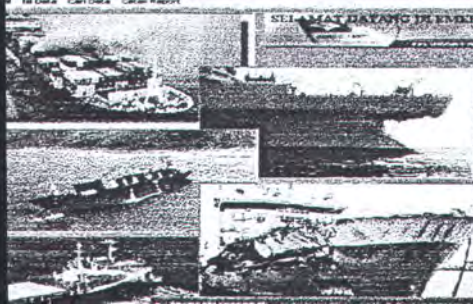
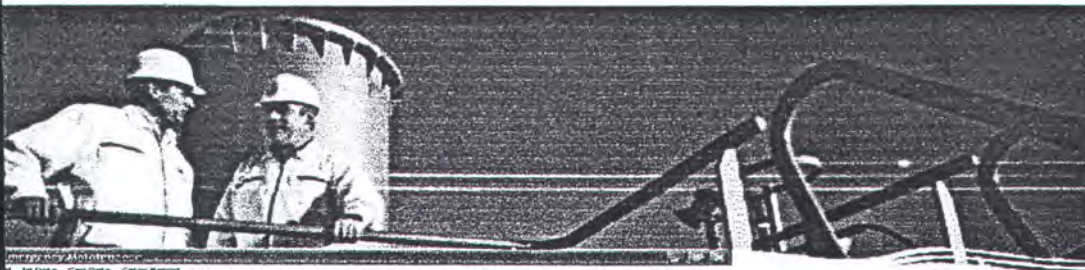
After the software is finished the software should we test about its effectiveness. One way of to test the effectiveness of the software is by executing the software through a case study and compare the result with the program that have been existed (if available) and do some repair if needed.

3.9 Conclusion and suggestion

At this phase we will make a conclusion about the effectiveness from this software. Whether the software has solved the existing problems that we formulated earlier or not? This conclusion also will be useful to make a software development in the future.



CHAPTER IV
SOFTWARE APPLICATION



SELAMAT HARIAN IN ENDRERGCV MAIN TENANCE MODUL

Responser Region ID: 11001 Unit: 11000
 No Request: 00042P/17/2001 Date: 2000/08/01/2000
 Ship Name: CAPARA JAYA NAGA IIS
 Ship Company: PT PENGEMBANGAN AIRLADA NAGAS NASIONAL
 Ship Number: 6428
 Call Sign: YE9H
 Ship Flag: INDONESIA
 Gross Tonnage: 3296 GRT: 3296
 Net Tonnage: 1650 NRT: 1650
 Gross Regt: 14.100 P.T.C.C
 Operating Date Of Survey: 1/3/2001 (Status: Not Approved)
 Loading Date Of Survey: 5/5/2001 (Status: Not Approved)
 Number Of Certificate Valid: 4
 Type Inspection: OCCASIONAL SURVEY
 No. Of Loss Visa: 0
 Flag Of Loss Visa: 0
 Date Of Loss Visa: 12/7/2001 (Status: Not Approved)
 Certificate Number: 1

Inspection Report No. Request	Ship Name	Ship Owner	Res. Month/Call Sign/Ship Flag	Class. Item	
20003	00042P/17/2001	CAPARA JAYA NAGA IIS	PTEN/DEMBANG/4435	YE9H INDONESIA	3296

Material D & Sheet Data No Demand Data No Item Item Name Location Quantity Cost

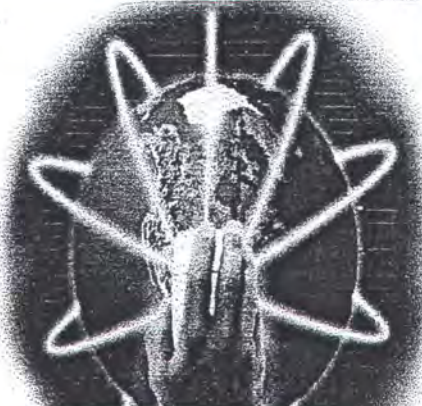
Material D & Sheet Data No Demand Data No Item	Item Name	Location	Quantity	Cost
MR0002301	1	D/PLY/SHELL/F55-SHELL PLATING	FS 36-39	1750x1500x10 mm 2000
MR0002301	2	D/PLY/STERN/F55STERN PLATING	FS 31-36	3100x1050x10 mm 2000

EMERGENCY REPAIR WORK DETAIL REPORT

Repair Work Detail ID (NO)	No Item	Repair Object	Repair Method	Repair Detail
EMRC0012001	1	D/PLY/SHELL/F55-39	SHELL PLATING REVERSED SHELL PLATING	
Date For Start/WBS	Time For Start/WBS	Date For Completion/WBS	Time For Completion/WBS	
1/5/2001	08.00	1/5/2001	11.00	
Planned Work Time	3	Actual Work Time	3	
Labour Cost/No Manpower				40000
Material Specification	Material Demand Quantity	Material Supply Quantity	Material Used Quantity	
1750x1500x10 mm 1 SHEET	1750x1500x10 mm 1 SHEET	1750x1500x10 mm 1 SHEET	1750x1500x10 mm 1 SHEET	
Material Cost/No	Material Cost/No	Material Cost/No	Material Cost/No	
300000	1000000	304000	None	
EMRC0012001	2	D/PLY/STERN/F55-36	STERN PLATING REVERSED STERN PLATING	
Date For Start/WBS	Time For Start/WBS	Date For Completion/WBS	Time For Completion/WBS	
1/5/2001	11.00	1/5/2001	12.00	
Planned Work Time	3	Actual Work Time	3	
Labour Cost/No Manpower				40000
Material Specification	Material Demand Quantity	Material Supply Quantity	Material Used Quantity	
3100x1050x10 mm 1 SHEET	3100x1050x10 mm 1 SHEET	3100x1050x10 mm 1 SHEET	3100x1050x10 mm 1 SHEET	
Material Cost/No	Material Cost/No	Material Cost/No	Material Cost/No	
300000	1000000	304000	None	



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CHAPTER IV

SOFTWARE APPLICATION

4.1 Meratus Shipping Company Profile

Meratus Shipping Company starts operating at October 1957 in Banjarmasin, South Kalimantan. With operated one ship that transporting food-stuff (especially rice) between Surabaya and Banjarmasin. This Company continues to growth and in the 1987 Meratus Shipping Company has 11 ships and in 1990 this company has 15 ships. Meratus Shipping Company representing first Indonesian shipping Company that serving transportation of interfiled container. Nowadays this Company has 29 ships that operated in Indonesia

4.2 Meratus Shipping Company Problem

Hull emergency maintenance plays an important part to restore the performance and safety from a ship. With the increasing of competition in shipping company Meratus Shipping Company need tool that make hull emergency maintenance faster and easy., with the development of information technology we can use the information technology to make software that helping the Meratus Shipping Company manage the hull emergency maintenance execution. The existing condition in Meratus Shipping Company there are don't have any software that helping the hull emergency maintenance execution, the data transfer for hull emergency maintenance execution still use manually hand written data transfer. From that situation we can try to develop the software that can help the hull emergency maintenance execution.

4.3 Defined Business Process for Hull Emergency Maintenance

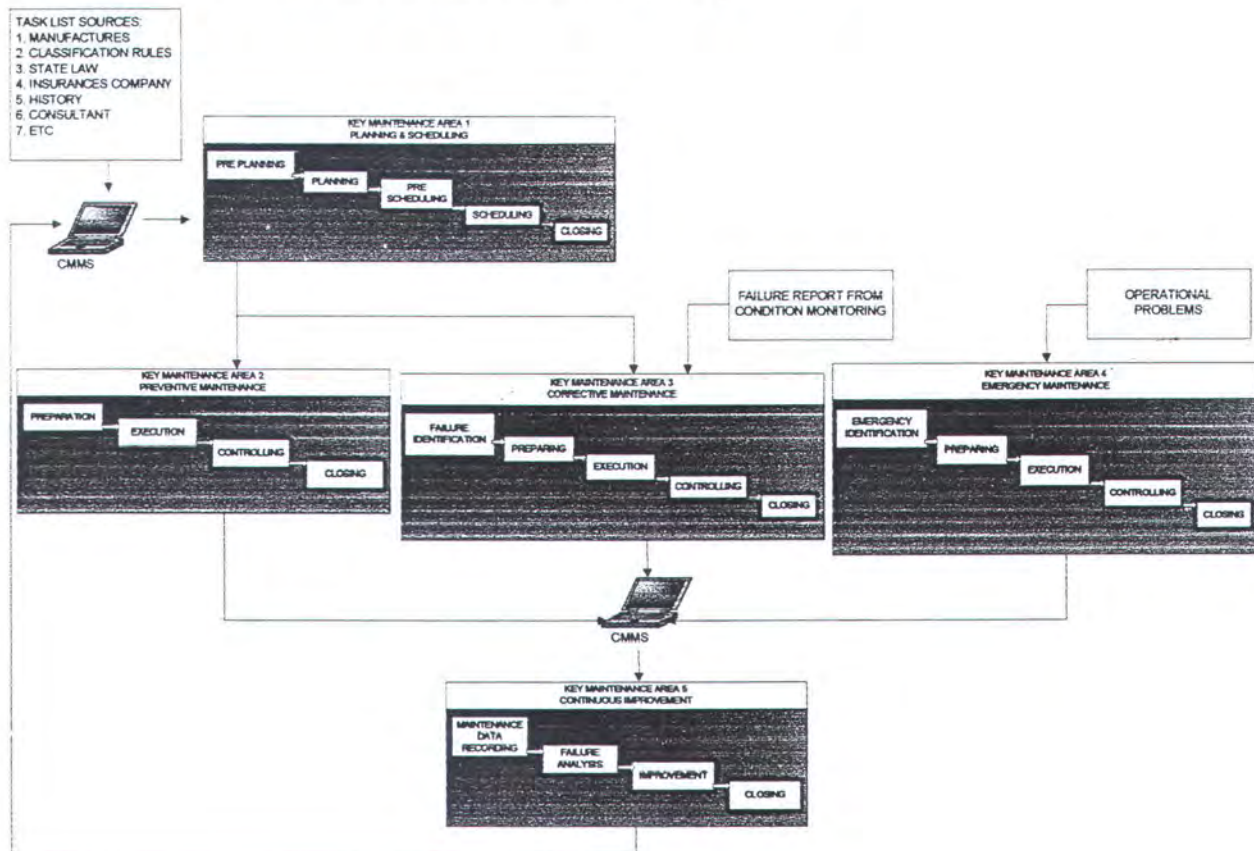
To define the business process for hull emergency maintenance the step are:

4.3.1 Defined Key Maintenance Area

The purpose of Key maintenance area is to defined the scope of maintenance part and relation between maintenance part in company or in

location where the maintenance executing. For Meratus Shipping Company we defined the key maintenance area become five parts and there are:

1. Key Maintenance area 1 : Planning & Scheduling
2. Key Maintenance area 2 : Preventive Maintenance
3. Key Maintenance Area 3 : Corrective Maintenance
4. Key Maintenance Area 4 : Emergency Maintenance
5. Key Maintenance Area 5 : Continuous Improvement



Picture 4.1 Key Maintenance Area in Meratus Shipping Company

Hull emergency maintenance as a part of emergency maintenance has five action sequence that must be accomplished that five sequences is:

1. Emergency Identification

The criteria that include as an emergency condition according to Meratus Shipping Company is:

- a. Salvage Contract
- b. Collision
- c. Grounding

- d. Abandoning the ship
 - e. Fire and Explosion
 - f. Main Engine Damaged
 - g. Auxiliary Engine Damaged
 - h. Ruder and Steering Gear Damaged
 - i. Oil Spill
2. Preparing

The preparing situation for hull emergency maintenance include all activity to prepare the hull emergency maintenance execution
 3. Execution

Execution part consist of all activities to repairing (restore) the ship that have been damaged by emergency condition
 4. Controlling

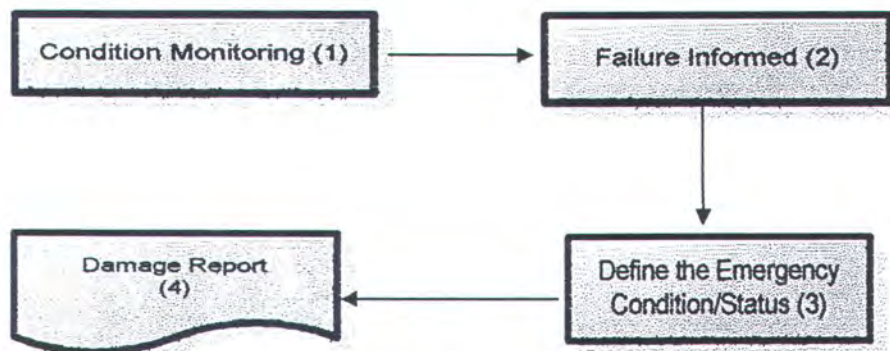
Controlling part consist of activities to control the repair (restoring) activities so the repair activities can work properly
 5. Closing

Closing part consist of endorsement activity from hull emergency maintenance execution

4.3.2 Defined the Hull Emergency Maintenance Step and Sequence

Like that we have been told in above, for the hull emergency maintenance there is five activities and sequence that must be accomplished. The detail for that's five activities is like this:

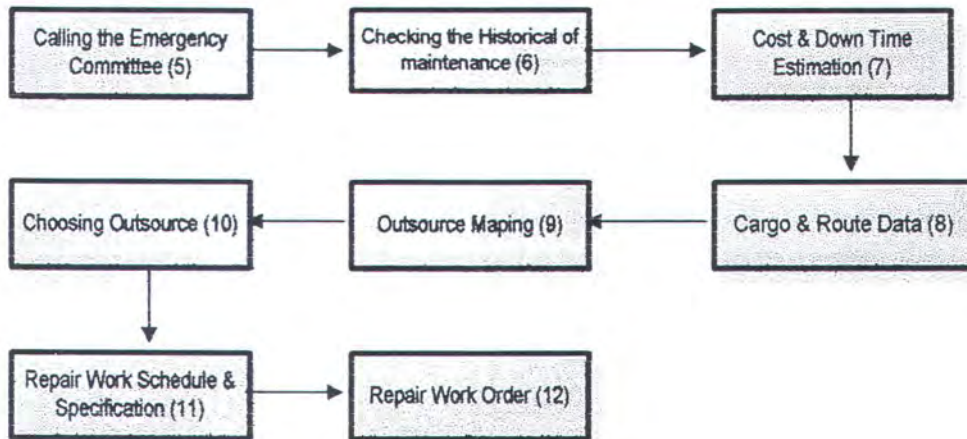
1. Emergency Identification



Picture 4.2 Emergency Identification sequence

The emergency identification sequences start with condition monitoring status for ship hull, if emergency condition occurs, the failure will be informed by chief officer. After the failure informed the chief officer and ship master will define the emergency status and if the status is emergency, chief officer will make damage and failure report that will be approved by ship master

2. Preparing



Picture 4.3 Preparing Sequence

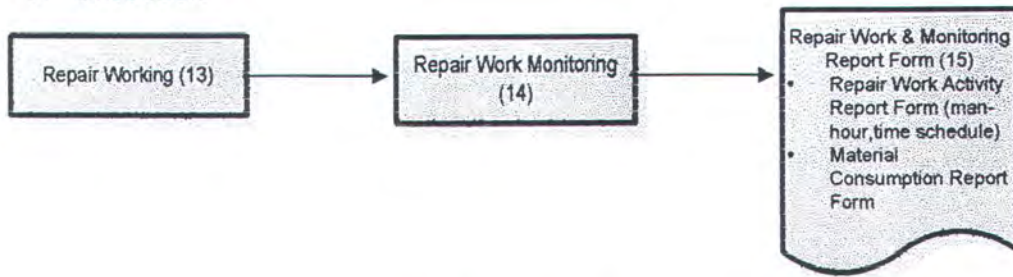
After the failure report has been reporting the Meratus Shipping Company will start to make an Emergency Committee. The Emergency Committee consists of:

- a. Shipmaster
- b. Superintendent
- c. Chief Officer
- d. Dock Monitoring
- e. Ship Manager
- f. Logistic Staff



After the emergency committee has been established they will check a Hull Emergency Maintenance History that became a consideration for estimating the cost for repair the ship. After that the Emergency committee also will check the shipping route for choosing the closest outsource from the ship. After the Emergency Committee choose the outsourcing they will make repair work order and list to restore the condition of ship

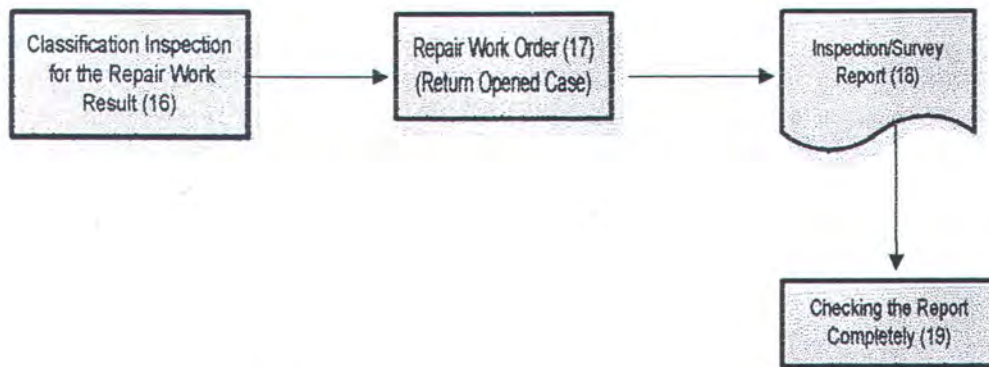
3. Execution



Picture 4.4 Execution Sequence

The repair working will be executed and will be monitored by the emergency committee, and the emergency committee also makes repair work and monitoring reports to report the repair activities that have been conducted.

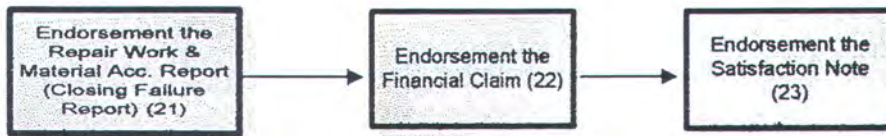
4. Controlling



Picture 4.5 Controlling Sequence

Because the ship has standards to be fulfilled and this standard is relegated to classification rules, so the controlling activity must involve the classification society to make surveys and monitoring for repair work. If the repairs match with classification regulations, the repair case will be closed. If the repairs still do not match with classification regulations, so the emergency maintenance will make a non-conformity report and order the repair work until the repair execution matches with classification regulations. Classification will make an inspection report that will become a consideration for the emergency committee.

5. Closing

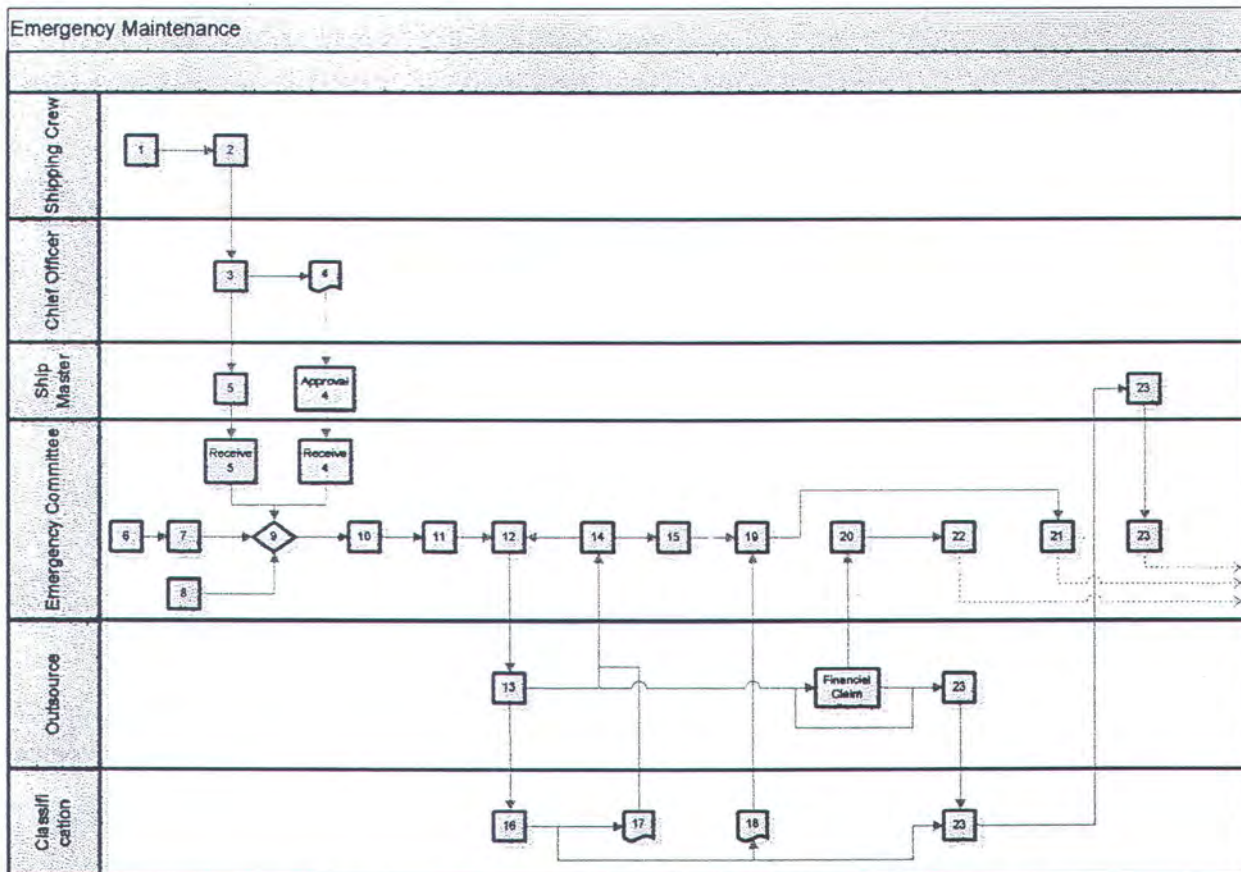


Picture 4.6 Closing Sequence

After the repair work have been closed so the next step is endorsement all activity that have been done in hull emergency maintenance execution. After the endorsement have been done so the work order for hull emergency maintenance have been closed

4.3.3 Make the Hull Emergency Maintenance Business Process for Meratus Shipping Company

After we defined the Hull Maintenance step and sequence so for the next step is we make the business process for Hull Emergency Maintenance execution. The business process is:



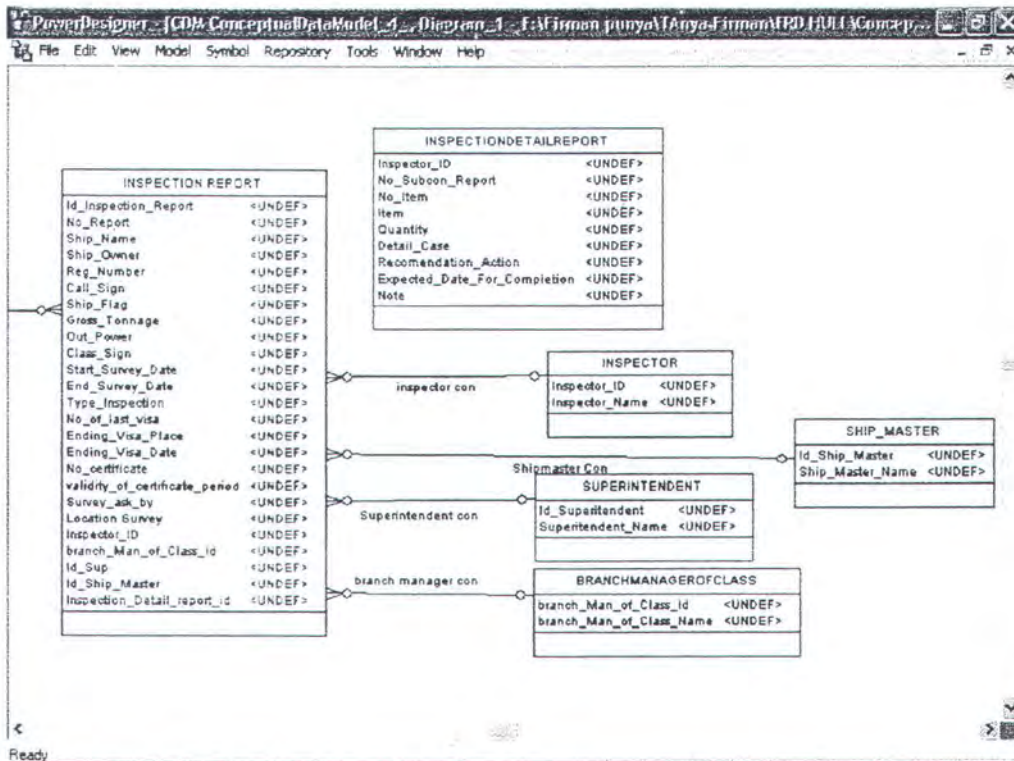
Picture 4.7 Hull Emergency Maintenance Business Process in Meratus Shipping Company

4.4 Constructing the E-R Diagram to Develop the Database

After we have been finished make business process for Hull Emergency Maintenance Module the next step is we are make an E-R Diagram to develop the database. E-R diagram is tool to describe the data requirements and assumptions in the system from a top-down perspective. E-R diagram also illustrate the logical structure of database. We constructing the E-R diagram using software Power designer 11, and the E-R Diagram are:

1. E-R Diagram for Hull Emergency Inspection Activities

This E-R diagram describe the data requirement that needed by Meratus Shipping Company and Classification society when conducted the hull emergency inspection activities.



Picture 4.8 Hull Emergency Maintenance Inspection E-R Diagram

Database table that have relation with E-R Diagram for Hull Emergency Inspection:

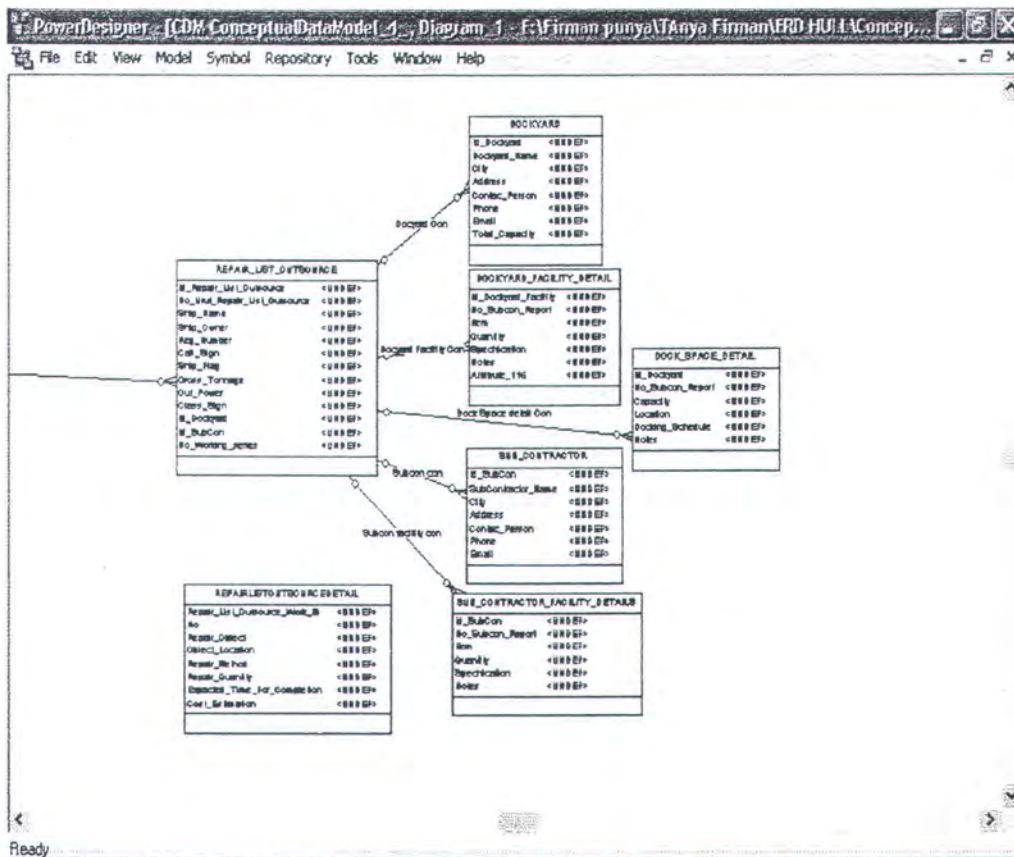
Table	Field	Field Explanation
Inspection Report	-Inspection Report ID	-The ID for Inspection Report
	-No Report	-Inspection Report Number
	-Ship Name	-Name of Ship
	-Ship Owner	-The Owner of Ship

	<ul style="list-style-type: none"> -Reg Number -Call Sign -Ship Flag -Gross Tonnage -Out Power -Class sign -Starting date of survey -Ending date of survey -Type inspection -No of Last Visa -Place of Last Visa -Date of Last Visa -Certificate Number -Validity of Certificate Period -Survey asked by -Survey location -Inspector ID -Branch manager of class ID -Superintendent ID -Ship Master ID -Inspection Detail ID 	<ul style="list-style-type: none"> -Ship Registration Number -Ship Call Sign -Ship Flag -Ship Gross Tonnage -Ship Out Power -Ship Class Sign -Starting date of survey -Ending date of survey -Type of survey/inspection -Ship no of last visa -Place of last visa -Date of last visa -Class certificate number -Validity Class Certificate -Party that asked survey -Location of Survey -ID of Inspector -ID of Branch manager of Class -ID of Superintendent -ID of Ship Master -ID of Inspection Detail Report
Inspection Detail Report	<ul style="list-style-type: none"> -Inspection Detail ID -No -No Item -Quantity -Detail Case -Recommendation Action -Excepted Date for Completion -Notes 	<ul style="list-style-type: none"> -ID of Inspection Detail Report -No Item on Report -No Demand Item -Quantity of Item -Detail of Inspection Result -Recommendation Action from Class -Excepted date for repair the damage -Notes
Branch Manager Of Class	<ul style="list-style-type: none"> -Branch Manager of Class ID -Branch Manager of Class Name 	<ul style="list-style-type: none"> -ID of Branch Manager of Class -Name of Branch Manager of Class
Inspector	<ul style="list-style-type: none"> -Inspector ID -Inspector Name 	<ul style="list-style-type: none"> -ID of Inspector -Name of Inspector
Superintendent	<ul style="list-style-type: none"> -Superintendent ID -Superintendent Name 	<ul style="list-style-type: none"> -ID of Superintendent -Name of Superintendent
Ship Master	<ul style="list-style-type: none"> -Ship Master ID -Ship Master Name 	<ul style="list-style-type: none"> -ID of Ship Master -Name of Ship Master

Table 4.1 Hull Emergency Maintenance Inspection E-R Diagram Field

2. E-R Diagram for Hull Emergency Maintenance Repair List Outsource

This E-R diagram describes the data requirement that needed by Meratus Shipping Company to choose Repair List Outsource (Dockyard and Subcontractor) and report their activities for hull emergency maintenance execution.



Picture 4.9 Hull Emergency Maintenance Repair List Outsource E-R Diagram

Database table that have relation with E-R Diagram for Hull Emergency Maintenance Repair List Outsource:

Table	Field	Field Explanation
Repair List Outsource	-Repair List Outsource ID	-The ID for Repair List Outsource Report
	-No Report	-Repair List Outsource Report Number
	-Ship Name	-Name of Ship
	-Ship Owner	-The Owner of Ship
	-Reg Number	-Ship Registration Number
	-Call Sign	-Ship Call Sign
	-Ship Flag	-Ship Flag
	-Gross Tonnage	-Ship Gross Tonnage
	-Out Power	-Ship Out Power

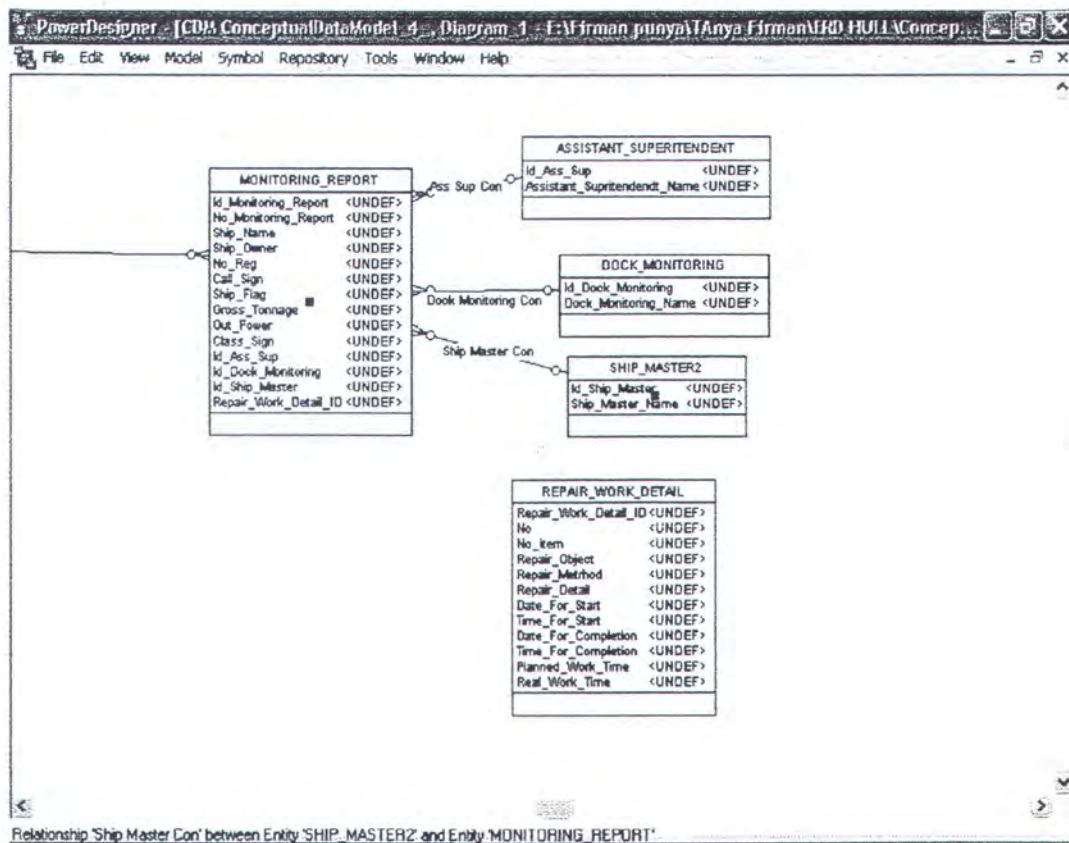
	<ul style="list-style-type: none"> -Class sign -Dockyard ID -Subcon ID -Repair List Outsource Work ID 	<ul style="list-style-type: none"> -Ship Class Sign -ID of Dockyard -ID of Subcontractor -ID of Repair List Outsource Detail Work Report
Repair List Outsource Detail	<ul style="list-style-type: none"> -Repair List Outsource Work ID -No -Repair Object -Object Location -Repair Method -Repair Quantity -Expected Time For Completion -Cost Estimation 	<ul style="list-style-type: none"> -ID of Repair List Outsource Detail Work Report -No Item on Report -Detail of Repair Object -Location of Repair Object -Method to Repair Object -Quantity of Object that have been Repair -Excepted date for completed the repair working -Cost Estimation to Repair Object
Dockyard	<ul style="list-style-type: none"> -Dockyard ID -Dockyard Name -City -Address -Contact Person -Phone -Email -Total Capacity 	<ul style="list-style-type: none"> -ID of Dockyard -Name of Dockyard -City where Dockyard placed -Dockyard Address -Contact Person from Dockyard -Dockyard Phone -Dockyard Email -Total Capacity of Dockyard
Dock Space Detail	<ul style="list-style-type: none"> -Dockyard ID -No Dockyard -Capacity -Location -Docking Schedule 	<ul style="list-style-type: none"> -ID of Dockyard -Number of Dock at Dockyard -Capacity of Dock -Location of Dock -Ship Docking Schedule
Dockyard Facility	<ul style="list-style-type: none"> -Dockyard ID -No Dockyard -Item -Quantity -Specification -Notes 	<ul style="list-style-type: none"> -ID of Dockyard -Number of Dock at Dockyard -Item of Facility -Quantity of Item at Dockyard -Specification of Item -Notes
Subcontractor	<ul style="list-style-type: none"> -SubCon ID -SubContractor Name -City -Address -Contact Person 	<ul style="list-style-type: none"> -ID of Subcontractor -Name of Subcontractor -City where Subcontractor placed -Subcontractor Address -Contact Person from

	-Phone -Email	Subcontractor -Subcontractor Phone -Subcontractor Email
SubconFacility	-SubCon ID -No -Item -Quantity -Specification -Notes	-ID of Subcontractor -No of Item at Subcontractor -Item of Facility -Quantity of Item at Subcontractor -Specification of Item -Notes

Table 4.2 Hull Emergency Maintenance Repair List Outsource E-R Diagram Field

3. E-R Diagram for Hull Emergency Maintenance Monitoring

This E-R diagram describes the data requirement that needed by Meratus Shipping Company to Monitoring Repair work activities that have been done by Dockyard, Subcontractor or Ship Crew and report their activities for Meratus Shipping Company.



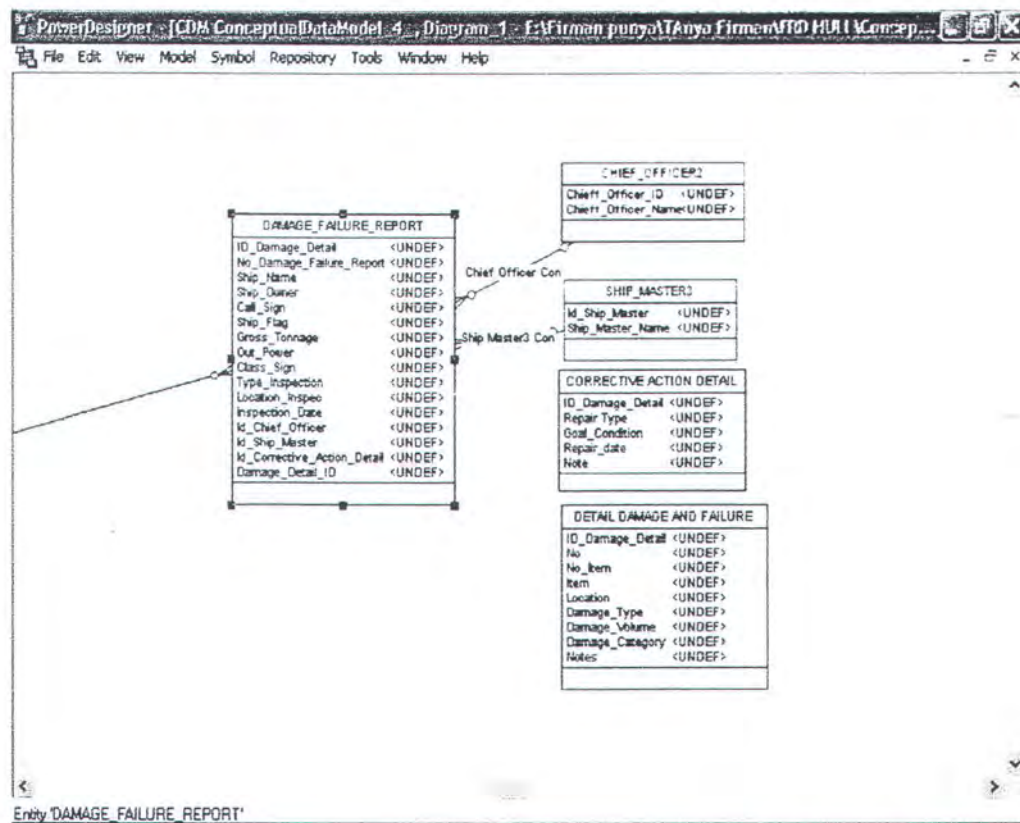
Picture 4.10 Hull Emergency Maintenance Monitoring E-R Diagram

Database table that have relation with E-R Diagram for Hull Emergency Maintenance Monitoring:

Table	Field	Field Explanation
Monitoring Report	-Monitoring Report ID -No Report -Ship Name -Ship Owner -Reg Number -Call Sign -Ship Flag -Gross Tonnage -Out Power -Class sign -Assistant Superintendent ID -Dock Monitoring ID -Ship Master ID -Repair Work Detail ID	-The ID for Monitoring Report -Monitoring Report Number -Name of Ship -The Owner of Ship -Ship Registration Number -Ship Call Sign -Ship Flag -Ship Gross Tonnage -Ship Out Power -Ship Class Sign -ID of Assistant Superintendent -ID of Dock Monitoring -ID of Ship Master -ID of Repair Work Detail Report
Repair Work Detail	-Repair Work Detail ID -No -No Item -Repair Object -Repair Method -Repair Detail -Date For Start -Time For Start -Date For Completion -Time For Completion -Planned Work Time -Real Work Time	-ID of Repair Work Detail Report -No Item on Report -No Demand Item -Object that been Repair -Method to Repair Object -Detail Repair -Starting Date for Repair -Starting Time for Repair -Completion Date for Repair -Completion Time for Repair -Planned Work Time to Repair Object -Real Work Time to Repair Object
Dock Monitoring	-Dock Monitoring ID -Dock Monitoring Name	-ID of Dock Monitoring -Name of Dock Monitoring
Assistant Superintendent	-Assistant Superintendent ID -Assistant Superintendent Name	-ID of Assistant Superintendent -Name of Assistant Superintendent
Ship Master	-Ship Master ID -Ship Master Name	-ID of Ship Master -Name of Ship Master

Table 4.3 Hull Emergency Maintenance Monitoring E-R Diagram Field

4. E-R Diagram Hull Emergency Maintenance Damage and Failure Report
- This E-R diagram describes the Damage and Failure Report that occur when hull of ship have been hit by emergency situation. This also becomes the first consideration for Meratus Shipping Company to take the next action or step to handle the emergency situation.



Picture 4.11 Hull Emergency Maintenance Damage and Failure E-R Diagram

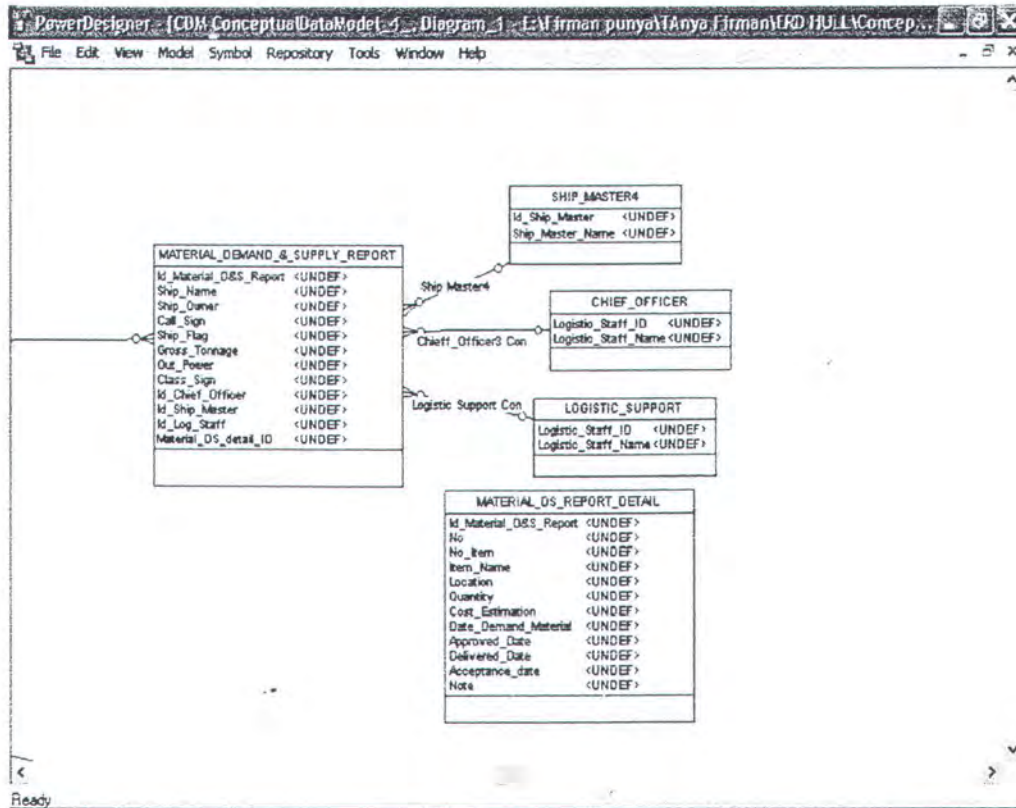
Database table that have relation with E-R Diagram for Hull Emergency Maintenance Damage and Failure:

Table	Field	Field Explanation
Damage and Failure Report	-Damage and Failure report ID	-The ID for Damage and Failure Report
	-No Report	-Damage and Failure Report Number
	-Ship Name	-Name of Ship
	-Ship Owner	-The Owner of Ship
	-Reg Number	-Ship Registration Number
	-Call Sign	-Ship Call Sign
	-Ship Flag	-Ship Flag
	-Gross Tonnage	-Ship Gross Tonnage

	<ul style="list-style-type: none"> -Out Power -Class sign -Type Inspection -Inspection Location -Date Of Inspection -Chief Officer ID -Ship Master ID -Corrective Action Detail ID -Damage Detail 	<ul style="list-style-type: none"> -Ship Out Power -Ship Class Sign -Type of Inspection -Location of Inspection -Date of Inspection -ID of Chief Officer -ID of Ship Master -ID of Corrective Action Detail -ID of Damage Detail
Damage Detail	<ul style="list-style-type: none"> -Damage Detail ID -No -No Item -Location -Damage Type -Damage Volume -Damage Category -Notes 	<ul style="list-style-type: none"> -ID of Damage Detail -No Item on Report -No Demand Item -Location of Object that have been Damage -Type of Damage -Volume of Damage -Category of Damage -Notes
Corrective Action Detail	<ul style="list-style-type: none"> -Corrective Action Detail ID -Repair Type -Goal Condition -Repair Date -Note 	<ul style="list-style-type: none"> -ID of Corrective Action Detail -Type of Repair that Conducted -Goal Condition of Repairing Object -Date of Repair -Note
Chief Officer	<ul style="list-style-type: none"> -Chief Officer ID -Chief Officer Name 	<ul style="list-style-type: none"> -ID of Chief Officer -Name of Chief Officer
Ship Master	<ul style="list-style-type: none"> -Ship Master ID -Ship Master Name 	<ul style="list-style-type: none"> -ID of Ship Master -Name of Ship Master

Table 4.4Hull Emergency Maintenance Damage and Failure E-R Diagram Field

5. E-R Diagram Hull Emergency Maintenance Material Demand and Supply
This E-R diagram describes the Material Demand and Supply Report for Meratus Shipping Company that needed to supply the material for repairing the ship hull that have been damaged by emergency condition



Picture 4.12 Hull Emergency Maintenance Material Demand and Supply
E-R Diagram

Database table that have relation with E-R Diagram for Hull Emergency Maintenance Material Demand and Supply:

Table	Field	Field Explanation
Material Demand and Supply Report	-Material Demand and Supply Report ID -No Report -Ship Name -Ship Owner -Reg Number -Call Sign -Ship Flag -Gross Tonnage -Out Power -Class sign -Chief Officer ID -Ship Master ID -Logistic Support ID -Material Demand and Supply Detail Report ID	-The ID for Material Demand and Supply Report -Material Demand and Supply Report Number -Name of Ship -The Owner of Ship -Ship Registration Number -Ship Call Sign -Ship Flag -Ship Gross Tonnage -Ship Out Power -Ship Class Sign -ID of Chief Officer -ID of Ship Master -ID of Logistic Support -ID of Material Demand and Supply Detail Report
Material Demand and Supply Report	-Material Demand and Supply Report Detail ID	-ID of Material Demand and Supply Detail Report

Detail	-No -No Item -Item Name -Location -Quantity -Cost Estimation -Date Demand Material -Approved Date -Delivered Date -Acceptance Date	-No Item on Report -No Demand Item -Name of Item -Location of Item on Hull -Quantity of Item -Cost Estimation of Item -Material Demand Date -Material Approved Date -Material Delivered Date -Material Acceptance Date -Real Work Time to Repair Object
Chief Officer	-Chief Officer ID -Chief Officer Name	-ID of Chief Officer -Name of Chief Officer
Logistic Support	-Logistic Support ID -Logistic Support Name	-ID of Logistic Support -Name of Logistic Support
-Ship Master	-Ship Master ID -Ship Master Name	-ID of Ship Master -Name of Ship Master

Table 4.5Hull Emergency Maintenance Material Demand and Supply E-R Diagram Field

4.5 Make Data Base Management System using Microsoft SQL Server 2000

After we finish make E-R Diagram for Hull Emergency Maintenance execution we can make the Database using Microsoft SQL Server 2000.

4.5.1 Define the Table Data Type

Before we start make data base table at Microsoft SQL Server 2000, we must defined the type of data that we will entered, because this will influence for designing the database in Microsoft SQL Server 2000. If the type of data between the data that we design in data base not match with the type of data that have been entered by user the error will occur.

In Microsoft SQL Server 2000 the type of data is like this:

1. Integer

This is numerical data which doesn't include the fraction (decimal). Enlist the type of data, range of data, and memory allocation at tables below:

Data Type	Data Range	Memory Allocation
bigint	-2^{63} (-9.223.372.036.854.775.808) Until	8 Byte

	$2^{63}-1$ (9.223.372.036.854.775.807)	
Int	-2^{31} (-2.147.483.648) Until $2^{31}-1$ (2.147.483.647)	4 Byte
smallint	-2^{15} (-32.768) Until $2^{15}-1$ (32.767)	2 Byte
tinyint	0 until 255	1 Byte
Bit	0,1 and null	1 Byte

Table 4.6 Integer data type, data range and memory allocation

2. Decimal and Numeric

This is numerical data that have real number and decimal number. The range of data is $-10^{38} + 1$ until $10^{38} - 1$. The account precision is between 1 until 38 with default number is 18. Memory allocation depend on account precision that used and that is between 5 Bytes until 17 Bytes

3. Money and Small Money

This is the numerical data that represent the currency. Enlist the type of data, range of data, and memory allocation at tables below:

Data Type	Data Range	Memory Allocation
money	-922.337.203.685.477.5808 Until 922.337.203.685.477.5807	8 Byte
Small money	-214.748.3648 Until 214.748.3647)	4 Byte

Table 4.7 Money and Small Money data type, data range and memory allocation

4. Float and Real

This is numerical data that represent data numeric floating point. This data type having character approximate its means all data in range can be

represent precisely. Enlist the type of data, range of data, and memory allocation at tables below:

Data Type	Data Range	Memory Allocation
float	-1.79E + 38 Until -2.23E – 38,0 and 2.23E – 38 until 1.79E + 38	Depend on Value (n)
real	-1.18E – 38, 0 and 1.18E – 38 Until 3.40E + 38	4 Byte

Table 4.8 Float and Real Money data type, data range and memory allocation

5. Date Time and Small Date Time

This is the data that represent the date and time. Enlist the type of data, range of data, and memory allocation at tables below:

Data Type	Data Range	Memory Allocation
datetime	1 January 1753 until 31 December 9999	8 Byte
smalldatetime	1 January 1900 until 6 juni 2079	4 Byte

Table 4.9 Datetime and Smalldatetime data type, data range and memory allocation

The precision of Date Time is 3, 33 millisecond and precision of smalldatetime is 1 minute

6. Char, VarChar and VarChar (Max)

This type is use to represent the non unicode character. **Char** is use to represent the character that have constant wide, **Varchar** is use to represent the data that have variable wide. The data range is from 1 until 8000, except for **Varchar (Max)** that can be until $2^{31} - 1$

7. nChar, nVarChar and nVarChar (Max)

This data type is same with the Char, Varchar and Varchar (Max), but this data type is use for UNICODE UCS-2 character

8. Binary, VarBinary and VarBinary (Max)

This data type is same with Char data type, but it us for binary data

9. Image

This data type is same with Varchar but it us for binary data that have range from 0 until $2^{31}-1$ or 2.147.483.647. This type is appropriate used for image data.

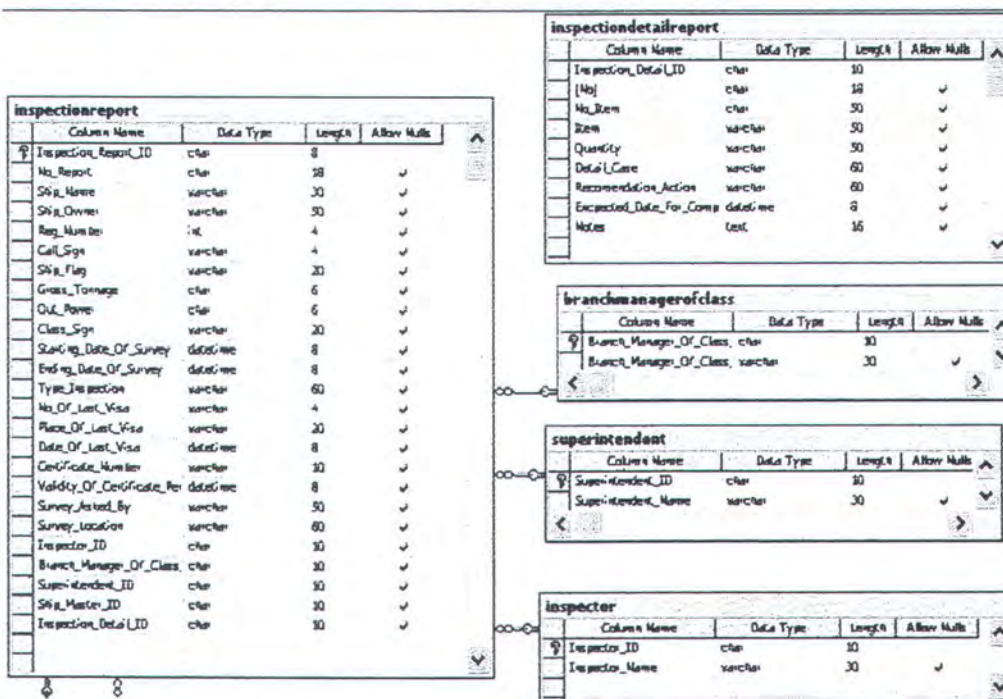
The table for Hull Emergency Maintenance that has been we design for the data type is like this:

1. Ship Data table design

shipdata				
	Column Name	Data Type	Length	Allow Nulls
PK	Ship_ID	char	4	
	Ship_Name	varchar	30	✓
	LOA	char	10	✓
	LPP	char	10	✓
	B	char	10	✓
	T	char	10	✓
	H	char	10	✓
	GRT	char	10	✓
	Shipping_Route_Name	varchar	30	✓
	Shipping_Route_Time	char	8	✓
	Voyage	int	4	✓
	Voyage_Time	int	4	✓

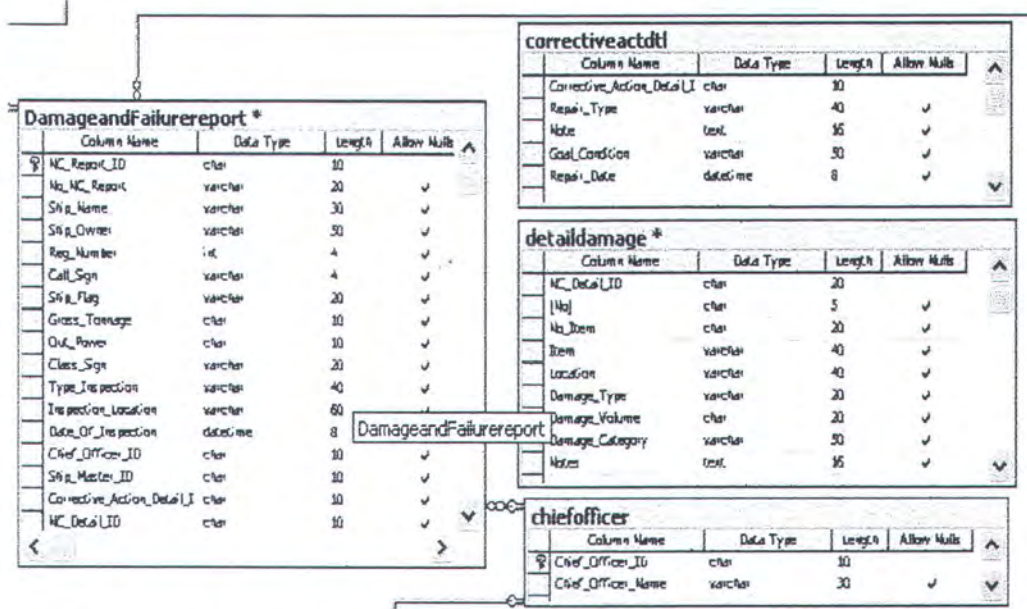
Picture 4.13 Ship data Table Design Using Microsoft SQL Server 2000

2. Hull Emergency Maintenance Inspection table design



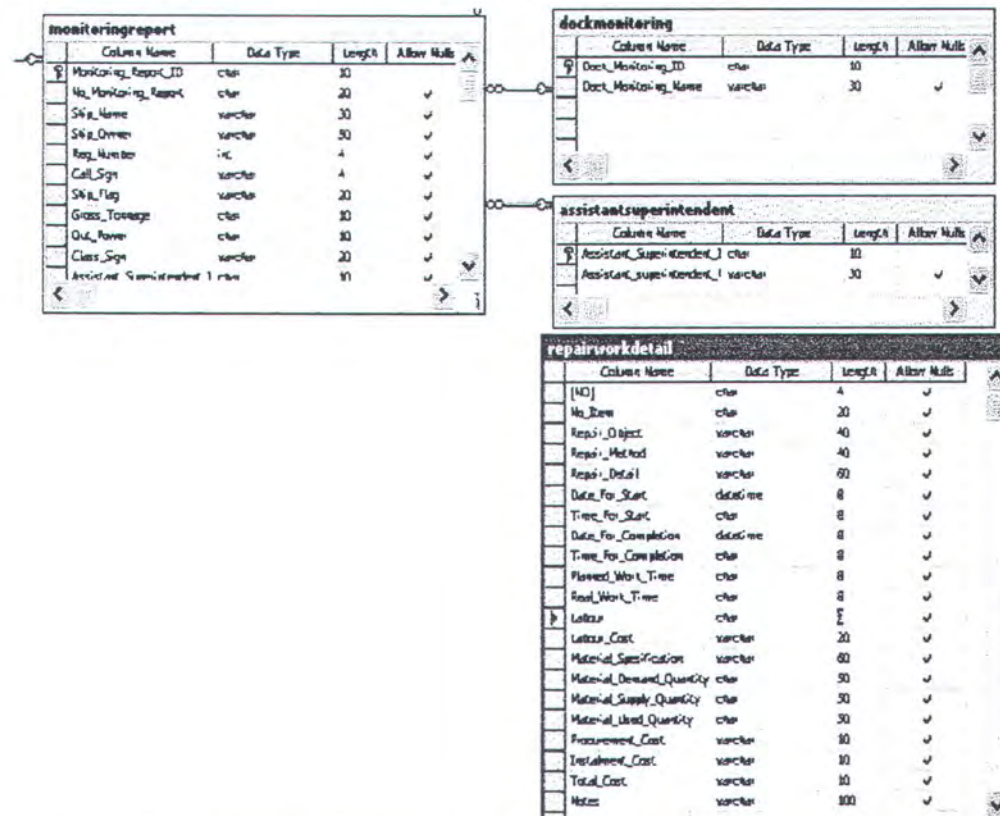
Picture 4.14 Hull Emergency Maintenance Inspection Table Design Using Microsoft SQL Server 2000

3. Hull Emergency Maintenance Damage and Failure table design



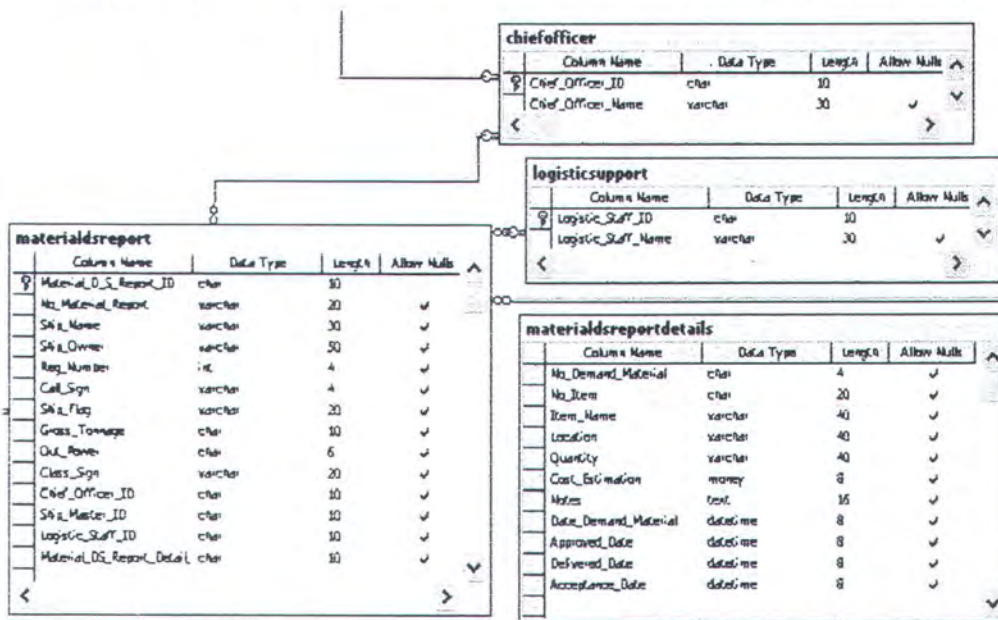
Picture 4.15 Hull Emergency Maintenance Failure and Damage table design using Microsoft SQL Server 2000

4. Hull Emergency Maintenance Monitoring table design



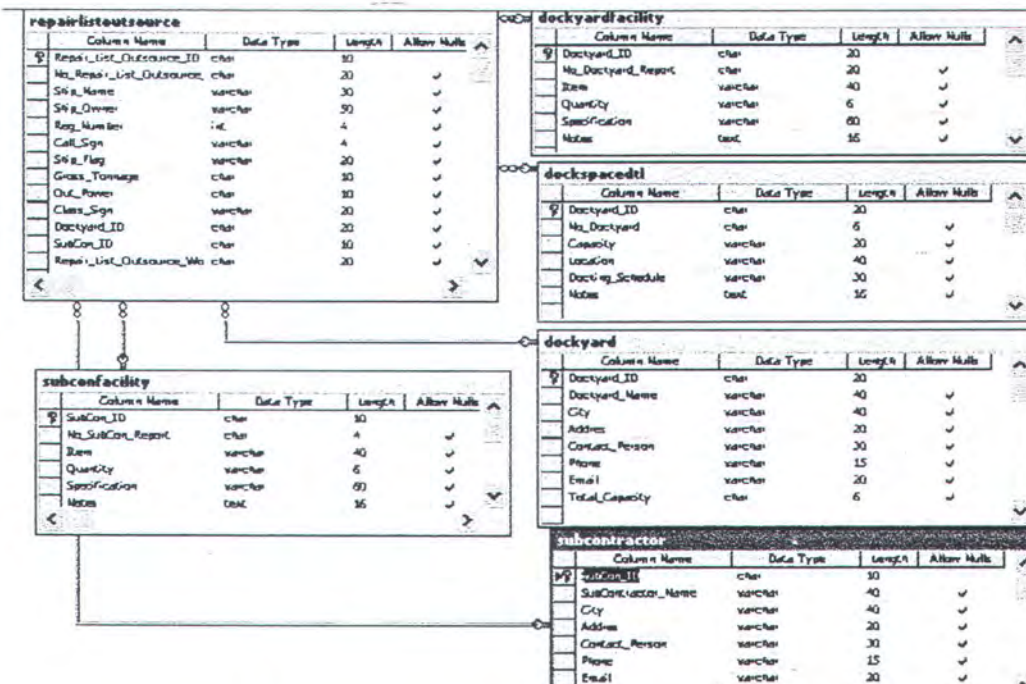
Picture 4.16 Hull Emergency Maintenance Monitoring table design Using Microsoft SQL Server 2000

5. Hull Emergency Maintenance Material Demand and Supply table design



Picture 4.17 Hull Emergency Maintenance Material Demand and Supply table design Using Microsoft SQL Server 2000

6. Hull Emergency Maintenance Repair list Outsource table design



Picture 4.18 Hull Emergency Maintenance Repair List Outsource table design Using Microsoft SQL Server 2000

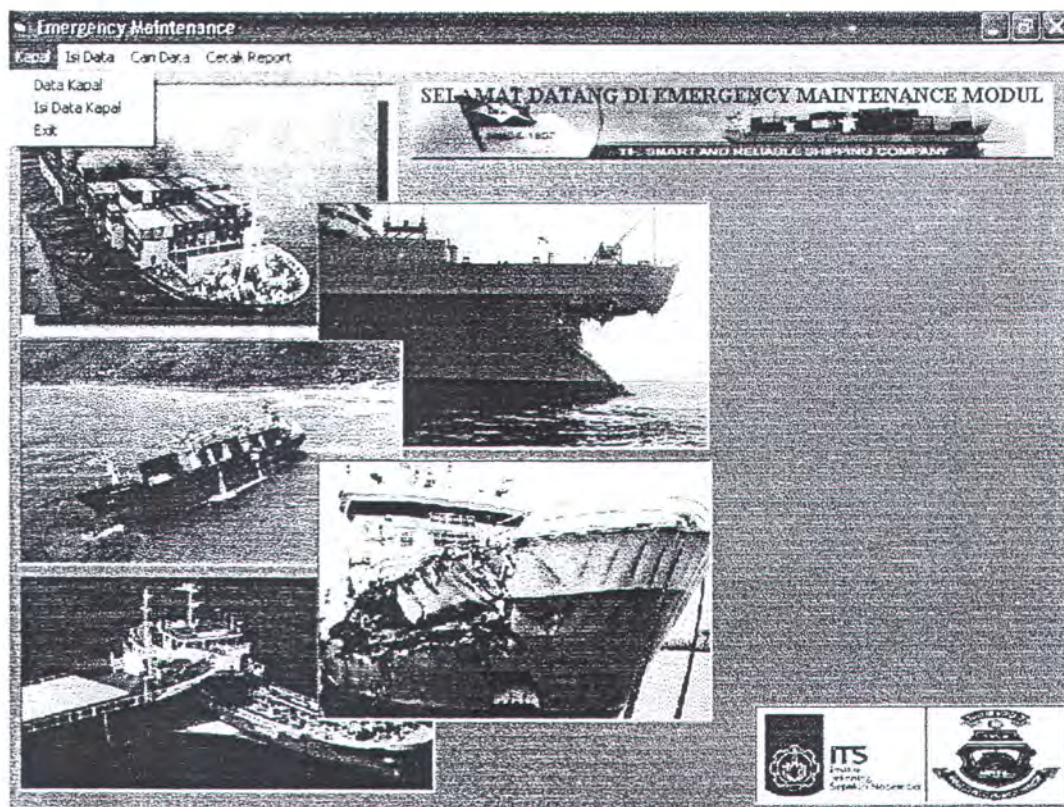
After we develop the table we can start to fill the data into the table. We also must see what data that Allow Nulls (the data is permitted not to be fill

4.6 Make User Interface (Module) using Microsoft Visual Basic 6.0

After we make database using Microsoft SQL Server the next step we make user interface (module) using Microsoft Visual Basic 6.0. That module is:

1. Main Menu Module

At first time this Hull Emergency Maintenance Module start we will show the Main menu form. This form is use as starting menu to choose other menu.

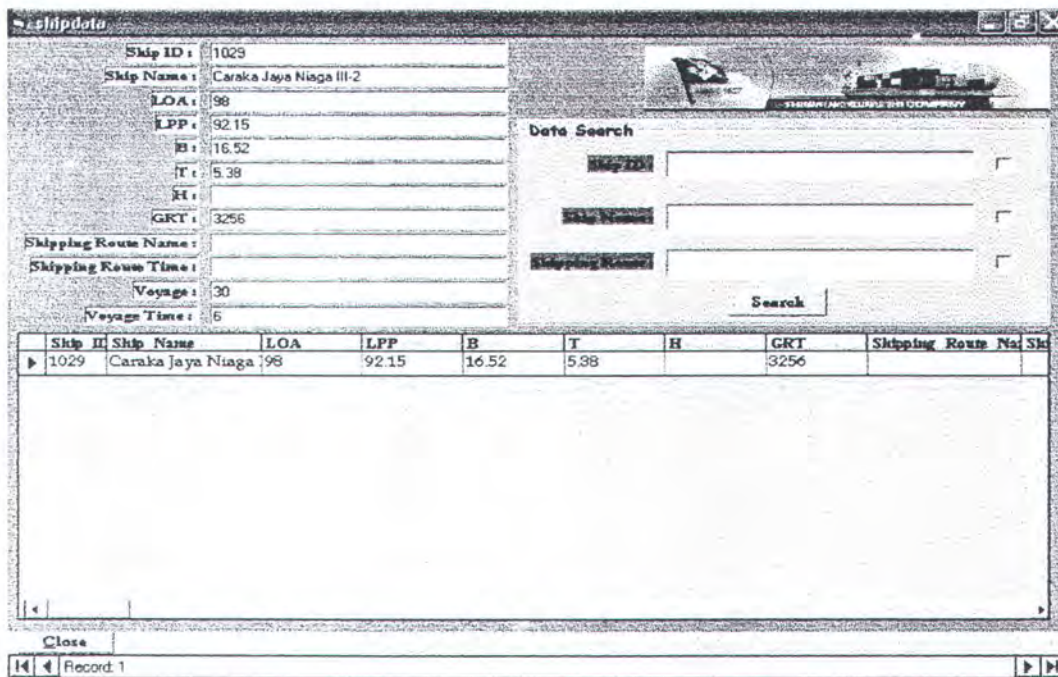


Picture 4.20 Main Menu Module

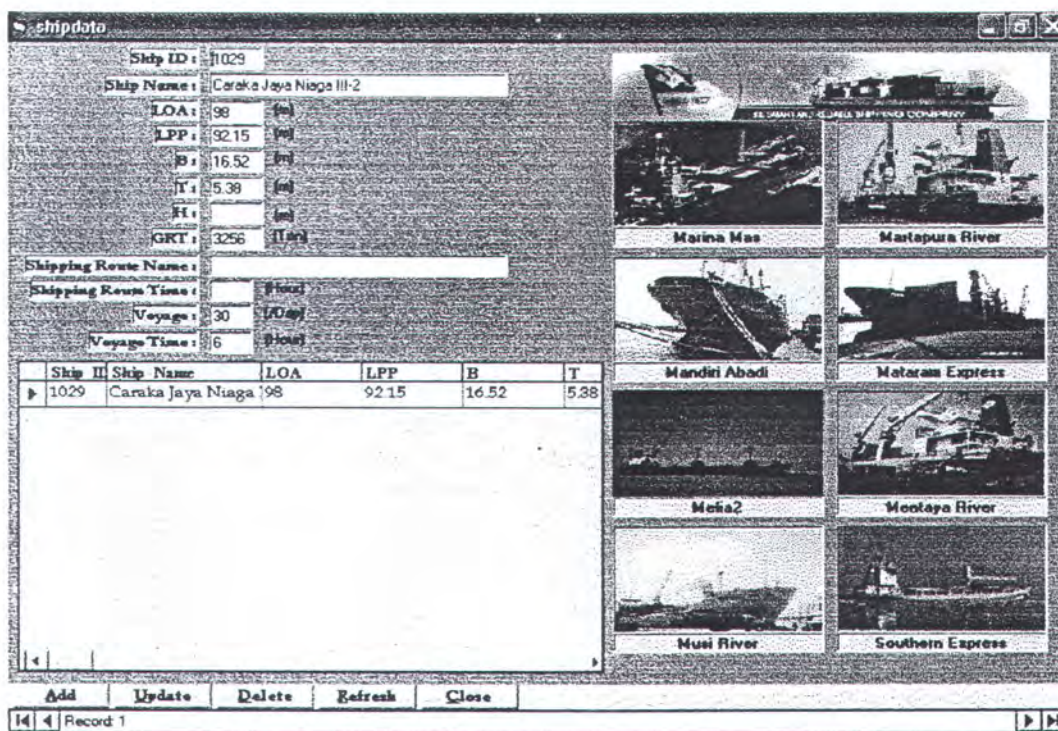
2. Ship Data Module

This form is divided into two sub module that is:

- a. Fill Ship Data Module. This module is use for fill Ship Data
- b. Search Ship Data Module. This module is use to search Ship Data



Picture 4.21 Module Search Ship Data



Picture 4.22 Fill Ship Data Module

3. Menu Fill Data

This Menu is use to fill data of Hull Emergency Maintenance Execution.

This Menu consists of:

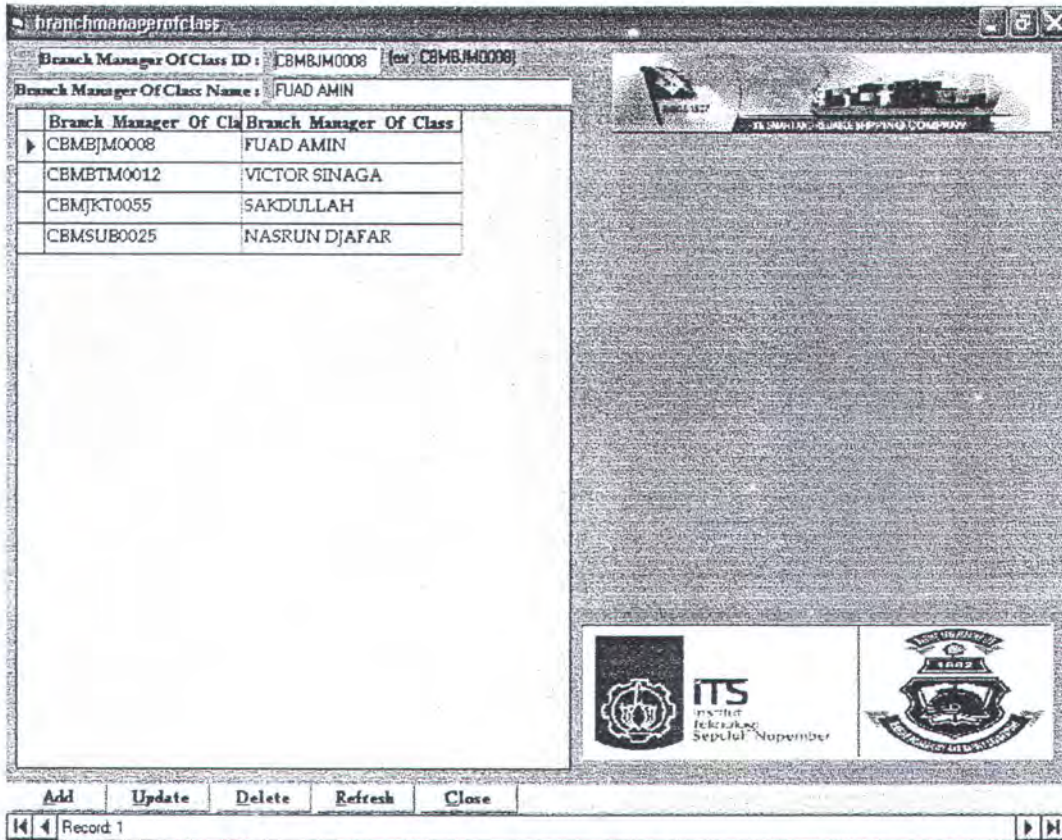
- a. Hull Emergency Maintenance Inspection Module. This Module is use to fill Hull Emergency Maintenance Inspection Data. The sample of the Module is:

Inspection Report No Report	Ship Name	Ship Owner	Reg Number	Call Sign	Ship Flag	Gross Tonnage
IR001	0004-SP/B1/2001 CARAKA JAYA NI	PT PENGEMBANG	4435	YEHH	INDONESIA	3256
IR002	0801-5B/B1/2003 CARAKA JAYA NI	PT PENGEMBANG	4435	YEHH	INDONESIA	3256

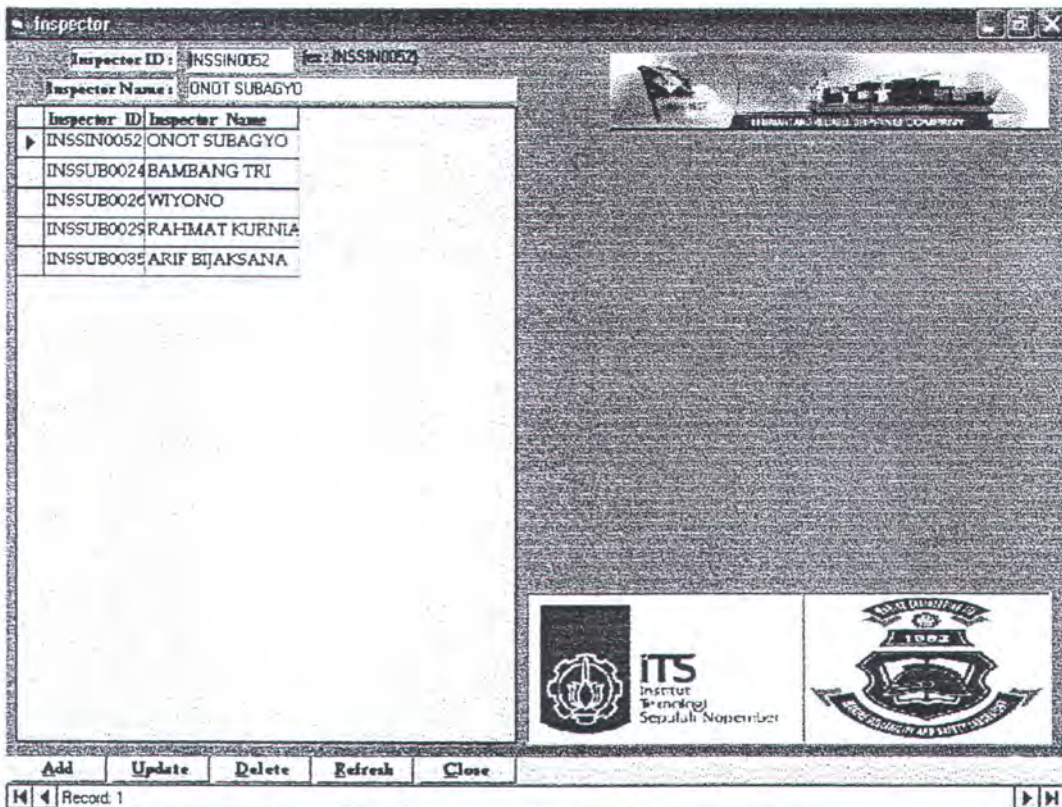
Picture 4.23 Fill Inspection Report Data Module

Inspection Detail No	No Item	Item	Quantity	Detail Case	Recommendation Act
IRD0012001	1	D/PLT/SHEEL/FS SHELL PLATING	1750x1300x	Damaged Part	Renewed as Follow
IRD0012001	2	D/PLT/STERN/FS STERN PLATING	3100x1050x	Damaged Part	Renewed as Follow

Picture 4.24 Fill Inspection Report Detail Data Module



Picture 4.25 Fill Branch Manager of Class Data Module



Picture 4.26 Fill Inspector Data Module

- b. Hull Emergency Maintenance Damage and Failure Module is. This Module is use to fill Hull Emergency Maintenance Damage and Failure Data. The sample of the Module is:

ancreport

NC Report ID: NCD001 (ex: NCD005)
 No NC Report: CJN1029/D-2001/0001 (ex: CJN1029/D-2005/0001)
 Ship Name: CARAKA JAYA NIAGA III-2
 Ship Owner: PT PENGEMBANGAN ARMADA NIAGA NASIONAL
 Reg Number: 4435
 Call Sign: YEHH
 Ship Flag: INDONESIA
 Gross Tonnage: 3256
 Out Power: 1650
 Class Sign: INDONESIA
 Type Inspection: OCCASIONAL SURVEY
 Inspection Location: SURABAYA
 Date Of Inspection: 1/3/2001 (Format: mm/dd/yyyy)
 Chief Officer ID: CDF10010 (ex: CDF1001002)
 Ship Master ID: SHM1001 (ex: SHM1001001)
 Corrective Action Detail ID: CAD0012 (ex: CAD0052005)
 NC Detail ID: NCD0012 (ex: NCD0052003) [Lihat Detail](#)

NC Report I/No NC Report	Ship Name	Ship Owner	Reg Num	Call Si	Ship Flag	Gross Tonn	Out
NC001	CJN1029/D-2001/CARAKA JAYA NI	PT PENGEMBANG	4435	YEHH	INDONESIA	3256	1650
NC002	CJN1029/D-2003/CARAKA JAYA NI	PT PENGEMBANG	4435	YEHH	INDONESIA	3256	1650

Add Update Delete Refresh Close

Record 1

Picture 4.27 Fill Damage and Failure Report Data Module

detailnc

NC Detail ID: NCD0012001 (ex: NCD0012005)
 No: 1
 No Item: D/PLT/SHELL/FS36-39 (ex: B/PLT/SHELL/FS36-39)
 Item: SHELL PLATING
 Location: FS 36-39
 Damage Type: DAMAGE PART
 Damage Volume: 1750x1300x10 mm
 Damage Category: MAYOR
 Notes:

NC Detail II/No	No Item	Item	Location	Damage Type	Damage Volu	Damage Cate
NCD0012001	1	D/PLT/SHELL/FS	FS 36-39	DAMAGE PART	1750x1300x10	MAYOR
NCD0012002	2	D/PLT/STERN/FS	FS 31-36	DAMAGE PART	3100x1050x10	MAYOR

Add Update Delete Refresh Close

Record 1

Picture 4.28 Fill Damage and Failure Detail Report Data Module


Corrective Action Detail ID: CAD0012001 (ex: CAD0012005)

Repair Type: RENEWED SIDE SHEEL

Goal Condition: SIDE SHELL HAVE BEEN RENEWED

Repair Date: 1/5/2001 (Format: mm/dd/yyyy)

Name:



Corrective Action Detail	Repair Type	Note	Goal Condition	Repair Date
CAD0012001	RENEWED SIDE SHE		SIDE SHELL HAVE	1/5/2001
CAD0012001	RENEWED STERN		STERN SHELL HA	1/5/2001

Add Update Delete Refresh Close

Record: 1

Picture 4.29 Fill Corrective Action Detail Data Module

c. Hull Emergency Maintenance Material Demand and Supply Module.

This Module is use to fill Hull Emergency Maintenance Material Demand and Supply Data. The sample of the Module is:

Material D and S Report ID: 7 (ex: MR002)

No Material Report: CJN1029/MR/01032001 (ex: CJN1029/MR/01032001)

Ship Name: CARAKA JAYA NIAGA III-2

Ship Owner: PT PENGEMBANGAN ARMADA NIAGA NASIONAL

Reg Number: 4435

Call Sign: YEHH

Ship Flag: INDONESIA

Gross Tonnage: 3256 (GT)

Out Power: 1650 (HP)


Class Sign: +A 100 IP "ECC"

Chief Officer ID: COF1001002 (ex: COF1001002)

Ship Master ID: SHM1001001 (ex: SHM1001001)

Logistic Staff ID: LGDA94001 (ex: LGDA94001)

Material D and S Report Detail ID: MRD-0012001 (ex: MRD0012001) Lihat Detail



Material D S Report	No Material Report	Ship Name	Ship Owner	Reg Number	Call Si	Ship Flag	Gross Ton
7	CJN1029/MR/01032001	CARAKA JAYA NIAGA III-2	PT PENGEMBANGAN ARMADA NIAGA NASIONAL	4435	YEHH	INDONESIA	3256
MR002	CJN1029/MR/071	CARAKAJAYA NIAGA III-2	PT PENGEMBANGAN ARMADA NIAGA NASIONAL	4435	YEHH	INDONESIA	3256

Add Update Delete Refresh Close

Record: 1

Picture 4.30 Fill Material Demand and Supply Report Data Module

- d. Hull Emergency Maintenance Monitoring Module. This Module is use to fill Hull Emergency Maintenance Monitoring Data. The sample of the Module is:

Monitoring Report ID: MO001
 No Monitoring Report: CJN102
 Ship Name: CARAKA JAYA NIAGA III-2
 Ship Owner: PT PENGEMBANGAN ARMADA NIAGA NAS
 Reg Number: 4435
 Call Sign: YEHH
 Ship Flag: INDONESIA
 Gross Tonnage: 3256
 Out Power: 1650
 Class Sign: +A 100 IP "ECC"
 Arrisment Superintendant ID: ASPDA00
 Dock Monitoring ID: D0MDA0
 Ship Master ID: SHM1001
 Repair Work Detail ID: RWD0012 [Lihat Detail](#)

Monitoring Report No	No Monitoring Rep	Ship Name	Ship Owner	Reg Num	Call Si	Ship Flag	Gross Tonn
MO001	CJN1029/MO/010	CARAKA JAYA NI	PT PENGEMBANG	4435	YEHH	INDONESIA	3256
MO002	CJN1027/MO/071	CARAKA JAYA NI	PT PENGEMBANG	4435	YEHH	INDONESIA	3256

Add Update Delete Refresh Close
 Record: 1

Picture 4.31 Fill Monitoring Report Data Module

- e. Hull Emergency Maintenance Repair List Outsource Module. This Module is use to fill Hull Emergency Repair List Outsource Data. The sample of the Module is:

Repair List Outsource ID: LO001
 No Repair List Outsource Report: CJN1029/LO/02032001
 Ship Name: CARAKA JAYA NIAGA III-2
 Ship Owner: PT PENGEMBANGAN ARMADA NIAGA NASIONAL
 Reg Number: 4435
 Call Sign: YEHH
 Ship Flag: INDONESIA
 Gross Tonnage: 3256
 Out Power: 1650
 Class Sign: +A 100 IP "ECC"
 Deckyard ID: DY/SIN/001
 Sub-Cen ID: SC/SIN/001
 Repair List Outsource Work ID: LOD0012001

Repair List Outsource No	No Repair List Outsource	Ship Name	Ship Owner	Reg Num	Call Si	Ship Flag
LO001	CJN1029/LO/02032001	CARAKA JAYA NI	PT PENGEMBANG	4435	YEHH	INDONESIA
LO002	CJN1027/LO/08112003	CARAKA JAYA NI	PT PENGEMBANG	4435	YEHH	INDONESIA

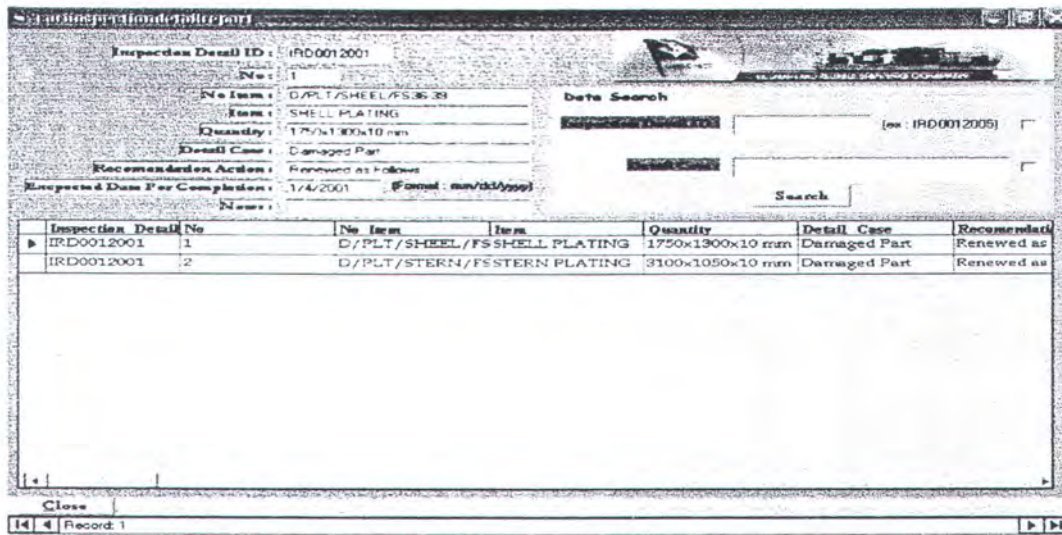
Add Update Delete Refresh Close
 Record: 1

Picture 4.32 Fill Repair List Outsource Report Data Module

4. Menu Search Data

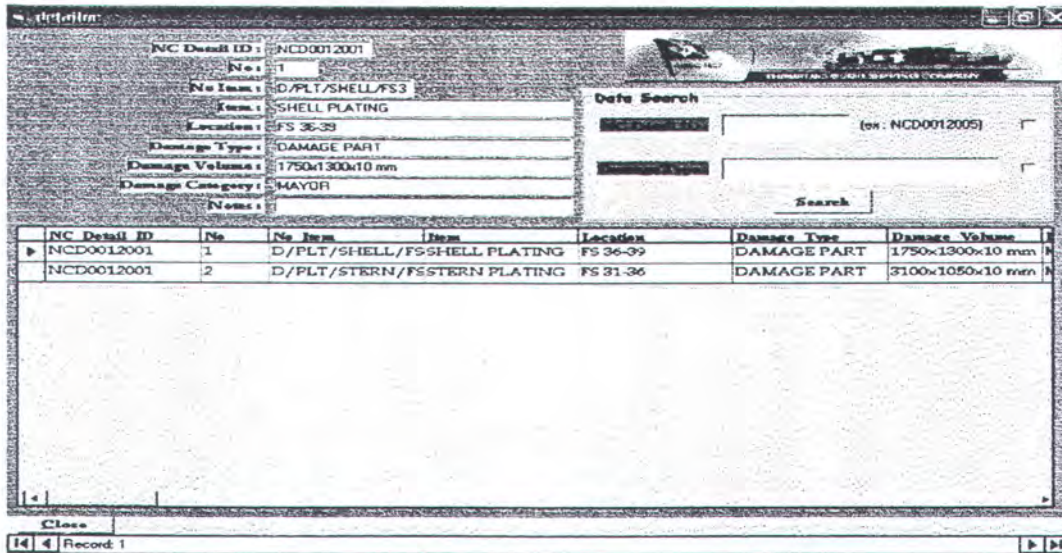
This menu is use for searching Hull Emergency Maintenance Data from Database. The form consists of:

- a. Hull Emergency Maintenance Inspection Search Module. This Module is use to search Hull Emergency Maintenance Inspection Data. The sample of the Module is:



Picture 4.33 Module Search Hull Emergency Maintenance Inspection Detail Report Data

- b. Hull Emergency Maintenance Damage and Failure Search Module. This Module is use to search Hull Emergency Maintenance Damage and Failure Data. The sample of the Module is:



Picture 4.34 Module Search Hull Emergency Maintenance Damage and Failure Report Data

- c. Hull Emergency Maintenance Material Demand and Supply Search Module. This Module is use to search Hull Emergency Maintenance Material Demand and Supply Data. The sample of the Module is:

Material D S Report Det	No Demand Mate	No Item	Item Name	Location	Quantity	Cost
MRD0012001	1	D/PLT/SHELL/FS	SHELL PLATING	FS 36-39	1750x1300x10 mm	2000000
MRD0012001	2	D/PLT/STERN/FS	STERN PLATING	FS 31-36	3100x1050x10 mm	3000000

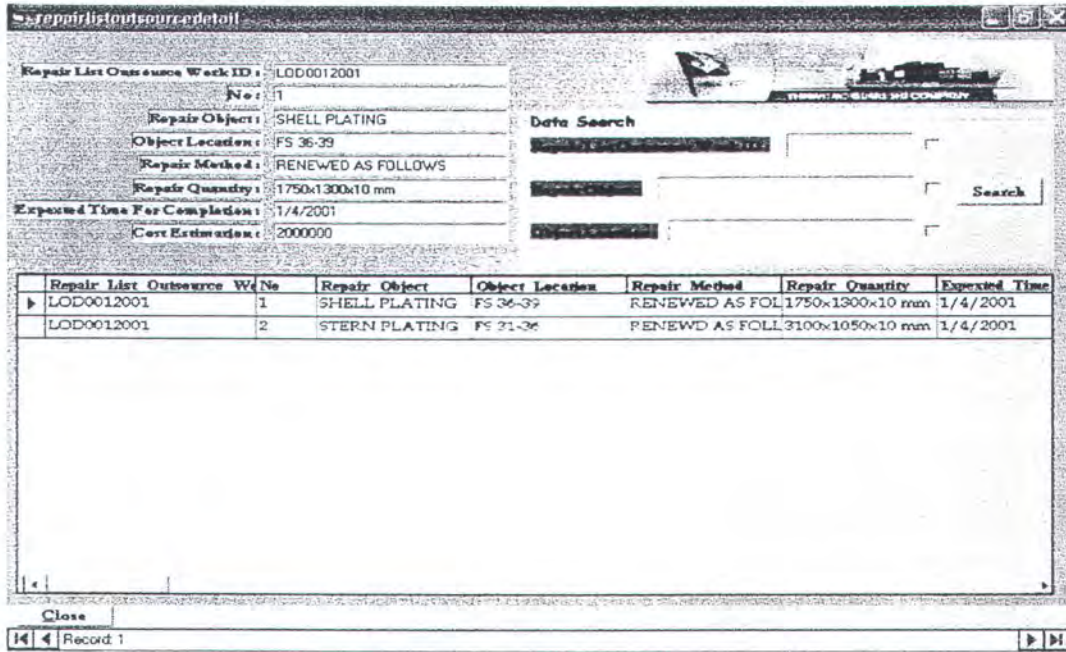
Picture 4.35 Module Search Hull Emergency Material Demand and Supply Detail Report Data

- d. Hull Emergency Maintenance Monitoring Search Module. This Module is use to search Hull Emergency Maintenance Monitoring Data. The sample of the Module is:

Repair Work Detail NO	No Item	Repair Object	Repair Method	Repair Detail	Date For Start	Time
RWD0012001	1	D/PLT/SHELL/FS	RENEWED SHELL	RENEWED SHELL	1/5/2001	08:00
RWD0012001	2	D/PLT/STERN/FS	RENEWED STERN	RENEWED STERN	1/5/2001	11:00

Picture 4.36 Module Search Hull Emergency Maintenance Repair Work Detail Report Data

- e. Hull Emergency Maintenance Repair List Outsource Search Module.
This Module is use to search Hull Emergency Maintenance Repair List Outsource Data. The sample of the Module is:

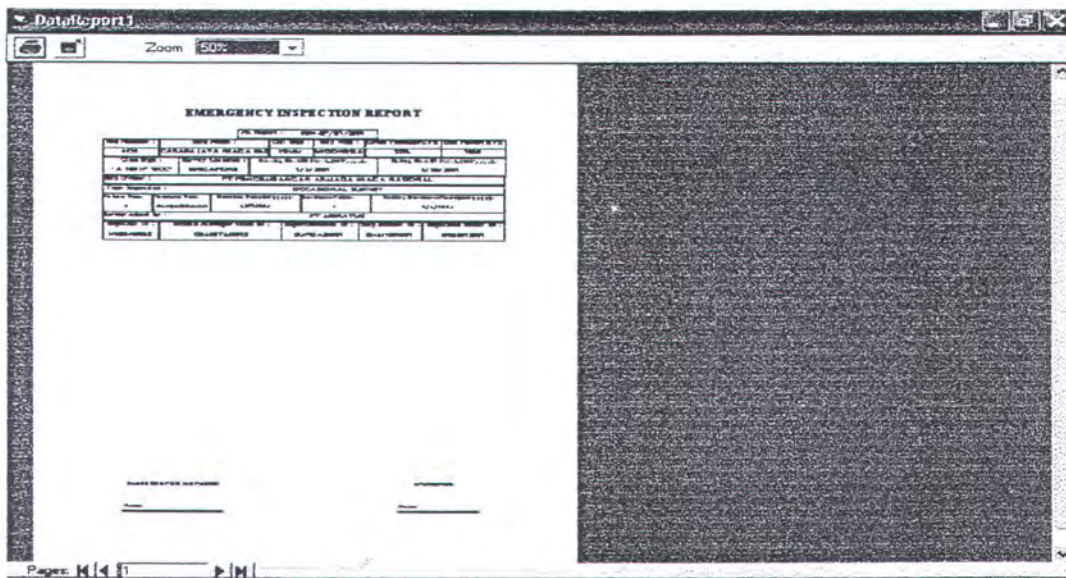


Picture 4.37 Module Search Hull Emergency Maintenance Repair List Outsource Work Detail Report Data

5. Menu Print Data

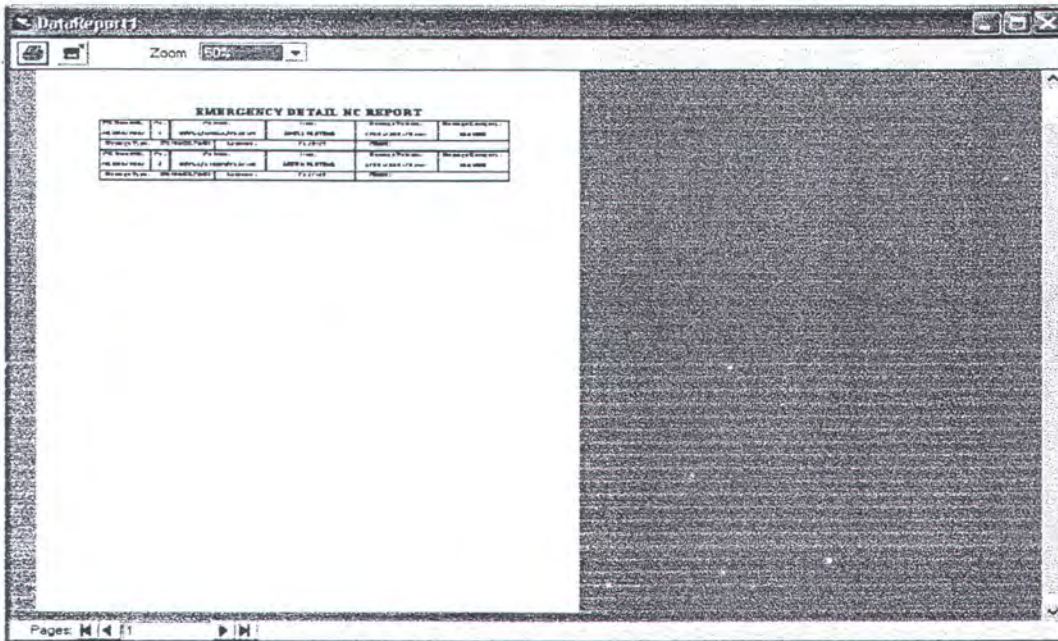
This menu is use to print the data report that we needed. The form consists of:

- a. Inspection Report Module. The sample of the Module is:



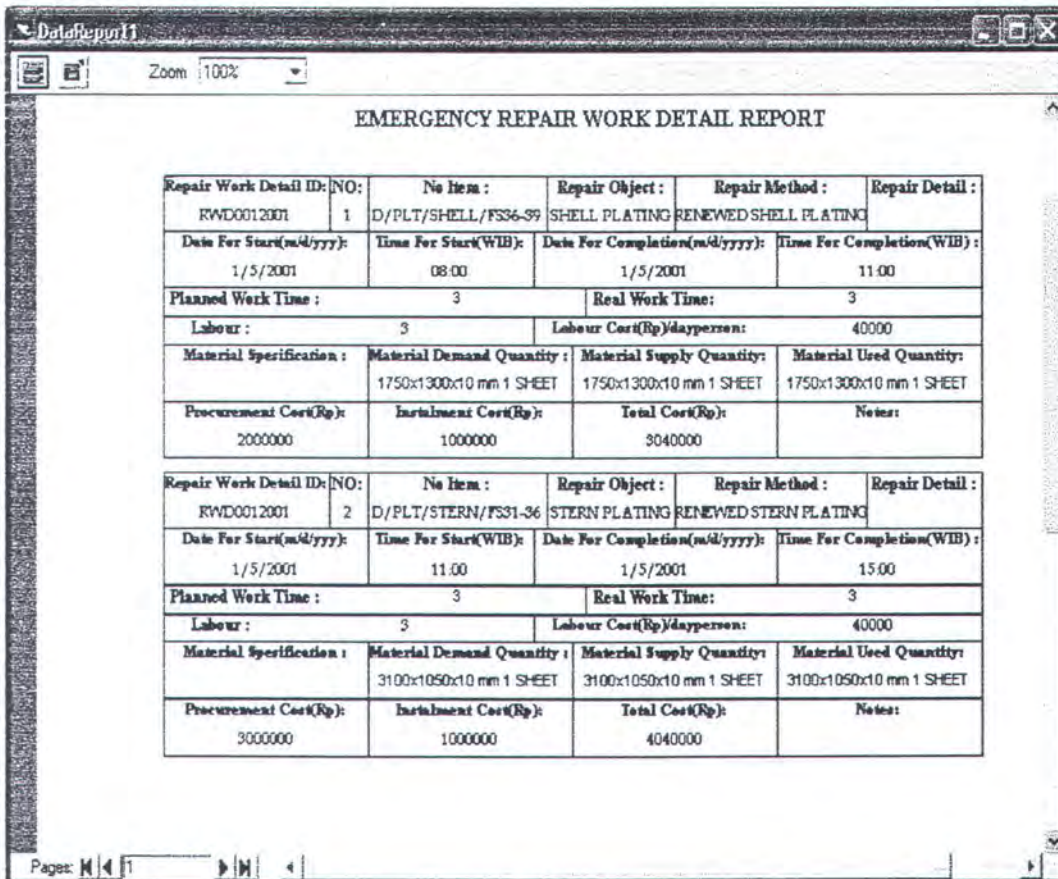
Picture 4.38 Module Print Inspection Report

b. Damage and Failure Report Module. The sample of the Module is:



Picture 4.39 Module Print Damage and Failure Detail Report

c. Monitoring Report Module. The sample of the Module is:



Picture 4.40 Module Print Repair Work Detail Report

- d. Material Demand and Supply Report Form. The sample of the Module is:

EMERGENCY MATERIAL DEMAND & SUPPLY REPORT

No Material Report : CJN1029/MR/01032001

Reg Number :	Ship Name :	Call Sign :	Ship Flag :	Gross Tonnage(GT):	Out Power(HP):
4435	CARAKA JAYA NAGA II-2	YBHH	INDONESIA	3256	1650
Class Sign : + A 100 IP "ECC"		Ship Owner : PT PENGEMBANGAN ARMADA NIAGA NASIONAL			
Chief Officer ID :	Ship Master ID :	Logistic Staff ID :	Material DS Report Detail ID:		
COP1001002	SHM1001001	LOGDA94001	MRD0012001		

Pages: 1

Picture 4.41 Module Print Material Demand and Supply Report

- e. Repair list Outsource Report Module. The sample of the Module is:

REPAIRLIST OUTSOURCE DETAIL WORK REPORT

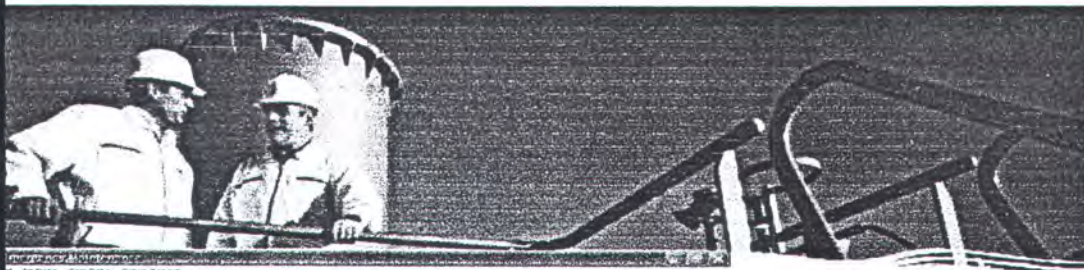
Repair List Outsrce Work ID:	No :	Repair Object :	Object Location:	Repair Method :	Repair Quantity :
LOD0012001	1	SHELL PLATING	FS 36-39	RENEWED AS FOLLOWS	1730x1500x10 mm
Expected Time For Completion(m/d/yyyy):			1/4/2001	Cost Estimation(Rp) :	2000000
Repair List Outsrce Work ID:	No :	Repair Object :	Object Location:	Repair Method :	Repair Quantity :
LOD0012001	2	STERN PLATING	FS 31-36	RENEWED AS FOLLOWS	3100x1050x10 mm
Expected Time For Completion(m/d/yyyy):			1/4/2001	Cost Estimation(Rp) :	3000000

Pages: 4

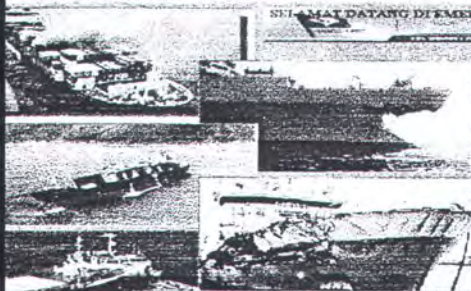
Picture 4.42 Module Print Repair List Outsource Detail Work



CHAPTER V
CONCLUSION AND SUGGESTION



SITI MAT DATANG DI EMERGENCY MAINTENANCE MODUL



Emergency Repair ID : 19001
 No. Register : 0004-SP/1/2001
 Ship Name : KARAKA JAYA NAGA 112
 Ship Owner : PT PENGEMBANGAN ARMADA NAGA NASIONAL
 Reg Number : 4235
 Call Sign : YEHM
 Ship Flag : INDONESIA
 Gross Tonnage : 2550
 Net Power : 1850
 Class Regis : HA 100 IP TCC
 Building Date Of Delivery : 1/2/2001
 Existing Date Of Delivery : 5/5/2001
 Available Of Condition Build : 1/10/2001
 Type Impulsion : COGAS CIAL SLFV
 No. Of Last Visit : 2
 Place Of Last Visit : KARAKA JAYA NAGA 112
 Date Of Last Visit : 12/7/2001
 Certificate Number : 19001

Inspection Report No.	Ship Name	Ship Owner	Reg. Number	Call Sign	Class	Issue Date
19001	KARAKA JAYA NAGA 112	PT PENGEMBANGAN ARMADA NAGA NASIONAL	4235	YEHM	HA 100 IP TCC	1/2/2001
19002	KARAKA JAYA NAGA 112	PT PENGEMBANGAN ARMADA NAGA NASIONAL	4235	YEHM	HA 100 IP TCC	1/2/2001

Material ID & Repair Detail ID : MR0001201

Part Name : D/PLY/SHELL/PS SHELL PLATING
 Location : PS 36-39
 Quantity : 1750x1300x10 mm SHEET
 Unit : 200000

Material ID & Repair Detail ID	Part Name	Location	Quantity	Unit
MR0001201	D/PLY/SHELL/PS SHELL PLATING	PS 36-39	1750x1300x10 mm	20000
MR0002201	D/PLY/STEERN/PS STEERN PLATING	PS 31-36	3100x1080x10 mm	20000

EMERGENCY REPAIR WORK DETAIL REPORT

Repair Work Detail ID (NO)	No Item	Repair Object	Repair Method	Repair Detail
190001201	1	D/PLY/SHELL/PS SHELL PLATING	REPAIR SHELL PLATING	
Planned Work Time : 2		Read Work Time : 3		
Material Specifications : 1750x1300x10 mm 1 SHEET		Material Supply Quantity : 1750x1300x10 mm 1 SHEET		Material Used Quantity : 1750x1300x10 mm 1 SHEET
Procurement CostRp	Installation CostRp	Total CostRp	Notes	
000000	1000000	1000000		
190001201	2	D/PLY/STEERN/PS STEERN PLATING	REPAIR STEERN PLATING	
Planned Work Time : 3		Read Work Time : 3		
Material Specifications : 3100x1080x10 mm 1 SHEET		Material Supply Quantity : 3100x1080x10 mm 1 SHEET		Material Used Quantity : 3100x1080x10 mm 1 SHEET
Procurement CostRp	Installation CostRp	Total CostRp	Notes	
000000	1000000	1000000		



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CHAPTER V CONCLUSION AND
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CHAPTER V

CONCLUSION AND SUGGESTION

After finished the final project, we should evaluated and analyzed the implementation of the Hull Emergency Maintenance Module. According to the evaluation and analyzing from this final project, we obtained some conclusion and suggestion concerning this final project.

1.1 Conclusion

Based on the evaluation, we got some conclusions that will be explained below:

- a. The implementation of Hull Emergency Maintenance Module will assist the performance from Hull Emergency Maintenance execution more efficient compare than using a paper sheet, especially in managing the data depository, data seeking and data reporting
- b. Hull Emergency Maintenance Module also assists the data access from many persons and location that related in Emergency Maintenance Execution. Not only in one division (Fleet Division), but also with the other division.
- c. Hull Emergency Maintenance Module will Provides an historical record of past hull emergency maintenance dates, location and items that carried out
- d. Hull Emergency Maintenance Module will Offers easy updating of the database
- e. Hull Emergency Maintenance Module will Display timelines of hull emergency maintenance data, eliminating the need to view individual listings of hull emergency maintenance items

1.2 Suggestion

As for suggestion which can be obtained after running the Hull Emergency Maintenance Module shall be explain as follows:

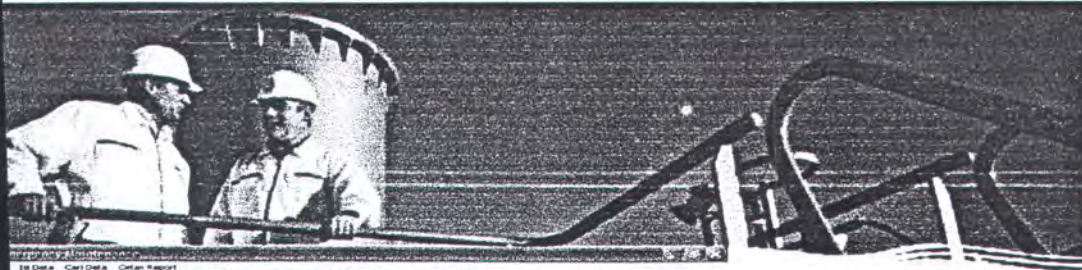
- a. By giving attention to this Hull Emergency Maintenance Module, in the future perhaps there will be an internal software development (components). For

improvement connection or integration programme with a good information management system in shipping companies.

- b. Integration with the other key maintenance area ought to conduct. With the other word, perhaps there will be development of planning/scheduling and continuous improvement maintenance module.



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STELAMAT HAYANG DI EMERGENCY MAINTENANCE MODUL

Response Report ID: 0001 Unit: 0000
 No Reg: 0004 SP/01/2001 Unit: 0000 00/01/2001
 Ship Name: CARAKA AYTA NAGA 112
 Ship Owner: PT PENGEMBANGAN ARKATA NAGA NASIONAL
 Reg Number: 4435
 Call Sign: YEHH
 Ship Flag: INDONESIA
 Gross Tonnage: 2000
 Net Tonnage: 1650
 Class: A-100 PCCC
 Sounding Date Of Survey: 1/3/2001 (Format: dd/MM/yyyy)
 Expiry Date Of Survey: 3/3/2003 (Format: dd/MM/yyyy)
 Number Of Condition Periods: 1
 Type Inspection: OCCASIONAL SUPPLY
 No. Of Last Visit: 1
 Date Of Last Visit: 12/2/2001 (Format: dd/MM/yyyy)
 Certificate Number: 01

Inspected By: CPT HERATUS
 Survey Location: SUNGAI KARANG
 Response ID: 0004 SP/01/2001 Unit: 0000 00/01/2001
 Problem & Manager: O/C: YEHH Unit: 0000 00/01/2001
 Supervisor ID: 0004 SP/01/2001 Unit: 0000 00/01/2001
 Ship Master ID: 0004 SP/01/2001 Unit: 0000 00/01/2001

Inspected By	Ship Name	Ship Owner	Reg. Number	Call Sign	Gross Tonnage	
0001	0004 SP/01/2001	CARAKA AYTA NAGA 112	PT PENGEMBANGAN ARKATA NAGA NASIONAL	YEHH	INDONESIA	2000

Model D B Report Detail ID: MRE0012001

No Item: 1
 Item Name: D/PLT/SHELL/FS 30
 Item Name: SHELL PLATING
 Location: FS 30 30
 Quantity: 1750x1000x10 mm SHEET
 Unit Cost: 2000000

Issue Date: 1/3/2001 (Format: dd/MM/yyyy)
 Approval Date: 1/3/2001 (Format: dd/MM/yyyy)
 Check-out Date: 1/3/2001 (Format: dd/MM/yyyy)
 Management Date: 1/3/2001 (Format: dd/MM/yyyy)

Material D B Report Detail

Model D B Report Detail ID	No Item	Item Name	Location	Quantity	Unit Cost	Total
MRE0012001	1	D/PLT/SHELL/FS00-30	SHELL PLATING	1750x1000x10 mm SHEET	2000000	3500000000
MRE0012001	2	D/PLT/STERN/FS00-30	STERN PLATING	1750x1000x10 mm SHEET	2000000	3500000000

EMERGENCY REPAIR WORK DETAIL REPORT

Repair Work Detail ID	No Item	Repair Object	Repair Method	Repair Detail
MRE0012001	1	D/PLT/SHELL/FS00-30	SHELL PLATING RENEWED SHELL PLATING	
Date For Start/Work:		Time For Start/Work:	Date For Completion/Work:	Time For Completion/Work:
1/3/2001		08.00	3/3/2001	11.00
Planned Work Time:		Real Work Time:		
3		3		
Labor:		Labor Cost/Management:		
40000		40000		
Material Specification:	Material Estimated Quantity:	Material Supply Quantity:	Material Used Quantity:	
1750x1000x10 mm SHEET	1750x1000x10 mm SHEET	1750x1000x10 mm SHEET	1750x1000x10 mm SHEET	
2000000	1000000	2000000	1000000	
Total Cost/Obj:		Total Cost/Obj:		
3500000		3500000		

Repair Work Detail ID	No Item	Repair Object	Repair Method	Repair Detail
MRE0012001	2	D/PLT/STERN/FS00-30	STERN PLATING RENEWED STERN PLATING	
Date For Start/Work:		Time For Start/Work:	Date For Completion/Work:	Time For Completion/Work:
1/3/2001		11.00	1/3/2001	13.00
Planned Work Time:		Real Work Time:		
3		3		
Labor:		Labor Cost/Management:		
40000		40000		
Material Specification:	Material Estimated Quantity:	Material Supply Quantity:	Material Used Quantity:	
1750x1000x10 mm SHEET	1750x1000x10 mm SHEET	1750x1000x10 mm SHEET	1750x1000x10 mm SHEET	
2000000	1000000	2000000	1000000	
Total Cost/Obj:		Total Cost/Obj:		
3500000		3500000		



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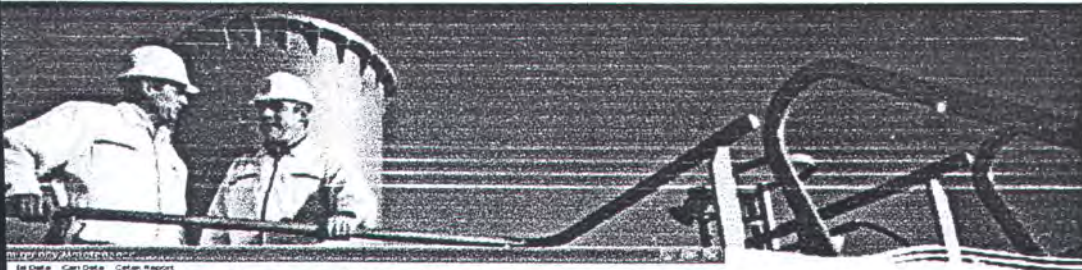
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APPENDIX



STEL AMAT DAYANG DE EMERGENCY MAINTENANCE MODUL

Response Report ID: #R001 Req: R0000
 No Request: 0004 SP/01/2001 Req: 0000 00/01/2001
 Ship Name: CARAKA JAYA NAGA 112
 Ship Owner: PT PEMERANGKAY ARNATA NUSA NASIONAL
 Reg Number: 4430
 Call Sign: YEH4
 Ship Flag: INDONESIA
 Gross Tonnage: 3276 GRT: 1620
 Net Tonnage: 1620 GRT: 810
 Char Regt: A-100 IP 1200
 Sounding Date Of Survey: 1/3/2001 (Status: non/ok/yyyy)
 Working Date Of Survey: 3/5/2001 (Status: non/ok/yyyy)
 Validity Of Certificate Period: 1/10/2001 (Status: non/ok/yyyy)
 Type Inspection: OCCASIONAL SURVEY
 No Of Last Visit: 6044784001
 Place Of Last Visit: BUKIT BARU
 Date Of Last Visit: 12/7/2001 (Status: non/ok/yyyy)
 Certificate Number: 1

Emergency Detail ID: #R0012001 Req: R0007000 Label Detail

Inspection Report No. Request	Ship Name	Ship Owner	Reg. Number	Call Sign	Ship Flag	Gross Tonnage
R-20001	0004-SP/01/2001	CARAKA JAYA NAGA 112	PT PEMERANGKAY ARNATA NUSA NASIONAL	YEH4	INDONESIA	3276
R-20002	0001-SS/01/2000	CARAKA JAYA NAGA 112	PT PEMERANGKAY ARNATA NUSA NASIONAL	YEH4	INDONESIA	3276

Material ID & Report Detail ID: #R0007000

No Item: 1
 Item Name: D/PLY SHELL/FS 30
 Item Name: SHELL PLATING
 Location: FS 30-30
 Quantity: 1700x1000x10 mm 1 SHEET
 Unit: 2000000

Issue Date: 1/3/2001 (Status: non/ok/yyyy)
 Approval Date: 1/3/2001 (Status: non/ok/yyyy)
 Expiration Date: 1/3/2001 (Status: non/ok/yyyy)
 Authorization Date: 1/3/2001 (Status: non/ok/yyyy)

Material ID & Report Detail No.	Item Name	Item Name	Location	Quantity	Unit
#R0007000	1	D/PLY SHELL/FS30 SHELL PLATING	FS 30-30	1700x1000x10 mm	20000
#R0007000	2	D/PLY STEER/FS30 STEER PLATING	FS 30-30	3100x1000x10 mm	20000

EMERGENCY REPAIR WORK DETAIL REPORT

Repair Work Detail ID (REQ)	No Item	Repair Object	Repair Method	Repair Detail	
RVD0012001	1	D/PLY SHELL/FS30-30	SHELL PLATING REPAIR SHELL PLATING		
Date For Issue/Work	1/3/2001	Time For Issue/Work	06.00	Date For Completion/Work	1/3/2001
Planned Work Time	3	Actual Work Time	3	Labors	40000
Material Specifications	Material Demand Quantity	Material Supply Quantity	Material Used Quantity		
	1700x1000x10 mm 1 SHEET	1700x1000x10 mm 1 SHEET	1700x1000x10 mm 1 SHEET		
Performance Cost/Qty	1000000	Total Cost/Qty	3040000		
RVD0012002	2	D/PLY STEER/FS30-30	STEER PLATING REPAIR STEER PLATING		
Date For Issue/Work	1/3/2001	Time For Issue/Work	11.00	Date For Completion/Work	1/3/2001
Planned Work Time	3	Actual Work Time	3	Labors	40000
Material Specifications	Material Demand Quantity	Material Supply Quantity	Material Used Quantity		
	3100x1000x10 mm 1 SHEET	3100x1000x10 mm 1 SHEET	3100x1000x10 mm 1 SHEET		
Performance Cost/Qty	1000000	Total Cost/Qty	4040000		



ITS
 Institut
 Teknologi
 Sepuluh Nopember

APPENDIX





BIRO KLASIFIKASI INDONESIA

LAPORAN SURVEY Survey Report

No. : 0833 - SB/B1/2004

No. Reg Reg. No	Nama Kapal Ship's name	Nama Panggilan Call sign	Bendera Flag	Isi kotor Gross tonnage	Daya Output
04435	CARAKA JAYA NIAGA III-2	Y E H H	Indonesia	3256 GT	1 x 1650 HP
Tanda kelas Class character		Tempat & tgl. Survey : Place & date of survey		Surabaya 26 Agustus 2004	
± A 100 I P "EQUIPPED FOR CARRIAGE OF CONTAINERS"					
Pemilik Owner PT. PENGEMBANGAN ARMADA NIAGA NASIONAL					

<input type="checkbox"/> Survey penerimaan kelas B/B Admission to class for new building	<input type="checkbox"/> Survey pengedokan Docking survey	<input type="checkbox"/> Survey bersambung lambung Continuous hull survey
<input type="checkbox"/> Survey penerimaan kelas B/L Admission to class for existing ship	<input type="checkbox"/> Survey bawah air In-water survey	<input type="checkbox"/> Survey bersambung mesin Continuous machinery survey
<input type="checkbox"/> Survey pembaruan kelas Class renewal survey	<input type="checkbox"/> Penundaan survey pengedokan Postponement for docking survey	<input type="checkbox"/> Survey ketel Boiler survey
<input type="checkbox"/> Survey antara Intermediate survey	<input type="checkbox"/> Survey poros baling-baling Propeller shaft survey	<input type="checkbox"/> Survey otomasi Automation survey
<input checked="" type="checkbox"/> Survey tahunan Annual survey	<input type="checkbox"/> Penundaan survey poros baling2 Postponement for propeller shaft survey	<input type="checkbox"/> Survey instalasi pendingin Refrigerating installation survey
<input type="checkbox"/> Survey perpanjangan kelas Extension for class renewal survey	<input checked="" type="checkbox"/> Survey khusus Pelaksanaan Visa Occasional survey	<input type="checkbox"/> Lain-lain : Others

No./ tempat & tgl. visa terakhir : 1, Surabaya No./ place & date of last visa 14 Agustus 2003	No. & masa berlaku sertifikat : 004501 s/d Certificate no. & validity September 2008
--	---

VISA No.
2
Survey tahunan dan survey khusus pelaksanaan visa lambung, terapung. Visa no. 1 dilaksanakan

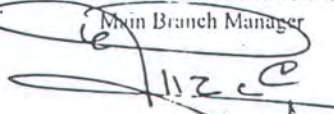
Kelas dipertahankan



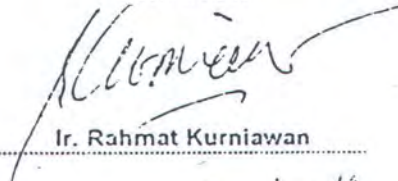
Atas permintaan PT. Meratus, telah dilaksanakan survey terhadap kapal tersebut diatas sewaktu terapung di Perairan Pelabuhan Tanjung Perak Surabaya dan dilaporkan sbb:

- Survey tahunan, Survey Khusus Pelaksanaan Visa, sesuai form F.101-1995 & F.104-1995

Surabaya, 26 Agustus 2004

KEPALA CABANG UTAMA
Main Branch Manager

Ir. M. Nasrun Djafar



SURVEYOR

Ir. Rahmat Kurniawan

LAMBUNG

I. Survey tahunan lambung dilaporkan sesuai form F.104-1995

II. Survey khusus pelaksanaan visa :

1. Jangkar dan rantai jangkar (ki/ka) diperiksa, keadaan baik.

Catatan :

Rantai jangkar kiri segel no. 6 diganti baru dan diperiksa, keadaan baik.

Rantai jangkar dilengkapi data-data sbb :

a. Certificate No. : - LR QDO 0450674/1

- LR NJG 0440871/6

b. Data rantai jangkar : - Diameter : 44 mm

- Grade : U2a

- Proof load : 769 KN

- Penandaan : LR QDO 0450674/1-3

c. Data kenter shackle : - Diameter : 44 mm

- Grade : U2(a)

- Proof load : 769 KN

- Penandaan : LR NJG 0440871/6-27

2. Review deck log book, tidak ada catatan negatif tentang kondisi kapai (kandas, rusak, dll.)

III. Catatan

Survey alas terakhir : 28 Juli 2003

Visa no. 1 dilaksanakan

---- END ----



BIRO KLASIFIKASI INDONESIA

LAPORAN SURVEY

Survey Report

No. : 0833 - SB/B1/2004

No. Reg Reg. No	Nama Kapal Ship's name	Nama Panggilan Call sign	Bendera Flag	Isi kotor Gross tonnage	Daya Output
04435	CARAKA JAYA NIAGA III-2	Y E H H	Indonesia	3256 GT	1 x 1650 HP
Tanda kelas Class character	± A 100 IP "EQUIPPED FOR CARRIAGE OF CONTAINERS"		Tempat & tgl. Survey : Place & date of survey	Surabaya 26 Agustus 2004	
Pemilik Owner	PT. PENGEMBANGAN ARMADA NIAGA NASIONAL				

<input type="checkbox"/> Survey penerimaan kelas B/B Admission to class for new building	<input type="checkbox"/> Survey pengedokan Docking survey	<input type="checkbox"/> Survey bersambung lambung Continuous hull survey
<input type="checkbox"/> Survey penerimaan kelas B/L Admission to class for existing ship	<input type="checkbox"/> Survey bawah air In-water survey	<input type="checkbox"/> Survey bersambung mesin Continuous machinery survey
<input type="checkbox"/> Survey perbaruan kelas Class renewal survey	<input type="checkbox"/> Penundaan survey pengedokan Postponement for docking survey	<input type="checkbox"/> Survey ketel Boiler survey
<input type="checkbox"/> Survey antara Intermediate survey	<input type="checkbox"/> Survey poros baling-baling Propeller shaft survey	<input type="checkbox"/> Survey otomasi Automation survey
<input checked="" type="checkbox"/> Survey tahunan Annual survey	<input type="checkbox"/> Penundaan survey poros baling ² Postponement for propeller shaft survey	<input type="checkbox"/> Survey instalasi pendingin Refrigerating installation survey
<input type="checkbox"/> Survey perpanjangan kelas Extension for class renewal survey	<input checked="" type="checkbox"/> Survey khusus Pelaksanaan Visa Occasional survey	<input type="checkbox"/> Lain-lain : Others

No./ tempat & tgl. visa terakhir : 1, Surabaya No. place & date of last visa 14 Agustus 2003	No. & masa berlaku sertifikat : 004501 s/d Certificate no. & validity September 2008
---	---

VISA No.
2
Survey tahunan dan survey khusus pelaksanaan visa lambung, terapung. Visa no. 1 dilaksanakan

Kelas dipertahankan

Atas permintaan PT. Meratus, telah dilaksanakan survey terhadap kapal tersebut diatas sewaktu terapung di Perairan Pelabuhan Tanjung Perak Surabaya dan dilaporkan sbb:

- Survey tahunan, Survey Khusus Pelaksanaan Visa, sesuai form F.101-1995 & F.104-1995

Surabaya, 26 Agustus 2004

KEPALA CABANG UTAMA
Main Branch Manager

Ir. M. Nasrun Djafar



SURVEYOR

ir. Rahmat Kurniawan

LAMBUNG

I. Survey tahunan lambung dilaporkan sesuai form F.104-1995

II. Survey khusus pelaksanaan visa :

1. Jangkar dan rantai jangkar (ki/ka) diperiksa, keadaan baik.

Catatan :

Rantai jangkar kiri segel no. 6 diganti baru dan diperiksa, keadaan baik.

Rantai jangkar dilengkapi data-data sbb :

a. Certificate No. : - LR QDO 0450674/1

- LR NJG 0440871/6

b. Data rantai jangkar : - Diameter : 44 mm

- Grade : U2a

- Proof load : 769 KN

- Penandaan : LR QDO 0450674/1-3

c. Data kenter shackle : - Diameter : 44 mm

- Grade : U2(a)

- Proof load : 769 KN

- Penandaan : LR NJG 0440871/6-27

2. Review deck log book, tidak ada catatan negatif tentang kondisi kapal (kandas, rusak, dll.)

III. Catatan

Survey alas terakhir : 28 Juli 2003

Visa no. 1 dilaksanakan

--- END ---



BIRO KLASIFIKASI INDONESIA

LAPORAN SURVEY

Survey Report

No. : 0385 - SB/B1/2003

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Celso...

No. Reg Reg. No	Nama Kapal Ship's name	Nama Panggila Call sign	Bendera Flag	Isi koter Gross tonage	Daya Output
4435	KM. CARAKA JAYA NIAGA III-2	YEHH	Indonesia	GT	1 x 1650 HP

Kelas Class character	+ A 100 I P "EQUIPPED FOR CARRIAGE OF CONTAINER"	Tempat & tgl. Survey Place & date of survey	Surabaya 22 April 2003 s/d 30 April 2003
Pemilik Owner PT. PENGEMBANGAN ARMADA NIAGA NASIONAL			

Survey penerimaan kelas B/B Admission to class for new building	<input type="checkbox"/>	Survey pengedokan Docking survey	<input type="checkbox"/>	Survey bersambung lambung Continuous hull survey	<input type="checkbox"/>
Survey penerimaan kelas B/L Admission to class for existing ship	<input type="checkbox"/>	Survey bawah air In-water survey	<input type="checkbox"/>	Survey bersambung mesin Continuous machinery survey	<input type="checkbox"/>
Survey pembaharuan kelas Class renewal survey	<input checked="" type="checkbox"/>	Penundaan survey pengedokan Postponement for docking survey	<input type="checkbox"/>	Survey ketel Boiler survey	<input type="checkbox"/>
Survey antara Intermediate survey	<input type="checkbox"/>	Survey poros baling-baling Propeller shaft survey	<input type="checkbox"/>	Survey otomasi Automation survey	<input type="checkbox"/>
Survey tahunan Annual survey	<input type="checkbox"/>	Penundaan survey poros baling2 Postponement for propeller shaft survey	<input type="checkbox"/>	Survey instalasi pendingin Refrigerating installation survey	<input type="checkbox"/>
Survey perpanjangan kelas Extention for class renewal survey	<input checked="" type="checkbox"/>	Survey khusus Penundaan Visa Occasional survey	<input type="checkbox"/>	Lain-lain : Others	<input type="checkbox"/>

No./ tempat & tgl. visa terakhir : 8, Surabaya	No. & masa berlaku sertifikat : 114359 s/d
No./ place & date of last visa : 24 Januari 2003	Certificate no. & validity : September 2003

ISA No. 9

Survey khusus penundaan Visa no. 8 dan penundaan pengedokan, terapung.

Kelas dipertahankan dengan catatan visa No. 8 dan survey pengedokan agar dilaksanakan paling lambat Juli 2003.

Tas permintaan PT. Meratus, telah dilaksanakan survey terhadap kapal tersebut diatas sewaktu terapung di Perairan Pelabuhan Tanjung Perak Surabaya dan dilaporkan sbb:

Penundaan survey pengedokan, Survey Khusus Penundaan Visa, sesuai form F.101-1995

Surabaya, 30 April 2003

KEPALA CABANG UTAMA
Main Branch Manager

[Signature]

Ir. M. Nasrun Bjafar



SURVEYOR

[Signature]

Ir. Arif Bijaksana P.N.

Survey Khusus Penundaan Visa Lambung Dan Penundaan Pengedokan

1. Pelat lambung kapal di atas garis air sejauh yang dapat diperiksa keadaan baik, kecuali beberapa bagian kedapatan deformasi, bagian yang deformasi tersebut diperiksa keadaan baik tidak terdapat keretakan dan dilaksanakan uji kedap keadaan baik.

Rekomendasi

Pelat lambung beserta gading yang deformasi agar dipotong dan diganti baru paling lambat Juli 2003, yaitu:

- Pelat antara gd. No. 39 - 42/43 (ki) berbatasan dengan geladak kedua
 - Gading No. 104 (ki) dua lajur diatas geladak kedua.
 - Pelat antara gd. No. 105/106 - 107 (ki) dua lajur diatas geladak kedua.
 - Pelat antara gd. No. 108 - 109 (ki) tiga lajur diatas geladak kedua.
2. Pelat geladak utama, pelat geladak kedua dan pelat alas ganda diperiksa keadaan baik.
 3. Pelat sekat kedap melintang diperiksa keadaan baik, kecuali beberapa bagian kedapatan tipis didoubling dan deformasi, pelat-pelat sekat yang kedapatan tipis didoubling dan deformasi diperiksa tidak terdapat keretakan dan diuji kedap hasil baik.

Rekomendasi

Pelat sekat kedap melintang yang kedapatan tipis didoubling dan deformasi agar dipotong dan diganti baru paling lambat Juli 2003, yaitu:

- Pelat sekat antara ruang muat I dan II (pada gd. No. 101) berbatasan dengan geladak kedua (ki/ka)
 - Pelat sekat antara ruang muat II dan III (pada gd. No. 67) berbatasan dengan geladak kedua (ki)
 - Pelat sekat antara ruang muat III dan kamar mesin (pada gd. No. 33) satu lajur diatas geladak-kedua (ki)
4. Bagian-bagian konstruksi di dalam Fore castle space, ruang muat I, II dan III, kamar mesin, dan ruang instalasi kemudi diperiksa keadaan baik., kecuali beberapa bracket untuk gading-gading ke tank top pada ruang muat kedapatan tipis.

Rekomendasi

Bracket gading-gading ke tank top yang kedapatan tipis pada gd. No. 43 - 46 (ki) dan pada gd. No. 48 - 53 (ki) agar dipotong dan diganti baru paling lambat Juli 2003.

5. Sumur-sumur bilga di ruang muat dan kamar mesin diperiksa secara umum, keadaan baik dan tidak ada tanda-tanda kebocoran.
6. Stuffing box poros baling-baling beserta sistem kekedapannya diperiksa eksternal dari dalam kamar mesin keadaan baik dan tidak terdapat kebocoran yang berlebih.
7. Ambang palka beserta penutupannya diperiksa keadaan baik.

8. Rumah geladak, pintu kedap cuaca, jendela dan engine skylight diperiksa keadaan baik
9. Bulwark (ki/ka) diperiksa keadaan baik.
10. Perlengkapan jangkar (ki/ka) dan peralatan tambat diperiksa visual keadaan terpasang baik di kapal.
11. Log book deck diperiksa dan berdasarkan informasi Nakhoda, kapal tidak pernah mengalami kerusakan yang serius atau tanda-tanda yang membahayakan pada bagian bawah garis air sejak pengedokan terakhir.

REKOMENDASI

Survey Pengedokan agar dilaksanakan paling lambat Juli 2003

CATATAN :

- Survey Alas terakhir 08 Januari 2001



BIRO KLASIFIKASI INDONESIA

P E M I L I H

LAPORAN SURVEY Survey Report

No : 0004-SP/B1/2001

5

No.Reg Reg.No	Nama Kapal Ship's name	Tanda Panggilan Call sign	Bendera Flag	Tonase kotor Gross Tonnage	Daya Output
4435	CARAKA JAYA NIAGA III - 2	Y E H H	Indonesia	3256 GT	1650 HP
Tanda kelas : + 100 I P "EQUIPPED FOR CARRIAGE Class character OF CONTAINER "			Tempat & tgl. survey : Singapore, 03/01/01 -10/01/01 Place & date of survey		
Pemilik : PT PENGEMBANGAN ARMADA Owner NIAGA NASIONAL			Operator : PT. PEL NUS MERATUS - SURABAYA		

- | | | |
|--|--|--|
| <input type="checkbox"/> Survey penerimaan kelas B/B
Admission to class for new building | <input checked="" type="checkbox"/> Survey pengedokan
Docking survey | <input type="checkbox"/> Survey bersambung lambung
Continuous hull survey |
| <input type="checkbox"/> Survey penerimaan kelas B/L
Admission to class for existing ship | <input type="checkbox"/> Survey bawah air
In-water survey | <input type="checkbox"/> Survey bersambung mesin
Continuous machinery survey |
| <input type="checkbox"/> Survey pembaharuan kelas
Class renewal survey | <input type="checkbox"/> Penundaan survey pengedokan
Postponement for docking survey | <input type="checkbox"/> Survey ketel
Boiler survey |
| <input checked="" type="checkbox"/> Survey antara
Intermediate survey | <input type="checkbox"/> Survey poros baling-baling
Propeller shaft survey | <input type="checkbox"/> Survey otomasi
Automation survey |
| <input type="checkbox"/> Survey tahunan
Annual survey | <input type="checkbox"/> Penundaan survey poros baling2
Postponement for propeller shaft survey | <input type="checkbox"/> Survey instalasi pendingin
Refrigerating installation survey |
| <input type="checkbox"/> Survey perpanjangan kelas
Extention for class renewal survey | <input type="checkbox"/> Survey Khusus
Occasional survey | <input type="checkbox"/> Lain-lain :
Others |

No./ tempat & tgl. visa terakhir : 4 / Banjarmasin, 07.12.2000 No./ place & date of last visa	No.& masa berlaku sertifikat: 114359 & Sept 2003 Certificate no.& validity
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Visa No. 5

Docking survey and Intermediate Survey Carried Out :

Visa No. Carried Out :

Class Confirmed

At the request of the owner's, Messrs PT. PELAYARAN NASIONAL MERATUS - SURABAYA the Undersigned Surveyor attended the ship while on dry dock at Singapore Technologies Marine Shipyard - Singapore, and reported accordance to survey report form F-101 and F-104 as follow :

Vessel dock : 03.01.2001

Vessel undock : 08.01.2001

Singapore, 14th January, 2001

KEPALA CABANG
Branch Manager

SURVEYOR

ONOT/SUBAGYO

Docking survey, Intermediate survey and Continuous Machinery Survey were carried out and reported as follows :

I. HULL

1. Shell Plating

Bottom and side plating, stem and stern frames clean, thickness measurement carried out, examined and found to be satisfactory.

Damage parts of side plate cropped off and renewed as follows,

- starboard

Strake F/G between fr. 35/36 - 38/39, size approx. 1750 x 1300 x 10 mm.

- stem plate.

Strake C - F, size approx. 3100 x 1050 x 10 mm.

Plate E/F, size approx. 900 x 700 x 12 mm

- some welding seam buildup by welding, examined and found to be satisfactory.

2. Deck Plating

Main deck, thickness measurement carried out, examined and found to be satisfactory.

Upper deck, boat deck, fore castle deck, visual inspection and found to be satisfactory.

3. Bulkhead

Transverse bulkhead examined and found to be satisfactory.

4. Tanks

Following tanks opened up, cleaned for internal survey, and hydraulic pressure test carried out found satisfactory

- Fore Peak Tank

- After Peak Tank

5. Sea Chests

Grating removed, chests cleaned, examined and found to be satisfactory steel surface recoated and gratings refitted.

6. Bower Anchor and Chain

- Bower anchor port and starboard side cleaned, examined and found to be satisfactory.

- Swivel port and starboard side cleaned, examined and found to be satisfactory.

- Chain anchor port and starboard side cleaned, examined and found to be satisfactory.

7. Rudder Stock and Rudder Blade

- Rudder Blade cleaned, damaged plate to be cropped off and renewed partly, hydraulic pressure test carried out and examined, and found to be satisfactory.

- Maximum bearing clearances recorded as follow :

Upper pintle 0,65 mm

Bottom pintle 2,90 mm

8. Thickness Measurements

Thickness measurements carried out by QA SYSTEMS PTE LTD. in order.

DAFTAR PERBAIKAN DAN PENGEDOKAN KM. CARAKA JAYA III - 2

PEMILIK : PT. PEL. MERATUS
 UKURAN UTAMA : LOA : 98,00 M
 : LPP : 92,15 M
 : B : 16,52 M
 : D : 5,38 M
 : GRT : 3.256 Ton
 Klasifikasi : BKI
 Jenis Survey : SS
 Order : K. 03055
 Pimpro : Budiadi *Yani*
 Wasdal : Heru PD
 S E : Tarkim
 O C : Sukatno
 Koord Pimpro : Budiadi

in = 09/07/03
 on = 11/07/03 (ETA)
 → 2 setelah harus
 putusan volume di
 material bila

FOR REVIEW
 Dated : 0002 700 01

NO URT	URAIAN PEKERJAAN	VOLUME
2.	3.	4.
A.	KAPAL SECARA UMUM	
01	PENGEDOKAN	8 ^{1/2} hari
02	Pemasangan & pengaturan balok lunas/sampin, g ✓	12 hari
03	Asistensi naik turun dok. ✓	
03	Bantuan kapal tunda untuk naik turun dok ✓ $\frac{F \times 1,2}{A \times 3,2}$ ok	
B.	PELAYANAN UMUM	
03	Diberikan tempat dan tenaga untuk pembuangan sampah.	5 m3
04	Sambungan darat untuk aliran listrik, 3 phase	1 hari
C7	Supply aliran listrik selama kapal diatas Dok, 380 V / 30A 20A (di atas puluh) A ^{1/2}	8 ^{1/2} hari
08	Supply air tawar ^{1/2}	50 ton
12	Penjaga kebakaran / peralatan untuk pemadam kebakaran, 1 orang (selama kapal di atas dok)	8 ^{1/2} hari
13	Fasilitas MCK selama pengedokan	8 ^{1/2} hari
14	Fasilitas tambat (termasuk bantuan tali temali).	3 hari
D	LAIN-LAIN	
08	Gambar bukaan kulit (sebagai laporan ultrasonic test) → dibubuhkan	1b:
ii.	KONSTRUKSI BADAN KAPAL	

NO URT	URAIAN PEKERJAAN	VOLUME
2.	3.	4.
A.	PEMBERSIHAN DAN PENGECATAN	
01	(bahan cat dan thinner dari owner) Badan kapal dibawah garis air (keel-DLL) a. Secrap <i>→ cuci</i> <i>→ Spot 2 sweep blast.</i> b. Waterjet <i>→ cuci</i> c. Cuci air tawar sebelum pengecatan d. Pengecatan, 2 x AC dan 2 x AF <i>→ A → tanya IP</i>	1.910 m2
04	Tanda lambung timbul/tanda sarat dicat. <i>→ Tanda plimsol yang lama dibuang.</i>	1 set ✓
15	Bak rantai jangkar a. Pembersihan b. Diperiksakan c. Pembersihan lumpur d. Pengecatan (cat ex owner) <i>→ bituminous</i>	2 buah ✓
B.	PELINDUNG MATERIAL	
02	Pemasangan & penggantian anode. (Anode owner supply). 3 kg 11 kg } <i>pelindung zinc anode</i> 4 kg 7 kg }	24 <i>fi</i> ✓ 48 buah ✓ 8 buah ✓ 23 <i>fi</i> ✓
C.	SUMBAT LUNAS & ALMARI LAMBUNG	
01	Buka, pasang dan semen sumbat dasar tanki	10 <i>fi</i> ✓ 11 buah ✓
02	Buka, bersihkan, periksa, pasang kembali dan dicat almari lambung (cat 2 x AC dan 1 x AF)	4 buah ✓
04	Buka, bersihkan, sekur, pelihara berkala, periksa dan pasang kembali katup-katup hisap dan katup buang. a. Katup hisap dan katup buang (Globe Valve).	
	dia.9" dia.7" dia.5" dia.4" dia.3" dia.2"	3 buah 3 buah 1 buah 1 buah 2 buah 8 buah
D	PEKERJAAN LAMBUNG SECARA UMUM	

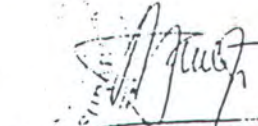
NO URT	URAIAN PEKERJAAN	VOLUME
2.	3.	4.
04	Daun kemudi dibersihkan dan dicat kemudian di pasang zing anodes ¹ bh. (zing anodes dari pemilik) 1x AC & 2x AF ₆	1 buah
05	Gland packing poros kemudi diganti baru (bahan ex owner)	1 set
D. 01	JANGKAR, PERALATAN TARIK DAN TAMBAT Jangkar beserta rantainya kanan kiri diturunkan diurai, dibersihkan, diwaterjet, diukur, dibuatkan laporan, diberi tanda dan dicat. → Cat bitumen	2 set
V	PERALATAN ABK DAN PENUMPANG	
VI C	KOMPONEN UTAMA DARI PERMESINAN BALING - BALING DENGAN TRANSMISINYA	
01	Buka pasang skerm/pelindung poros baling baling	1 unit ✓
02	Ukur kelonggaran poros baling baling dan dibuatkan laporan.	1 unit ✓
03	Bila hasil pengukuran tidak memenuhi syarat, poros baling-baling dengan baling balingnya dicabut ditempat untuk pemeriksaan.	1 unit
04	Poros baling baling dan baling baling dibawa - kebengkel untuk perbaikan / perawatan - Periksa kelurusan diatas bangku bubut. - Bubut Sleve/ dudukan bantalan. - Diadakan Contacfiit konis daun baling baling dan flens kopling. - Srempet/ bubut permukaan flends kopling.	1 unit ✓
06	Baling baling dibersihkan dan dipolish. → Recondisi - balansir Reimers	1 buah
07	Reimes packing ganti baru (bahan ex owner)	1 buah
08	Poros baling-baling pada dudukan spy magnaflug	1 buah

NO URT	URAIAN PEKERJAAN	VOLUME
2.	3.	4.
VII A 01	SISTIM KOMPONEN UTAMA DARI PERMESINAN SISTIM MINYAK BAHAN BAKAR. Pipa dikamar mesin yang tidak memenuhi syarat diganti baru (diluar bending dan fitting) sch.40 weldid, dia. 3"	12 meter

No. Form : Per/F71-003/Rev.0

Surabaya, 10 Juli 2003

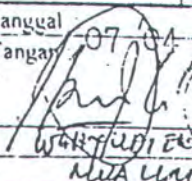
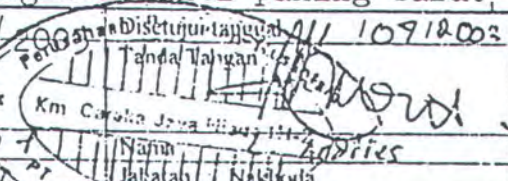
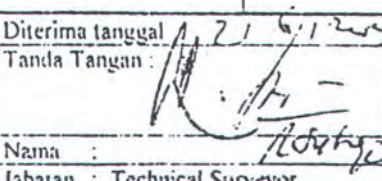
PT. DOK DAN PERKAPALAN SURABAYA
(PERSERO)



Bambang Subekti, ST

Ka. Biro Rendal

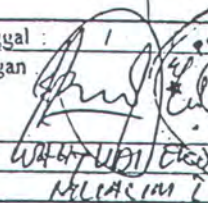
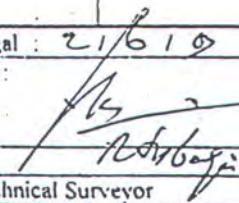
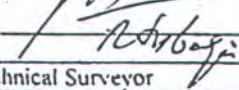
DAFTAR PERBAIKAN (REPAIR LIST)

Nama Kapal : KM.Caraka Jaya Niaga III-2		Tanggal Rencana Docking : / /		
No	Obyek Perbaikan	Aktivitas/ Uraian Perbaikan yang diperlukan	Kebutuhan Spare Part	
			Spesifikasi	Jumlah
01	Fore castle Fair lead	Fairlead haluan jumlah 6buah buka,bersihkan,check kondisi as dan bushnya. selanjutnya digemukin dan rakit kembali.	dia.280mm	6 buah
02	Pijakan me lihat jangkar	Pijakan melihat jangkar tipis dan keropos agar di ganti dengan plat baru. Pijakan operator windlass dirawat, ganti plat baru.	Plat kembang/ Borders uk. 800X800X5 mm Borders uk. 390x1200x5mm	2 buah 2 buah
03	Kanvas rem windlass	Kanvas rem windlass sudah aus dan tipis agar diganti dengan yang baru.	2400x100x10mm mur baut kuni- ngan.	2 set
04	Pipa hidrolik	Pipa hidrolik windlass sudah keropos agar diganti pipa baru sesuai aslinya.	Pipa 2" Flens elbow	1 btg 2 buah 4 buah
05	Kotak mic	Kotak mic publik addresser haluan rusak, agar dibuatkan baru.	400x200x230mm	1 buah
06	Forecastle deck	Forecastle deck yang berkarat diketok, sikat, meni dan cat deck green 2x luas +/- 20M2	Meni Cat hijau Thinner	20 Lt 20 Lt 05 Lt
07	Bulwark	Bulwark haluan yang berkarat diketok, sikat, meni dan cat abu-abu 2x Luas +/- 30 M2	Meni Cat abu-abu	05 Lt 10 Lt
08	Man hole bosunstore	Man hole dirawat, engsel yang rusak dirawat, mur baut kupu-kupu yang rusak diganti, ganti paking baru.	Plat strip 35mm x 3mm	1 Et
Dibuat tanggal 07/04/2003 Tanda Tangan: 		Disetujui tanggal 11/09/2003 Tanda Tangan: 		Diterima tanggal 21/6/2003 Tanda Tangan: 
Nama: W. H. T. S. 03 Jabatan: MUA UM		Nama: H. A. S. 03 Jabatan: Nikitoda		Nama: H. A. S. 03 Jabatan: Technical Surveyor

DAFTAR PERBAIKAN (REPAIR LIST)

Nama Kapal		: KM. Caraka Jaya Niaga III-2		
Tanggal Rencana Docking :		/ /		
No.	Obyek Perbaikan	Aktivitas/ Uraian Perbaikan yang diperlukan	Kebutuhan Spare Part	
			Spesifikasi	Jumlah
09.	Pintu ke- dap air.	Pintu kedap air bosunstore 2 bh, handle yang macet di lancarkan, digrease baru. Karet yang rusak/mati ganti karet paking baru.	Karet paking	
10.	Alur ran- tai jangkar	Alur rantai jangkar dari ulup menuju bak rantai aus agar didoubling plat baru.	Plat besi Kawat las.	
11.	Swivel & rantai jang kar	Swivel jangkar kanan kiri yang tipis agar ditambah las bagian dalam. Rantai jangkar yang ukuran dibawah standard ganti baru sesuai persetujuan SM dan petunjuk klass	Kawat las. Rantai Jangkar.	
12.	Main deck. Bracket.	Bracket bulwark kanan kiri sudah tipis bagian bawah, agar dipotong bagian tipis dan dilas sambung plat baru seperti aslinya.	Plat bentuk bracket bul- wark.	29 bh
13.	Bracket hatchcoaming.	Bracket hatchcoaming bagian bawah tipis & berkarat agar dipotong dan dilas sambung platbaru.	Plat dibentuk bracket	33bh
14.	Plat bulwark	Plat bulwark bagian bawah sudah tipis dipotong dan disambung plat baru. Sambungan bulwark dilas.	Plat strip Kawat las	8 btg
Dibuat tanggal		Diterima tanggal : 2 / 6 / 2005		
Tanda Tangan		Tanda Tangan :		
Nama : WAHID WIDAYAN		Nama : H. Subagio		
Jabatan : MUACIM I		Jabatan : Technical Surveyor		

DAFTAR PERBAIKAN (REPAIR LIST)

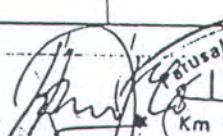
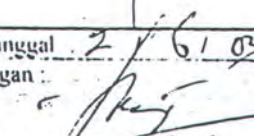
Nama Kapal : KM. Caraka Jaya Niaga III-2		Tanggal Rencana Docking : / /		
No.	Obyek Perbaikan	Aktivitas/ Uraian Perbaikan yang diperlukan	Kebutuhan Spare Part	
			Spesifikasi	Jumlah
15.	Bulwark	Bulwark dan hatchcoaming yang berkarat diketok, sikat, meni dan cat abu-abu 2 X.	Meni Cat abu-abu Thinner	60 Lt 80 Lt. 20 Lt
16.	Ponton	Ponton palka 2,2,&3 alur got air hujan berkarat dan keropos diganti plat baru Packing karet yang rusak ganti packing baru. Ponton yang sudah direpair diketok, meni, cat abu-abu 2x .	Plat strip Packing karet Meni cat abu-abu Thinner	 60 Lt 80 Lt 20 Lt
17.	Blower	Blower palka 1,2,3 dilancarkan kran buka tutup dan direpair yang rusak. dibuatkan sistem buka tutup blower/klep buka tutup.	Plat 3mm	2 lb
18.	Man hole	Tutup man hole palka 1,2,3 sebanyak 6 bh dirawat, di gemukin dan karet paking yang rusak diganti	Plat srip 35mmx3mm karet uk. 35mm x 20mm.	5 btg 20 Mtr
19.	Main deck	Main deck palka 1,2,3 luas +/- 300 M2 diketok, sikat, meni dan dicat merah dek.	Meni Cat merah thinner	80 lt 80 Lt 20 lt
20.	Buritan. Fairlead.	Fair lead buritan 6bh dibuka, dilancarkan dan dirakit kembali. ganti mur baut yang rusak. tutup fair lead 4 buah rusak diganti baru.	dia. 280 mm	06 bh
Dibuat tanggal : 1		Dibetujukan oleh : 1		
Tanda Tangan : 		Tanda Tangan : 		
Nama : M. L. ANORIES		Nama : 		
Jabatan : MELACIM		Jabatan : Technical Surveyor		

DAFTAR PERBAIKAN (REPAIR LIST)

Nama Kapal : KM. Caraka Jaya Niaga III-2		Tanggal Rencana Docking : / /		
No.	Obyek Perbaikan	Aktivitas/ Uraian Perbaikan yang diperlukan	Kebutuhan Spare Part	
			Spesifikasi	Jumlah
21.	Manhole buritan	Manhole gudang kering uk. 880mmx880mm alur paking karet keropos pada tepinya agar didobling plat tebal 3mm.	Plat strip 35mmx3mm Karetukuran 35mmx20mm	2btg 3 M
22.	Kanvas mooring winch.	Kanvas rem mooring winch sudah tipis dan aus uk. 90mmx250mmx8mm.	Kanvas rem Mur baut.	2 set
23.	Tangga Acc	Tangga gangway accomodasi kanan kiri bahan besi diketok, meni, dan cat perak.	Meni Cat perak thinner	5 lt 5 lt 2 lt
24.	Poop deck	Poop deck luas +/- 200M2 diketok, sikat, meni dan di cat dek green 2x.	Meni Cat hijau Thinner	40 lt 40 lt 10 lt
25.	Railing.	Railing buritan panjang +/- 80M bagian yang berkarat diketok, meni dan dicat putih dan hitam bag. atas	Meni Cat putih Cat hitam Thinner	05 lt 20 lt 10 lt 05 lt
26.	Dinding	Dinding dari anjungan sampai buritan ketok bagian berkarat, meni dan dicat putih.	Meni Cat putih	10 lt 30 lt
27.	Sekoci	Perlengkapan sekoci kanan kiri dicek dan yang kurang /rusak diganti.		
	cat sekoci	Sekoci dicuci dengan sabun dan dicat dengan cat orange dipasang reflectif tip baru	Cat Orange Reflectif tip	20 lt 1roll

Disetujui tanggal	Diterima tanggal
Tanda Tangan	Tanda Tangan
Nama	Nama
Jabatan	Jabatan

DAFTAR PERBAIKAN (REPAIR LIST)

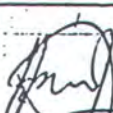
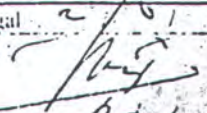
Nama Kapal : KM.Caraka Jaya Niaga III-2		Tanggal Rencana Docking : / /		
No.	Obyek Perbaikan	Aktivitas/ Uraian Perbaikan yang diperlukan	Kebutuhan Spare Part	
			Spesifikasi	Jumlah
29.	Blok pengantar wire sekoci.	Blok pengantar wire sekoci dilancarkan dan diberi gemuk baru termasuk wire dan labrang sekoci.	Grease	1 Pail
30.	Dewi-dewi	Dewi-dewi sekoci termasuk railingnya diketok, sikat, meni, cat putih.	Meni Cat putih Thinner	5 lt 20 lt 5 lt
31.	Deck sekoci	Deck sekoci luas +/-190M2 diketok, sikat, meni dan cat hijau deck.	Meni Cat Hijau Thinner	30 lt 40 lt 10 lt
32.	Anjungan . Rumah/atap pelindung dek.	Samping kanan kiri anjungan dibuatkan atap pelindung dek anjungan dari bahan tulang pipa& atap fiber.	Pipa 1,5" fiber/atap 900mmx2400mm	10 btg 20 lbr
33.	Compass deck	Compass deck, bridge deck, captaintdeck diketok, sikat, meni, cat hijau deck.	Meni Cat hijau	30 lt 50 lt
34.	Railing	Railing dari compass deck sampai captain deck dirawat dan dicat putih.	Meni Cat putih Thinner	5 lt 10 lt 5 lt
35.	Blower	Blower kamar mesin posisi di capt.deck 2bh penutup bagian dalam sudah keropos agar diganti baru dan ganti paking karetnya.	Plat t.3mm Karet 3mmx2mm	1 lbr 10 Mtr
Dibuat tanggal		Diterima tanggal		
Tanda Tangan		Tanda Tangan :		
 (Km Caraka Jaya Niaga III-2)				
Nama : WAH... Jabatan :		Nama : ... Jabatan : Technical Surveyor		

DAFTAR PERBAIKAN (REPAIR LIST)

Nama Kapal : KM. Caraka Jaya Niaga III-2		Tanggal Rencana Docking : / /		
No.	Obyek Perbaikan	Aktivitas/ Uraian Perbaikan yang diperlukan	Kebutuhan Spare Part	
			Spesifikasi	Jumlah
36.	Palkah Plat Topside.	Plat topside lambung kiri penyok sepanjang frame 103-110 agar di replating.	Plat tebal 12mm	
37.	Braket	Braket gading-gading di lower hold sebagian tipis & berkarat agar diganti baru.	Plat dibentuk braket.	
38.	Plat tank Top	Plat tank top yang sudah tipis dan berkarat agar diganti plat baru.	Plat tebal 12mm	
39.	Plat tween deck.	Plat tween deck yang berkarat diketok, sikat, meni dan di cat merah 2X.	Meni Cat merah de Thinner	80 lt 80 lt 40 lt
40.	Dinding Palka	Dinding palka dicuci/cleaning seluruh palka dan dicat abu-abu dan perak	Meni Cat abu-abu. Cat Perak	100 lt 40 lt
41.	Pelindung kabel	Pelindung kabel bahan dari plat yang rusak buat baru.		
42.	Kotak sepatu container.	Kotak tempat sepatu container untuk dalam palka dibuatkan baru (3 bh)	Plat siku 2 papan	
43.	Saringan air got.	Saringan pipa hisap got palka 1,2,3 kiri kanan yang rusak dibuatkan baru.	Plat bentuk saringan.	
44.	Pelindung smoke detector.	Plat pelindung smoke detector 33 bh rusak agar dibuatkan baru, untuk palka 1,2,3.	Plat 3mm	8 Lb
45.				

Dibuat tanggal Tanda Tangan	Perusahaan Pelawaran Desertuji tanggal Tanda Tangan Km Caraka Jaya Niaga	Diterima tanggal Tanda Tangan
Nama : <i>[Signature]</i>	Nama : <i>[Signature]</i>	Nama : <i>[Signature]</i>
Jabatan : <i>[Signature]</i>	Jabatan : Nakhoda	Jabatan : Technical Surveyor

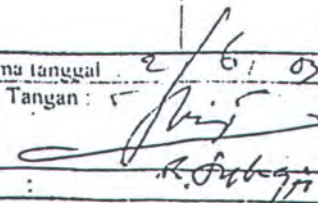
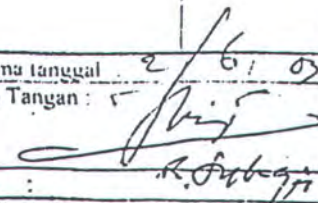
DAFTAR PERBAIKAN (REPAIR LIST)

Nama Kapal		: KM.Caraka Jaya Niaga III-2		
Tanggal Rencana Docking		: / /		
No.	Obyek Perbaikan	Aktivitas/ Uraian Perbaikan yang diperlukan	Kebutuhan Spare Part	
			Spesifikasi	Jumlah
45.	Bracket	Bracket frame sebagian sudah tipis dan keropos agar dipotong bagian yang tipis dan ganti baru.	Plat bentuk bracket.	
46.	Sekat palka	Plat sekat palka 1 dan 2, 2 dan 3, palka 3 dan kamar mesin bagian bawah keropos dan tipis agar dipotong dan dilas plat baru.		
47.	Tanki-tanki	semua tanki balast dan air tawar dibuka, paking manhole diganti baru. semua tanki diclening, cek kondisinya.	Paking manhole tanki	
48.	Pipa sonding.	pipa sounding balast dan air tawar di periksa, yang keropos ganti baru. plat bagian soundingan diperiksa .	Pipa 1.5"	
49.	Got palka	Got palka 1, 2, 3 dikeringkan, dikleaning, diketok dan dicat bituminus.		
50.	Crane	Crane 1, 2 merk Lieberl bagian dinding dan batang pemuat diketok, meni, dan cat hijau 2x	Meni cat hijau Thinner	20 lt 80 lt 20 lt
51.	Cargo blok	Cargo blok crane 1 dan 2 dibuka, bersihkan, pompa gemuk baru dan rakit kembali. cek kondisi sheave dan bearing serta as nya.		
52.	Wire rope.	Wire rope crane 1, 2 jenis non rotating wire dicheck ulang kondisi dan dimintakan spare.	Spare wire crane 1 : Crane 2 : Ø32mm X 207 M Ø25mm X 174 M	
Dibuat tanggal		: / /		
Tanda Tangan		: 		
Nama		: Agus		
Jabatan		: PELAYANAN		
Diterima tanggal		: 2/6/0		
Tanda Tangan		: 		
Nama		: Agus		
Jabatan		: Technical Surveyor		

DAFTAR PERBAIKAN (REPAIR LIST)

Nama Kapal : KM.Caraka Jaya Niaga III-2
Tanggal Rencana Docking : / /

No.	Obyek Perbaikan	Aktivitas/ Uraian Perbaikan yang diperlukan	Kebutuhan Spare Part	
			Spesifikasi	Jumlah
53.	Railing	Railing crane 1,2 yang rusak agar diperbaiki.	Pipa ϕ 1,5"	
53.	Kaca crane	Kaca pelindung crane 1,2 yang pecah agar diganti baru.	Kaca mika.	
54.	Radar	Radar merk JRC jangkauan hanya \pm 1 NM agar direpair.		
55.	Echo sounder.	Echo sounder merk JRC agar diadakan service.		
56.	Gyro	Compass gyro merk anschutz kiel dan auto pilot rudder compilot agar diadakan servis		
57.	Compass adjusment	Agar diadakan compass adjustment dan kalibrasi RDF saat sea trial.		
58.	Master clock.	Master clock anjungan rusak penunjukan jamnya agar di-repair.		
59.	Plat topside.	Plat topside buritan kiri posisi kamar mesin penyok ke dalam agar diadakan replating.		
60.	Tanda selar	Tanda selar kapal sudah rusak agar dibuatkan baru.		
61.	Dinding akomodasi.	Dinding akomodasi kamar masinis III dan kelasi keropos agar diganti plat baru.		
62.	Plat bosun store.	Plat lambung kiri di bosun store bocor agar diganti plat baru.		

Tanggal : / /
 Tanda Tangan : 
 Diterima tanggal : 2/6/07
 Tanda Tangan : 
 Nama : R. Subagja
 Jabatan : Technical Surveyor
 Nama : W. H. L. M. S.
 Jabatan : Nakhoda