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ACADEMY OF MARITIME EDUCATION AND TRAINING (AMET)

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135, EAST COAST ROAD, KANATHUR, CHENNAI - 603 112.

TAMILNADU, INDIA

Internship Project –

"AUTOMATED MOORING SYSTEM"

A Report On Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	ANITHA.N.P	2098A	ANS17043

April & 2020

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BONAFIDE CERTIFICATE

This is to certify that the project entitled **"AUTOMATED MOORING SYSTEM"** submitted by Cadet. **ANITHA.N.P** Reg.No **ANS17043**…Batch 16……in the Department of Nautical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt.P.Rajendran
Associate Professor
Department of Nautical Science

Signature

Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme : **B.Sc**

Year of study and Batch/Group : **Batch-16/ Group -5**

Name of the Mentor : Capt.P.Rajendran

Title of the assigned internship : **"AUTOMATED MOORING SYSTEM"**

Nature of Internship : **Individual/Group**

Reg No of Student : ANS17043

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

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INTERNSHIP EVALUATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Student	**ANITHA.N.P**
Register No and Roll No	ANS17043& 2098A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP-4
Semester	**VI**
Title of Internship	**"AUTOMATED MOORING SYSTEM"**
Duration of Internship	1 MONTH
Mentor of the Student	Capt.P.Rajendran

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	8
2	Adequacy & quality of information recorded	10	9
3	Drawings, sketches and data recorded	10	8
4	Thought process and recording techniques used	5	4
5	Organization of the information	5	3
6	Originality of the Internship Report	20	14
7	Adequacy and purposeful write-up of the Internship Report	10	8
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	8
9	Practical applications, relationships with basic theory and concepts	10	7
10	Presentation Skills	10	7
Total		**100**	**76**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

AUTOMATED MOORING SYSTEM

The “mooring magnets” were excluded in the past in order to avoid damage the roro vessels cargoes sensitive to the magnetic field, such as TVs, computers, etc., whose cathode ray tubes are especially sensitive to the magnetic fields. Moreover, such magnetic fields could have prevented the lifting of steel containers from deck or holds.

But now, “magnetic” specialists from the Delft University of Technology in the Netherlands think they are able to develop electromagnets whose magnetic field would not penetrate too much into the vessel's spaces.

For thousands of years, the traditional practice of mooring with ropes has remained unchanged

Automating the mooring process represents an entirely new field of maritime technology

Each of their mooring magnets generates a 1-tesla magnetic field. The magnets are formed from 13 long, thin, rod-shaped electromagnets placed side by side in a pattern that concentrates the magnetic field around the sides of the rods. The proximity of the rods ensures the field from each is attracted to its neighbours, rather than extending forward very far, the inventors say. They are confident their magnets will not affect anything inside a ship.

According to calculation, 52 of these magnets mounted along a quayside will be capable of holding a 400-metre container ship in place. The magnets are strong enough to secure a ship in winds of up to storm force 12, and will be unaffected by the wash from passing ships.

To allow the ship to rise and fall with the tide, the magnets are periodically switched off and then on again.
With a full knowledge of the mooring conditions at all times, the operator has complete control and understanding of the moored state of the vessel.

Working Principle and construction of automated mooring system By Magnet

Principle of electromagnetism is used for magnetic mooring system. An electromagnet is a type of magnet in which the magnetic field is produced by an electric current. Electric current is used for making temporary magnets known as electromagnets that work on the magnetic effect of electric current. Combination of a solenoid and a soft iron core constitute an electromagnet. Soft iron should be used to remove magnetism of electromagnet when the electric current is cut off.

Electromagnets can be made of different shapes and sizes depending on the purpose for which they are to be used.

Working principle of the magnetic mooring system that the system has the electrical cables, fenders to protect the quay and vessel, the magnetic pads connected to the hydraulic arms and the power supply that provides the magnetism. Electrical power produces electromagnetic fields turns on the magnets and electromagnetic fields are used for mooring the ship.

Advantages of the mooring system

For thousands of years the maritime industry has relied on the use of ropes to secure vessels. It has been a reliable system that has worked well but is now somehow out of synch with the maritime industry's focus on continuous improvements in productivity and efficiency.

Safety

- Risk of injury to shore and ship personnel by mooring ropes eliminated.
- Continuous load monitoring and sophisticated alarm functions relayed in real time to operations personnel.

Economy

• Fast attachment (typically > 12 sec) and instant release.

• No more delays while waiting for mooring crews to become available.

• Only one operator required, based ashore or onboard, to activate and remotely monitor the mooring system.

• No more disruption of other duties or mandatory rest hours of ship crews.

• Reduction of crew numbers on ships and pier on fixed-route operations.

• Shorter port stay means less speed is required at sea and offers better ship and berth utilization.

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TAMILNADU, INDIA

Internship Project –

"SUCTION OF OIL USING NANOTECHNOLOGY AND MAGNETISM"

A Report On Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	**GOWTHAM.R**	**2147A**	**ANS17092**

April & 2020

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BONAFIDE CERTIFICATE

This is to certify that the project entitled "SUCTION OF OIL USING NANOTECHNOLOGY AND MAGNETISM"submitted by cadet**.**
GOWTHAM.R Reg.No: **ANS17092**…Batch 16……in the Department of Nautical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt.K.Rajesh
Associate Professor
Department of Nautical Science

Signature

Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme **: B.Sc**

Year of study and Batch/Group **: Batch-16/ Group -6**

Name of the Mentor **: Capt.Dr.K.Rajesh**

Title of the assigned internship **: "SUCTION OF OIL USING NANOTECHNOLOGY AND MAGNETISM"**

Nature of Internship **: Individual/Group**

Reg No of Student **:** ANS 17092

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

INTERNSHIP EVALUATION REPORT 2019-20

AMET
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Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Student	GOWTHAM.R
Register No and Roll No	ANS 17092 & 2147A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP-5
Semester	**VI**
Title of Internship	**"SUCTION OF OIL USING NANOTECHNOLOGY AND MAGNETISM"**
Duration of Internship	1 MONTH
Mentor of the Student	**Capt. Dr.K.Rajesh**

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	9
2	Adequacy & quality of information recorded	10	9
3	Drawings, sketches and data recorded	10	9
4	Thought process and recording techniques used	5	4
5	Organization of the information	5	4
6	Originality of the Internship Report	20	15
7	Adequacy and purposeful write-up of the Internship Report	10	8
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	6
9	Practical applications, relationships with basic theory and concepts	10	8
10	Presentation Skills	10	8
Total		**100**	**86**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

SUCTION OF OIL USING NANOTECHNOLOGY AND MAGNETISM

ABSTRACT:

The objective of this project is to control the oil spills caused in the ocean by the method of Nanotechnology. Our project uses magnetism as a means to collect the spilled oil. There are many methods like using floating skimmers, or suction methods. But our method is one of the easiest, economical as well as safest method for the marine environment.

While other methods employ many machineries, which may sometime lead to fire accidents or explosion hazards, our methods incorporate the usage of nano-magnetic particles which merely collects the oil by sticking to the surface of the oil. When the magnetic particles are collected by attraction with another strong magnets, they bring along with the oil particles by acting as an oleophilic and help clean the spilt oil.

In the upcoming section, we are to discuss the introduction of how the oil spill damages an environment as well as what made us choose this as our project.

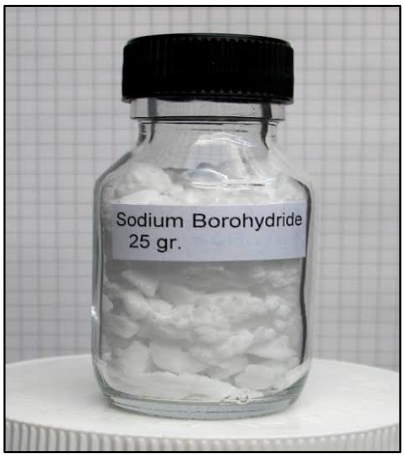
INTRODUCTION:

- The water pollution causes serious risk to the marine environment. In this case, it is the oil pollution.
- It risks the life of hundreds of waters organisms and endangers the marine environment.
- In this introduction, we are going to discuss some of the larger oil spills occurred in that have been considered the worst oil spills in decades.
- In 1991, Gulf Oil War caused a serious damage to the marine body. Iraq spilled Oil in the ocean by opening pipelines and tanks of oil to set fire to UN forces. Over 3 months, it caused a major pollution and killed hundreds of aquatic birds and animals.

- In 2010, another large oil spill caused in the Gulf of Mexico which was when the oil drilling rig exploded and caused the death of 11 workers. It occurred 13,000 ft beneath the water surface. BP took many steps to control the spill but it resulted in failure. It caused 80,000 birds, 25,000 mammals, 10,000 fishes to be affected. Over 53,000 barrels per day of spilled oil was collected. It took 87 days to overcome the crisis.
- In 2017, an outbound empty tanker collided with an inbound oil tanker causes oil spill at Ennore port in Tamilnadu, India. But it caused no major damages.
- It is the responsibility of us seafarers, to protect every living organism. We cannot prevent the incident but only control damages in some cases. On taking scientific steps, we can overcome it.
- This project tells us how to protect the marine ecology and environment from the oil pollution.
- Many methods are undertaken for cleaning of oil spill from the marine environment in a method which is safe the environment as well as cleaning the oil spill.
- In this project we are going to use one of the finest method - magnetic suction method, to remove oil from the ocean.

MATERIAL USED:

Sodium Borohydride



Ferric chloride hexahydrate

Methanol

100ml - Glass beakers

A box gloves

pH test strips

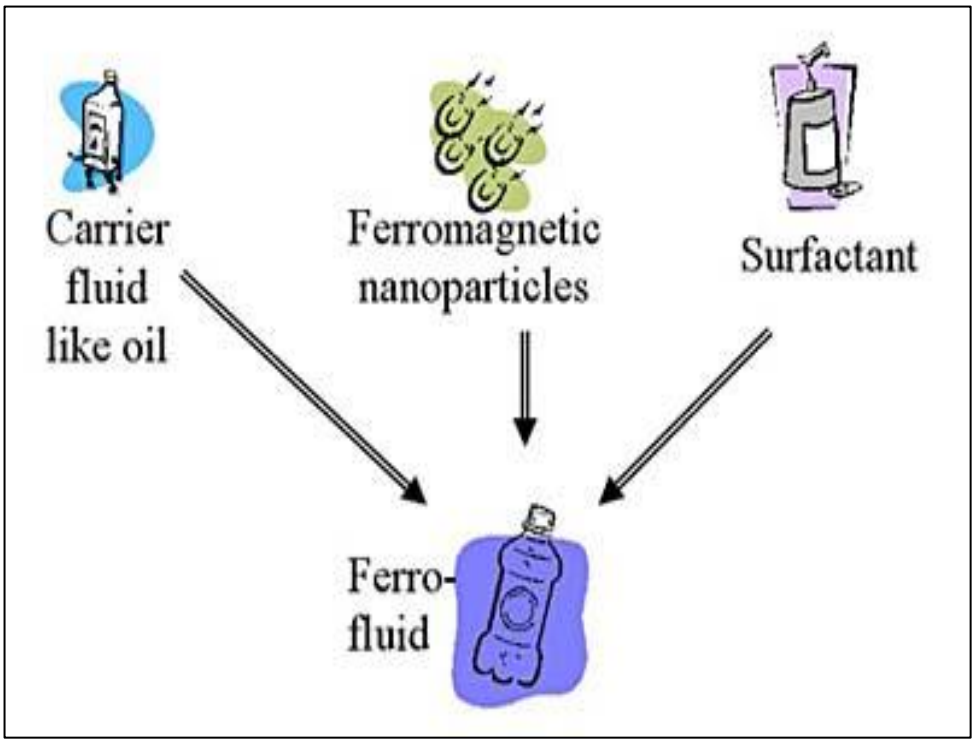
Magnetic stirring bead

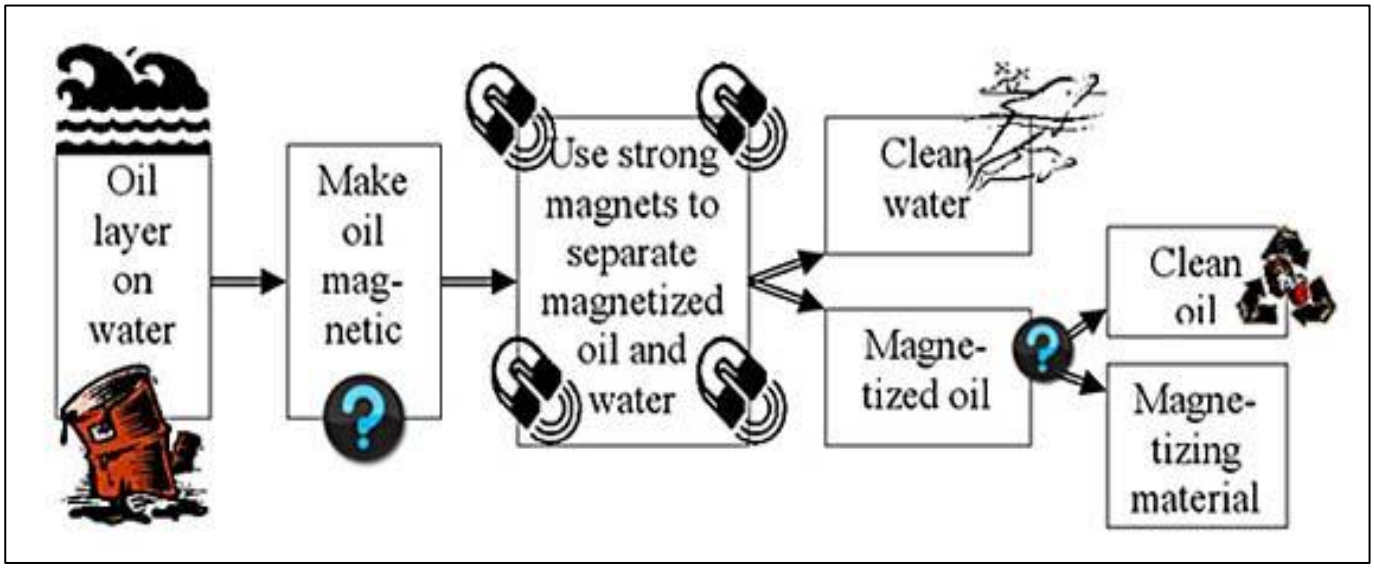
Magnet

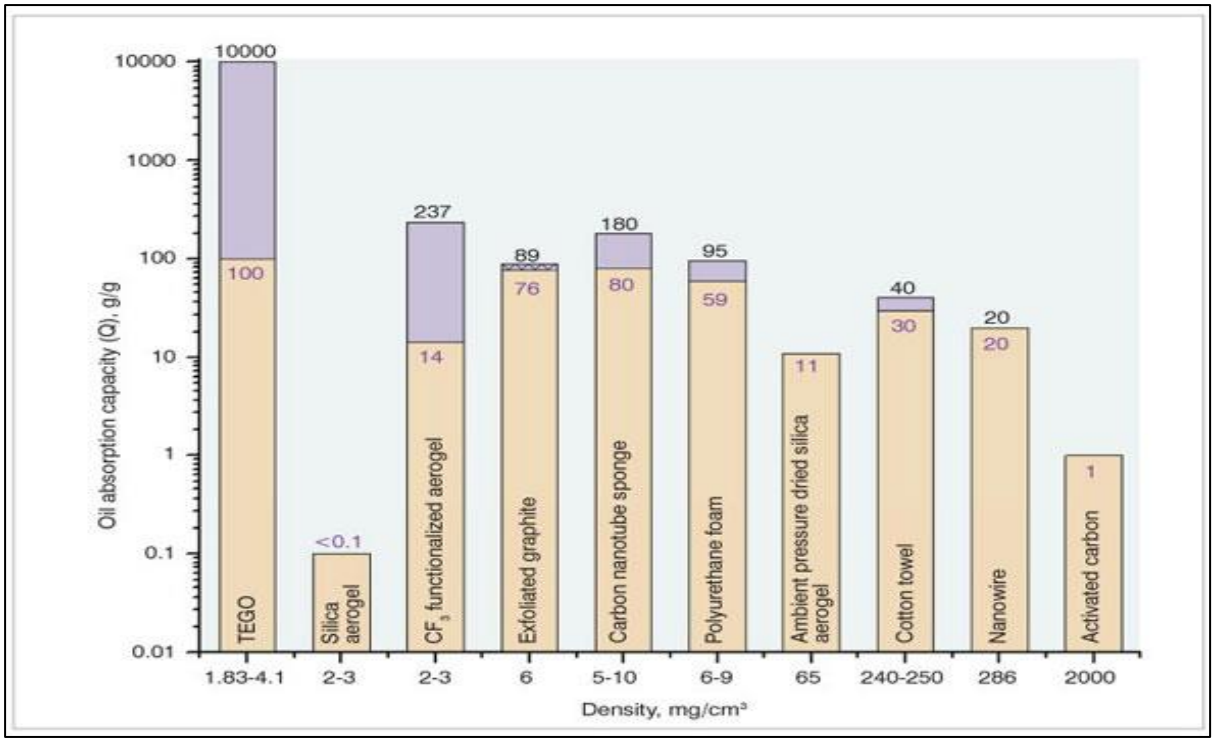
METHODOLOGY:

- In Magnetic suction method ferrous-nano particles are added to the oil. To make the ferrous nano particles oleophilic.
- The oil usually does not gets attracted to magnet but it gets attracted when it is mixed with ferro nano particles.
- The ferrous nano particles do not mingle with the water because it is aqua phobic.
- The ferrous nano particles stick to the oil due to electromagnetic force.
- The oil does not expand further due to the electromagnetic force.
- In oceans we use contained booms that attract the ferro fluid by a strong magnetic force.
- This strong magnetic force comes into play when we use cylindrical magnet because it has strong attractive force.
- Then the mixture moves forward because of the equal magnetic force created in the contained boom.
- After that the magnetic materials are separated magnetically from the oil.
- Both the oil and the magnets can be reused again making it an efficient mode of cleaning Oil Spills.
- In this project we use one of the finest methods (magnetic suction method) to remove oil from the ocean.

LIST OF PHOTOGRAPHS:







CONCLUSION:

- We know that Oil spill is hazardous to marine environment, the economy of the country as well as the aquatic organisms.
- The advantage of magnetic suction method is that, it requires very low electricity and it does not affect any living organisms and without any chemicals.
- Hence, we present a best way to cope up with the problem of collecting the oil spill.

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TAMILNADU, INDIA

Internship Project –

"SHIP SIDE OIL – SPILL POLLUTION CONTROL"

A Report On Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	**ANAL JAMON**	**2089A**	**ANS17034**

April & 2020

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BONAFIDE CERTIFICATE

This is to certify that the project entitled ""**SHIP SIDE OIL – SPILL POLLUTION CONTROL**""submitted by cadet**. ANAL JAMON** Reg.No: ANS17034…Batch 16……in the Department of autical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt.YESHWANTHRAJ
Associate Professor
Department of Nautical Science

Signature

Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme **: B.Sc**

Year of study and Batch/Group **: Batch-16/ Group -6**

Name of the Mentor **: Capt.Yeshwanthraj**

Title of the assigned internship **: "SHIP SIDE OIL – SPILL POLLUTION CONTROL"**

Nature of Internship **: Individual/Group**

Reg No of Student : ANS 17034

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

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INTERNSHIP EVALUATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

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Name of the Student	Amal Joman
Register No and Roll No	ANS 17034 & 2089A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP-5
Semester	**VI**
Title of Internship	**SHIP SIDE OIL – SPILL POLLUTION CONTROL"**
Duration of Internship	1 MONTH
Mentor of the Student	**Capt. Yeshwanthraj**

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	8
2	Adequacy & quality of information recorded	10	9
3	Drawings, sketches and data recorded	10	9
4	Thought process and recording techniques used	5	4
5	Organization of the information	5	4
6	Originality of the Internship Report	20	14
7	Adequacy and purposeful write-up of the Internship Report	10	7
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	5
9	Practical applications, relationships with basic theory and concepts	10	7
10	Presentation Skills	10	7
Total		**100**	**80**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

CONTENTS

ABSTRACT

Marine pollution and control have been one of the major issues faced by the shipping industries. Even though strict laws and regulations have been laid by the IMO (International Maritime organization) through MARPOL (International Convention for the Prevention of Pollution from Ships) Annex 1, regarding oil spills in the ocean, it is very true that oil pollution from ships can only be reduced or controlled to an extent, it can't be totally eradicated. This is where oil spill management and oil spill control comes into play. Oil spill becomes harmful only when it occurs in a large scale, where the measures taken for control and spilled oil should be done fast, effectively, thereby ensuring that it does not does not spread to the surrounding waters, ports or affect any marine organism which is nearby the spillage area. The major problem for oil spill control comes when the spill occurs in open oceans. Due to the action of the wind, current and huge waves, there occurs a dispersion of spilt oil very fast. During this time, oil spillage is hard to control if it occurs in a large scale. Our project aims to control oil spill control and management in the ship side.

The following sections of our project will clearly define and explain how our device aims to reduce oil spill which has occurred in the shipside in open ocean for fast oil pollution control and management with the help of a Tube type skimmer which will consist of a tube on the surface of the oil spill area which rotates continuously thereby collecting oil with it and acting as an oleophilic. The continuous conveyor motion of the tube allows collecting oil and also refurbishing it at the same time

INTRODUCTION

Oil skimmer is generally a machine that removes floating oil and grease from liquid. The floating oil adheres to skimming media, such as a belt, tube, rope, mop, or disk. The media then runs back to the machine to be wiped clean. This project is built around a working model of a tube-type oil skimmer which can be can be self-powered and used for the collection of spilled oil.

Oil and water are very well known to be immiscible substances. It can be clearly separated from one another through various methods. In fact, this property gives us the advantage of separating the oil from the ocean before it causes further damage. The relationship between oil and water in a mixture is well-known and governed by two physical properties:

1. **Specific Gravity**

Most hydrocarbons have a lower specific gravity than water. Without agitation, oil separates from the water and floats to the surface. These oils are known as LNAPL's, Light Non-Aqueous Phase Liquid.

Oils (and other compounds) that sink in water have a higher specific gravity and are known as DNAPL's, Dense Non-Aqueous Phase Liquid.

2. **Surface Tension and Affinity**

Normally, oil bonds more tightly to itself and other materials than to water. This affinity and differences in surface tension between oil and water, cause oils to adhere to a skimming medium.

There are several types of industrial oil skimmers. The best type of Oil Skimmer will maximize oil removal while minimizing capital outlay and skimmer operating costs.

These applications are based on the following characteristics:

- Operating conditions
- Hazardous materials
- Temperature/viscosity
- Skimmed water content
- Residual oil
- Portability
- Tank or sump characteristics
- Size, design, shape, and location installation

METHODOLOGY

All oil skimmers rely on the fluid properties of specific gravity and surface tension. Most use a moving medium to remove floating oil from the fluid's surface. Floating oil and grease cling to skimming media more readily than water. This allows media in the shape of tube to pass through the fluid surface and pick up floating oil and grease while rejecting most of the water. The oily material is subsequently removed from the media with wiper blades or pinch rollers.

Tube Oil Skimmers uses collector tube that is sized in length for the application and welded into a continuous loop. Collector tube floats on the surface of water and is driven in a continuous loop by the skimmer. Oils, fats, and grease cling to the outer surface of the tube and are drawn into the skimmer. The material drawn into the skimmer is scraped off by abrasive resistant scrapers and flows into a sludge pan with drain coupling. The clean tube is then driven back to the surface of the water by the skimmer to remove more material.

In this way the cycle of the skimmer produces a continuous loop which causes the tube to get cleaned and go back into the water again and again so as to drain the desired quantity of oil from the water and to send that oil and water mixture or only oil into the oil water separation tank for the purification

Once it is sent into the separation tank the oil is purified and can be reused. By using such a type of skimmer the pollution which will be caused by the oil spill which will be reduced to a considerable amount than what would have been if there was no skimmer.

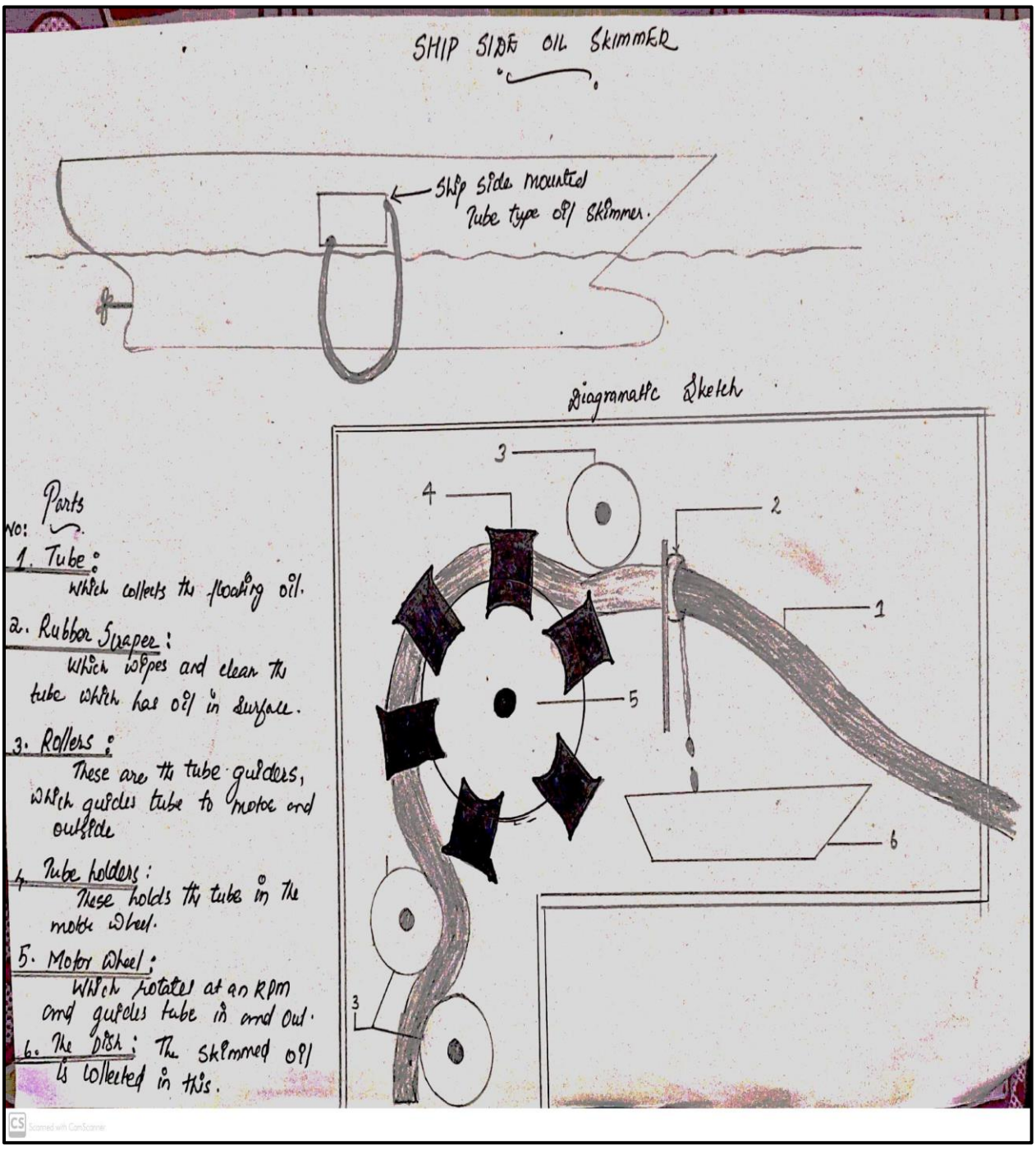
CONCLUSION:

As seen in the above procedures it can be seen that the tube type oil skimmer designed by our group can be used effectively to control and reduce the amount of oil spilled into the open ocean thus relieving from getting caught and held for major oil spills under the sections of MARPOL.

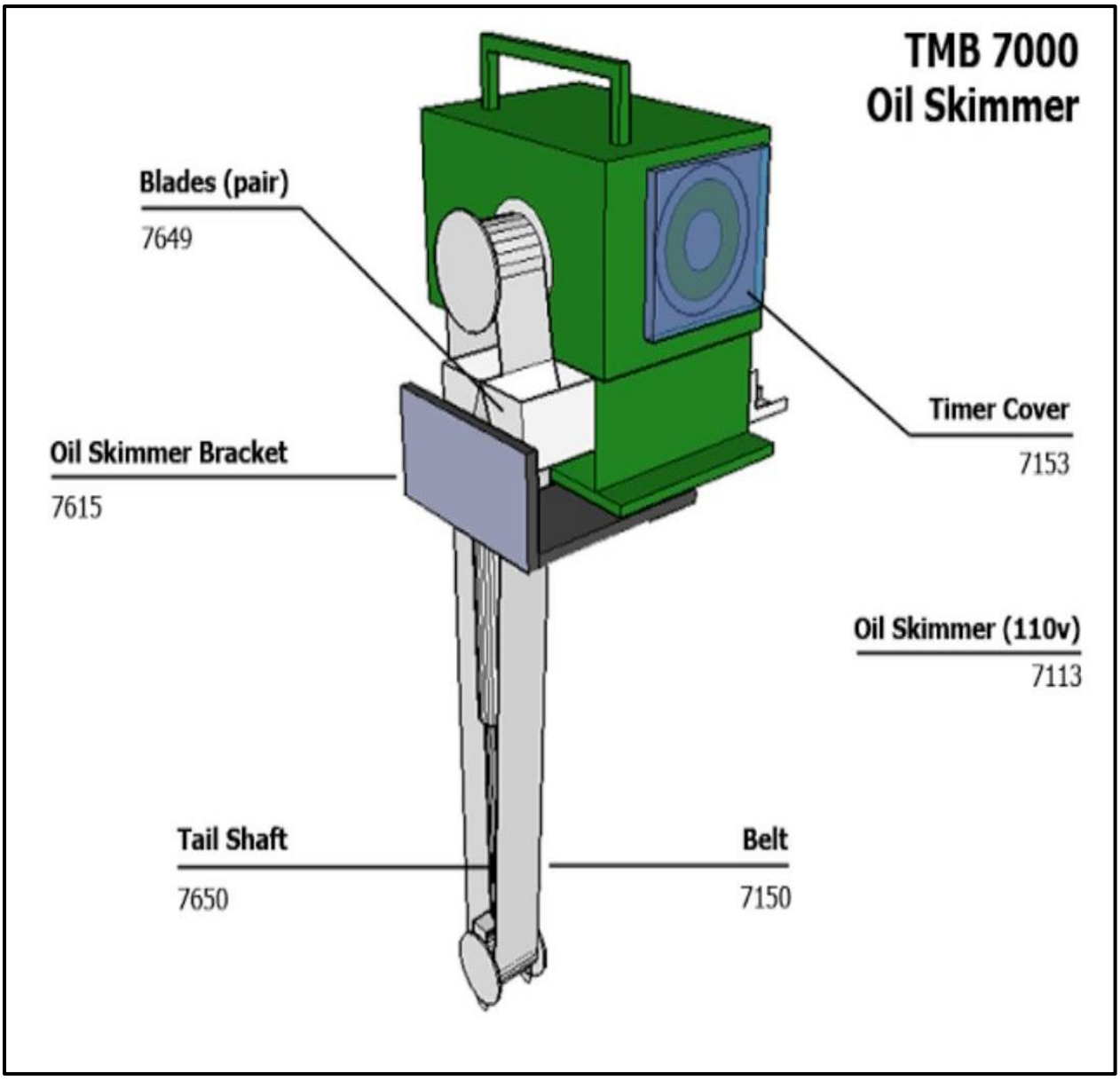
This model is more efficient to absorb ship-side oil spill as, being attached to the ship side, it gets more access to the spilt oil offside. Secondly, since it is placed and its moment is controlled in water, it floats along with the spilled oil due to the movement of the ship and the oil in the open ocean gets absorbed, thereby tackling the problem of major quantities of oil being drifted away.

PHOTOGRAPHS:

1. **Diagrammatic sketch of the Tube type Oil Skimmer mounted on the ship side along with its parts**



2. General sketch showing the basic parts of an oil skimmer



3. **The image showing the actual set up of the Tube type Oil Skimmer mode taken from the Coast Guard Station, Chennai.**

STUDENT DIARY

- SeaTeam: Team 1

FOREWORD

* This sheet is to reflect only those items covered for the purpose of the NOVUS – Navinautics converted Internship project during the COVID outbreak.
* This student's diary serves solely for the purpose of Internship Project decided for which the topic was before the epidemic.
* The Students diary maintained herewith is the consolidated thoughts and findings done for the purpose of this project by the members of this team.
* This contains a culmination of fresh ideas by our cadets and notes referred from various websites, videos and journal papers whose references have been sited at the end of this diary.
* The list of all diagrams, images, sketches have been mentioned with serial numbers for the purpose of reference. Please note that some of them are not exact images, but accurate ones made based on the ideas of our team members.
* Hope this students' diary serves the purpose of detailing the workings of our team for our project.

- *Team 1 – Seateam Management*

Day: 1

Date: 29th February, 2020

No. of hours: 40 minutes

Task: Formation of Team and WhatsApp group for Seateam Team 1.

Information:

- The following team was formed with total 7 members out of 14 members, with the help of SCC Cdt. Shahin Marvan. The initial ideas on the topic was presented, upon which the ideas for the topic were to be developed.

Sl. No.	Cadet Name	Roll No.	Reg. No.
1	S Akshaya	2358A	ANS18042
2	Jatin Soni	2347A	ANS18031
3	Amaljith JD	2359A	ANS18043
4	CS Aditya	2330A	ANS18014
5	R Ranjith	2344A	ANS18028
6	S Sanjai	2345A	ANS18030
7	Gokul Prasanth	2416A	ANS18100

- For Seateam Team – 1, the leader elected was Cdt Akshaya S and the idea for the topic was suggested by the same person – Shipside Oil Spill Pollution Control Equipment.
- WhatsApp group called – NOVUS were formed through which further communications were to be made.
- Further plans were made by the members of the team to discuss regarding the project.

Remarks: The members of the team were asked to discuss regarding the possibilities of making working model for the topic.

Day: 2

Date: 3rd March, 2020

No. of hours: 1hr 15 mins approx.

Task: Purpose for choosing the topic was discussed by Cdt Akshaya

Information:

- Marine pollution has been one of the most dangerous crimes committed for long by human kind. Be it due to negligence or due to human errors.
- Oil pollution in Seas and Oceans not only damages the marine life and environments, but also threatens the economy of a country.
- The very best example of this mishap is the BP oil spill and the Exon Valdez case which led to formation of MARPOL Annex 1.

- The IMO MARPOL Annex 1 – Regulations for the Prevention of Pollution by Oil came into force and laid strict enforcements against oil discharge. But in case of Oil Discharge, these devices will come in handy to curb the oil spread and pollution immediately.
- Our purpose is to construct a handy oil spill control device which is not only in the shore and with the coast guards, but also inside the ship to use immediately in case of emergency.

Remarks: The purpose was jointly agreed by the members of the team who were to further give their ideas on the type of oil skimmer to be made.

Day: 3

Date: 4th March, 2020

No. of hours: 2hr 30 mins approx.

Task: Topic was decided.

Information:

- The topic as decided earlier was developed upon. The Oil spill control equipment was to be made which was in relevance with the pollution control topic.
- Oil Skimmer was a device that is used to separate the oil discharged into the ocean due to spills.
- Cdt Gokul Prasanth suggested the types of oil skimmers used by the counties to control oil spill.
- Types of oil skimmers discussed based on their constructions were:

    - Belt type oil skimmers
    - Drum Oil Skimmer
    - Rope-Mop oil skimmers
    - Tube type oil skimmers
    - Disk Skimmers
    - Floating Suction Skimmers

- Cdt Gokul Prasanth suggested the construction of Belt type Oil Skimmers for the following reasons – due to its compactness in size, it would not take so much working space and its rate of oil pick up was upto 2 gallons per hour.
- The materials required for construction of Belt type skimmer was a belt which was made of oil absorbent material which was decided to be added.

Remarks: The idea of constructing a Belt type Oil Skimmer as to be thought upon by the members of the team. Cdt Akshaya asked the team members to go to find out the practical merits and demerits of constructing this type of skimmer. The pros and cons were to be discussed in the next day's meeting.

Day: 4

Date: 5th March, 2020

No. of hours: 1hr 30 mins approx.

Task: To discuss the merits and demerits of Belt type oil Skimmer.

Information:

- Cdt Gokul had presented the idea of Belt type oil skimmers the previous day. Cdt Jatin Soni commented on the demerits of using a belt type oil skimmer while onboard.
- They were as follows:

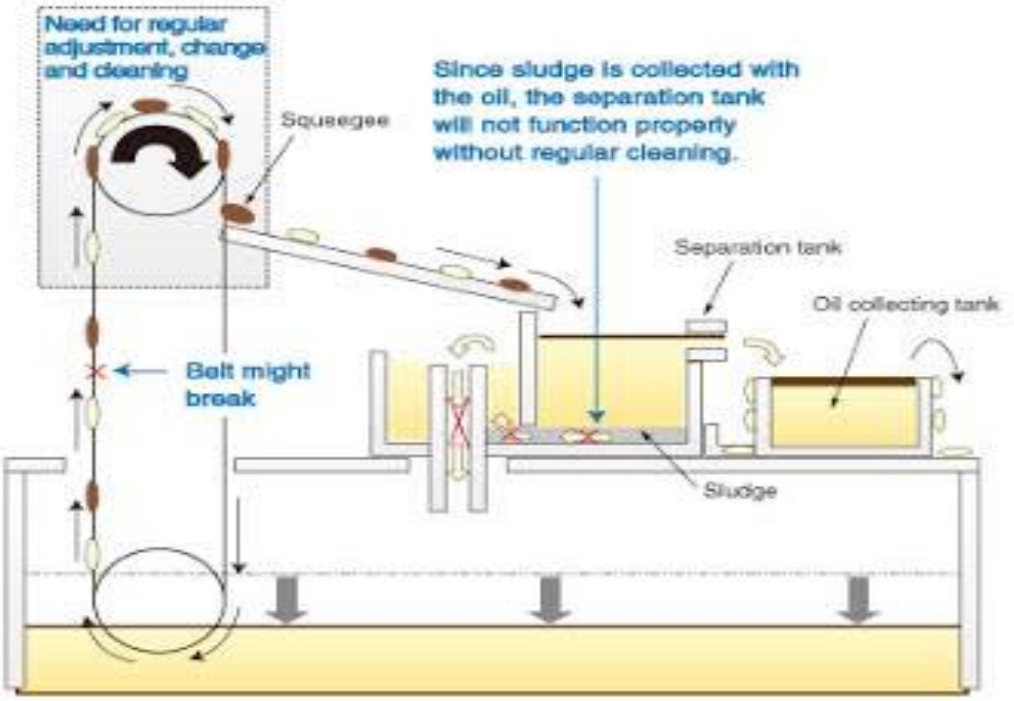
  - It has a very slow oil skim rate
  - It has a very high operating and maintaining cost.
  - Its efficiency is affected if debris is found.
  - It is not effective at collecting oil if it does not float directly to the belt.

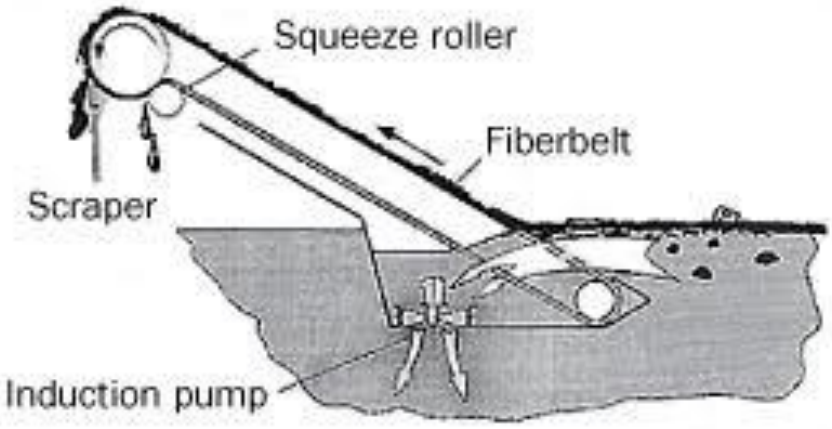
- On group discussion with the team mates, the idea was changed to make a more efficient mode of Oil Skimmer device.
- Cdt Akshaya suggested another type of Oil Skimmer – The Rope-Mop type of Oil Skimmer.
- The rope mop type of oil skimmer is used to recover oil surface like the other oil skimmers. But it uses a rope type mop which is laid over the area of oil spillage. The polypropylene material of the rope-mop, which is woven, absorbs the spilled oil and then collects the oil in a collector drum.
- The advantages of rope-mop type skimmer were to be as follows:

  - It has two types of deployment – vertical and horizontal which is used can be used to collect oil down sumps and drains also.
  - It can be retro-fitted
  - It can be used in variety of configurations.
  - It can recover upto 2000L/hr of floating oil quantity.
  - It contains a built-in oil/water separator.
  - It can be monitored as a single or a double unit.

- The diagrammatic and pictorial representation of the skimmers were discussed with the team members

Standard Belt Oil Skimmer





Fiberbelt oil and debris recovery system

Remarks: The idea of constructing a Belt type Oil Skimmer as to be thought upon by the members of the team. Cdt Akshaya asked the team members to go to find out the practical merits and demerits of constructing this type of skimmer. The pros and cons were to be discussed in the next day's meeting.

Day: 5

Date: 6th March, 2020

No. of hours: 20 mins approx.

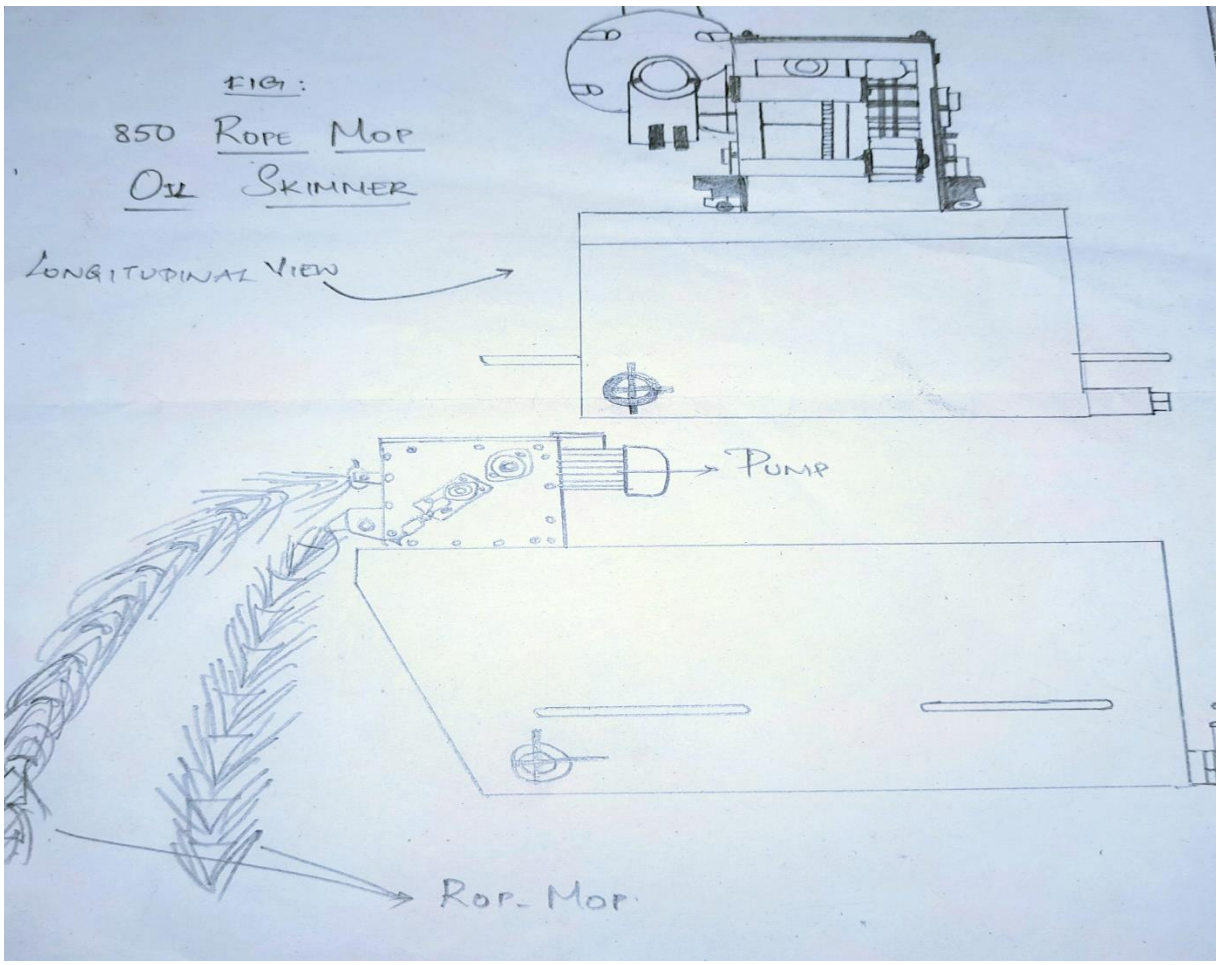
Task: To discuss the merits and demerits of Rope-Mop type Oil Skimmer

Information:

- Cdt Akshaya presented the idea of Rope-Mop Type Oil Skimmers.
- It was rejected by Cdt CS Aditya with his own presentation of demerits which outweighed the merits.
- The following were considered the demerits:

    - It only collects oil that sticks to the rope. The oil which does not stick to the rope is not collected.
    - It has a very high operating and maintaining costs.
    - Some units can drag oil into the water and cause re-emulsification.

Remarks: Citing the disadvantages, the team members were asked to present a different idea for construction of type of oil skimmer which was viable, economical and efficient.



Day: 6

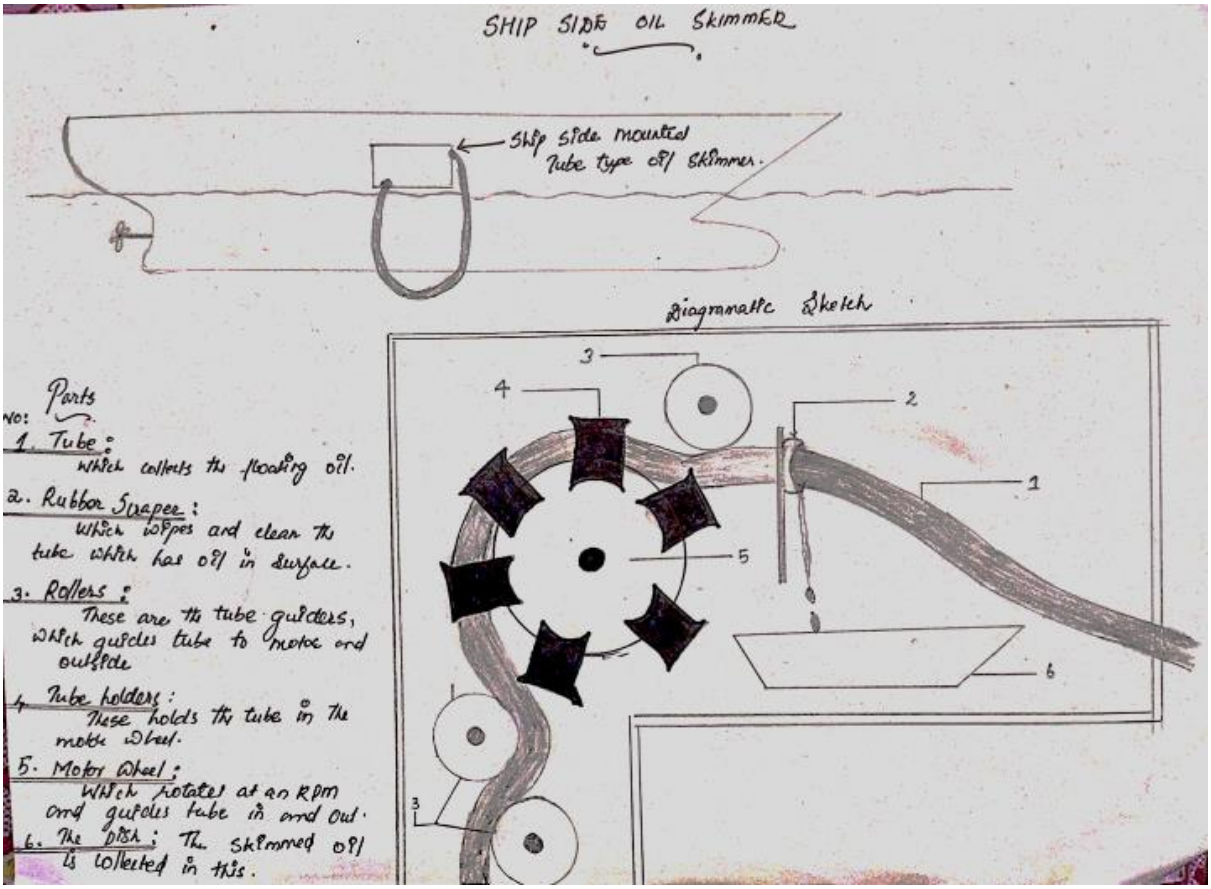
Date: 9th March, 2020

No. of hours: 1hr 30 mins approx.

Task: To discuss and finalize alternate idea for the Oil Skimmer model

Information:

- Cdt Amaljith suggested the tube type oil skimmer which contained the culminated advantage of all the oil skimmer types. Its demerits were negligible.
- It was easier to construct to construct than the rope-mop type skimmer.
- They were most cost effective and had a high oil absorbing rate.
- It could be stowed and stored easily onboard a ship.
- The diagram given by Cdt Amaljith explaining the working was as follows.



Remarks: The Tube type oil skimmer was found most economical and viable of all the oil skimmers and was easier to construct. Approved by the team.

Day: 7

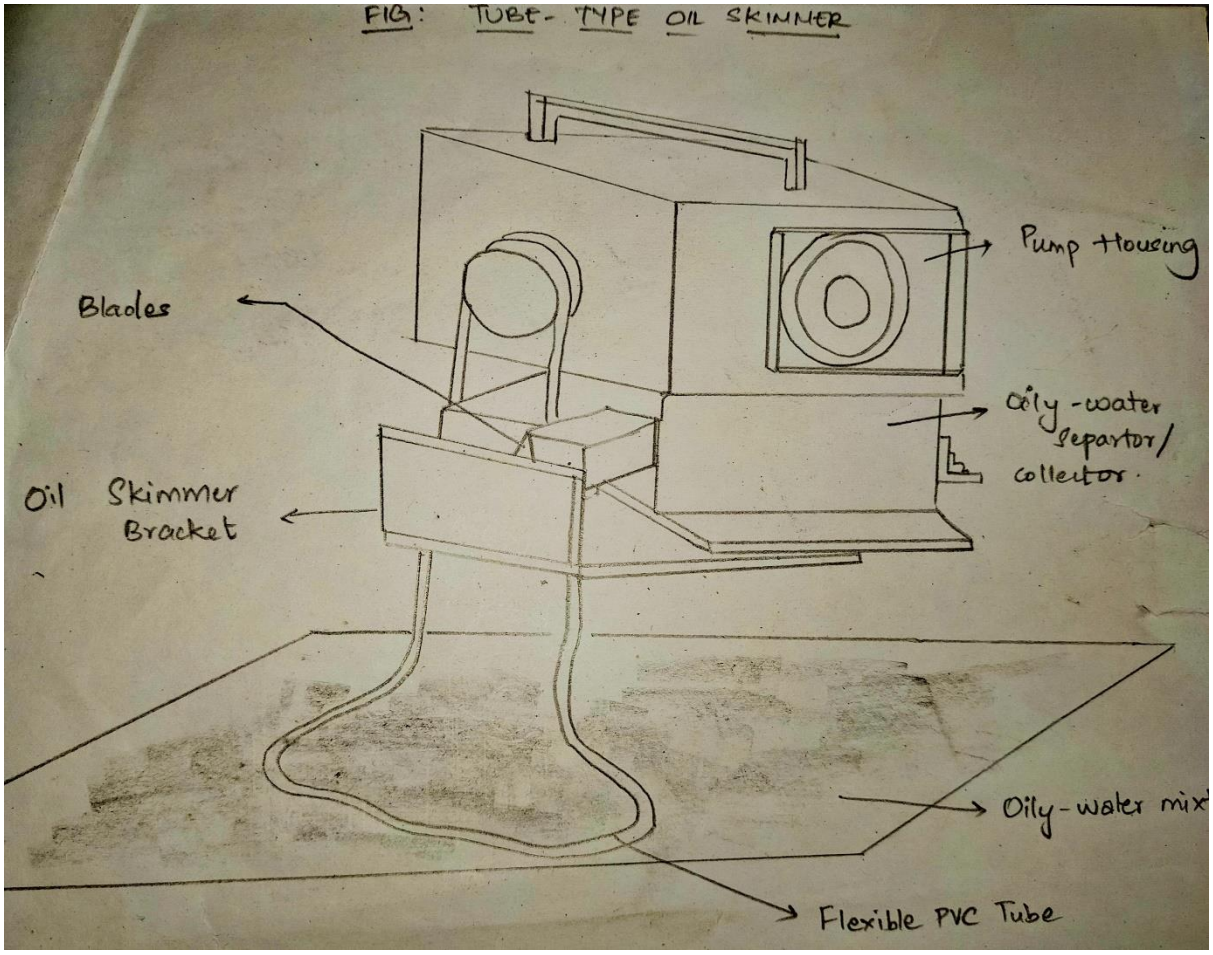
Date: 11th March, 2020

No. of hours: 30 mins approx.

Task: Tube Oil Skimmers – General Introduction cum Discussions.

Information:

- Cdt S Sanjai supported the idea of Tube type Oil Skimmers with his own diagram and a video that explained the working of the tube type oil skimmer from YouTube.
- The diagram was as follows:



- The link for the video is attached herewith: http://youtu.be/PHsVRcxxdcl

Remarks: The video and diagrammatic representation gave a clear working of the Tube Type oil Skimmers. The parts of the device are to be discussed further.

Day: 8

Date: 12th March, 2020

No. of hours: 2hr 45 mins approx.

Task: Parts of Tube Oil Skimmers.

Information: The main parts of tube type oil skimmers were analyzed from the video seen with the help of the diagram.

1. Squeeze roller – For squeezing the tube to prevent the oil stuck on the tube.
2. Tube – The tube made of Flexible PVC which acts as an oleophilic.
3. Scrapper – The scrapper scraps the oil of the and separates them from the tube.
4. Induction Pump – The induction pump rotates the tube and keeps it going in and out of the squeeze roller.
5. Oily water mixture collection drum – Collects the separated oily water mixture and sends it to shipboard OWS in the Engine room for further segregation.

The following parts have been modified for the purpose of demo working model construction as follows:

1. Sponge rollers
2. Polyvinyl Chloride tube - Flexible
3. Oil absorbent pads
4. Dynamo motor
5. Plastic tray

The other items required for the project are:

1. Single Core Breadboard Wire
2. Dual shaft motor fitted with wheels
3. Sand paper
4. High density oil – 100 mL
5. Salt Water – 10 L

Remarks: The list of materials required for making the model was drafted. The cost and expenditure analysis of the items are to be made and the order is to be placed.

Day: 9

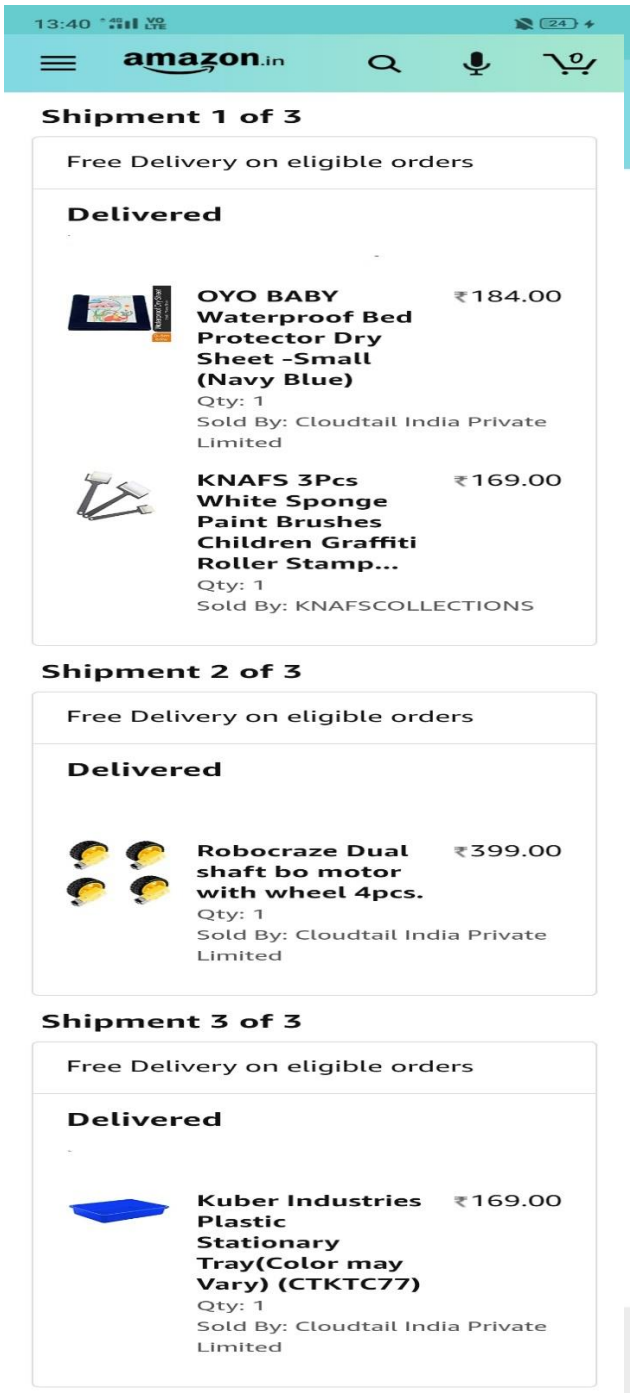
Date: 13th March, 2020

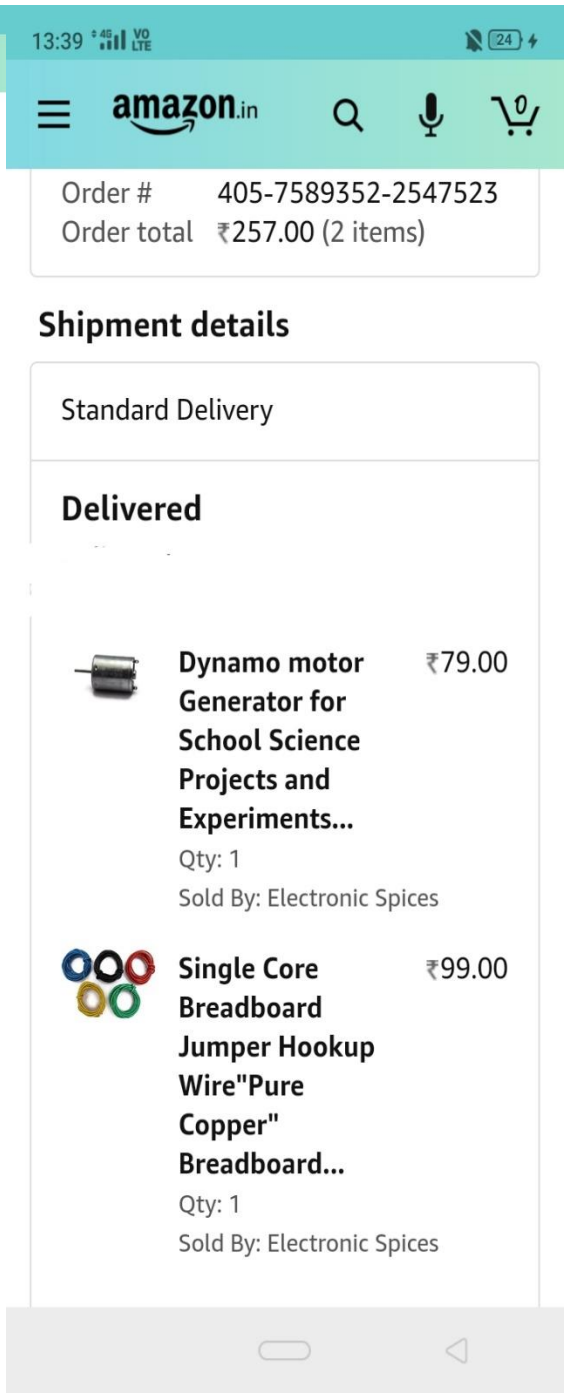
No. of hours: 45 mins approx.

Task: Expenses incurred.

Information:

- The list of all materials was made. An amount of 200/- was collected from all the 7 members.
- Total of 7 * 200 = 1400/- was collected for the purpose of the project.





- The following table contains the list of materials ordered online and its costs summary:

S.No.	Materials	Cost
1	Dynamo Motor Generator	Rs. 79
2	Single Core Bread Board Jumper Hookup Wire – Pure copper	Rs. 99
3	Water Proof Oil Absorbent Sheet	Rs. 184
4	PVC Flexible Tube	Rs. 185
5	Roller Paint Sponges	Rs. 169
6	Dual Shaft Motor with wheel	Rs. 399
7	High Density Oil	Taken from FPFF Station
8	Plastic Tray	Rs. 169
9	Shipping Costs + Tax	Rs. 79
Total Expenditure Incurred		Rs. 1363

Remarks: The total amount were tallied and the items were ordered.

Day: 10

Date: 14th March, 2020

No. of hours: 2hrs 15 mins approx.

Task: Items received. To start construction of the working model.

Information:

- The items ordered were received.
- The team members to start the construction of the model with the help of the videos seen.
- The initial task was to set up the rotating tubes assembly with the help of the dynamo motor and the flexible PVC tube.
- The tube with a rotating model was successfully confirmed.

Remarks: The stage one of the working models was made successfully. Stage 2 to be completed

Note: *On 16th March 2020, the Govt has declared Holidays for all universities till further notice. The project has neared its completing stage but is on standby.*

Day: 11

Date: 16th May, 2020

No. of hours: 40 mins approx.

Task: ZOOM Meeting conducted to discuss the further proceeding of the project.

Information:

- At 1800 IST, as pre-planned, a ZOOM Meeting was conducted with all the 7 members of the team.

Remarks: The team was to meet up daily until the 20th of May, 2020 to further discuss regarding the proceedings.

Day: 12

Date: 17th May, 2020

No. of hours: 40 mins approx.

Task: ZOOM Meeting conducted to discuss the Limitation and design factors of Oil Skimmers.

Information:

- There are some factors to consider regarding the limitation of design type. They are:

  - Oil Removal Flow rate: ASTM Standards F2709 establishes the test procedure for determining oil recovery rate (ORR).
  - Oil Removal Concentration: It is a common misconception that oil skimmers provide pure concentrations of oil. They usually provide an oily water mixture which is later separated by the OWS equipment.
  - Effectiveness with different oils: Oleophilic and Non-Oleophilic skimmers are not equally effective with all oil types due to the changing of nature of attraction forces with different oils and materials.
  - Effectiveness with chemicals in water: These skimmers may not work if there are detergents, cleaners or surfactants mixed with the water.
  - Effects of trash and debris: Trash and debris may block or interfere the operation of oil skimmers.
  - Skimming Direction: Skimming is done in all directions to remove oil.
  - Service Access: Since it contains heavy serviceable items of equipment mounted on the skimmer, it may require special lifting equipment and safe stowage area so as not to damage the components.

Remarks: The points listed above were discusses with the teammates and they were debated if it suited and met the requirements of the project made by our team.

Day: 13

Date: 18th May, 2020

No. of hours: 40 mins approx.

Task: ZOOM Meeting conducted to discuss the doubts of the team mem

Information:

- The members of the team were prompted to ask the questions that they had to which the team leader, Cdt Akshaya explained the answers.
- **Cdt R Ranjith** – If the device is attached permanently to the ship side, then won't it be a trouble or obstruction during berthing?
- **Answer**: The device is a shipside device, yes, which can be "attached". It's not a permanent fixature but a portable temporary one which can be detached after the oil skimming is done on the ship side.
- **Cdt Jatin Soni –** Why was the rope-mop type skimmer replaced for a tube type skimmer model? How is it different from the rope-mop type in in its mechanism?
- **Answer**: The rope-mop type skimmer uses the polypropylene woven fabric which acts as a mop and absorbs the oil to it. It is very difficult to clean and reuse the rope-mop later. But the tube type skimmer's tube acts as an oleophilic which sticks to the oil and can be cleaned easier. Hence the rope-mop type skimmer is efficient than the tube type skimmer.
- **Cdt S Sanjai** – I would like to understand the explanation of oleophilic and non-oleophilic skimmers.
- **Answer**: The world "oleo" means "oil" and "philic" means to "attract". Here, according to the context of the project. Oleophilic means that the tube attracts oil, i.e. the oil gets attached to the tube and makes it the principle of the oil.
- **Cdt Gokul Prasanth –** What is weir and weir less oil skimmers?
- **Answers**: The weir oil skimmers contain a suction mechanism for absorbing oil, while the weir less skimmers contains a device like rope, or tube, or belt or drum for absorbing the oil.

Remarks: The doubts were discussed in the zoom session with examples. To meet in the next session with further questions or doubts.

Day: 14

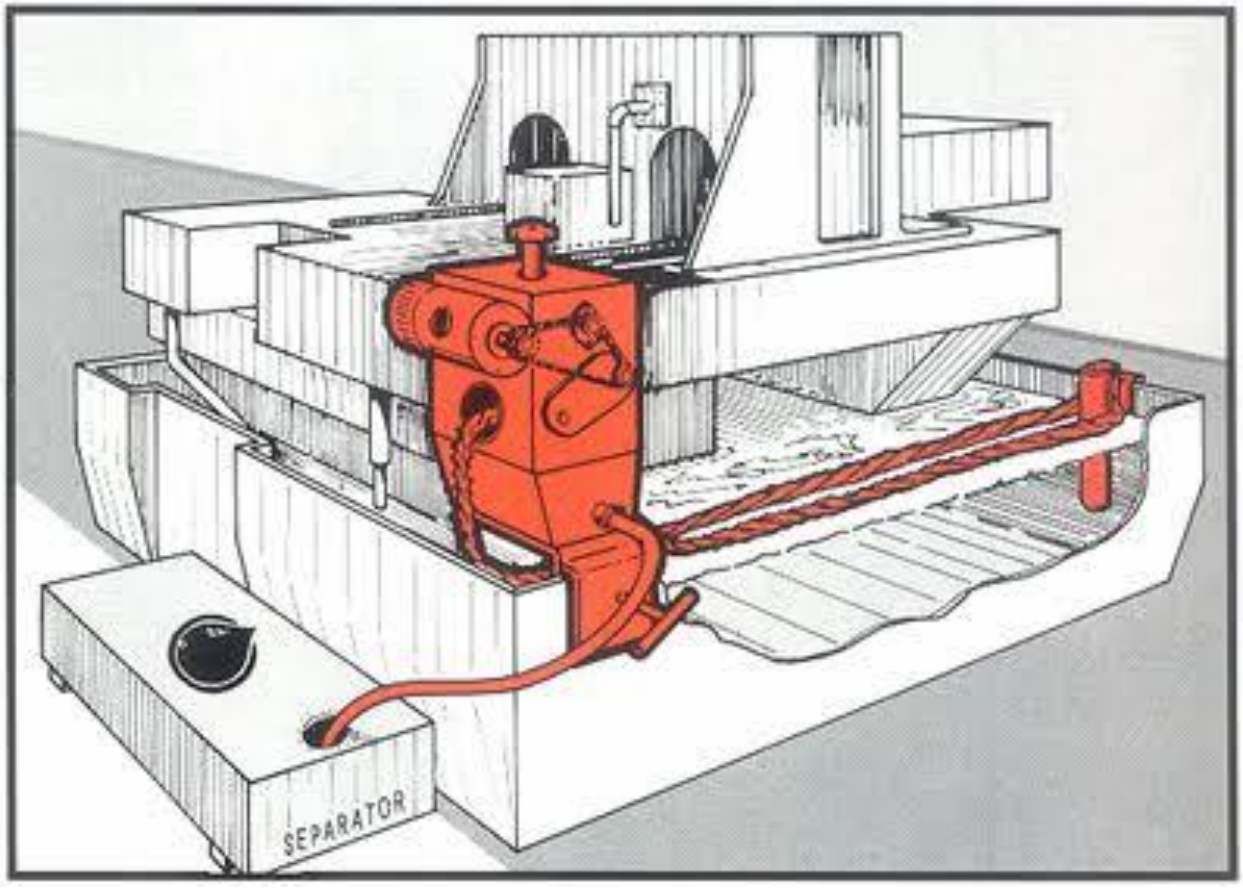
Date: 19th May, 2020

No. of hours: 40 mins approx.

Task: ZOOM Meeting – revision of the mechanism of an oil skimmer

Information:

- Tube Oil Skimmers uses collector tube that is sized in length for the application and welded into a continuous loop.
- Collector tube floats on the surface of water and is driven in a continuous loop by the skimmer.
- Oils, fats, and grease cling to the outer surface of the tube and are drawn into the skimmer.
- The material drawn into the skimmer is scraped off by abrasive resistant scrapers and flows into a sludge pan with drain coupling. The clean tube is then driven back to the surface of the water by the skimmer to remove more material.
- In this way the cycle of the skimmer produces a continuous loop which causes the tube to get cleaned and go back into the water again and again so as to drain the desired quantity of oil from the water and to send that oil and water mixture or only oil into the oil water separation tank for the purification
- Once it is sent into the separation tank the oil is purified and can be reused.
- By using such a type of skimmer, the pollution which will be caused by the oil spill which will be reduced to a considerable amount than what would have been if there was no skimmer.
- The following picture was shown along in the zoom meeting to explain it further:



Remarks: To conclude the meeting and to prepare for the submission of student's report and to update the student's diary.

Tasks regarding it has been separated and given out to each individual team member.

Day: 15

Date: 2nd July, 2020

No. of hours: 40 mins approx.

Task: Prepare Report and Students' diary

Information:

- Cdt Akshaya has been assigned the task of finalizing and presenting the report and students' diary.
- The report has been prepared and edited by Cdt Jatin Soni.
- The Students diary has been prepared with the assistance of Cdt S Sanjai, Cdt Amaljith JD, Cdt Gokul Prasanth and Cdt R Ranjith.
- The overall editing, processing and proof reading of all the documents has been done by Cdt CS Aditya

Remarks: The students diary, report has been completed and submitted by all cadets of the team.

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135, EAST COAST ROAD, KANATHUR, CHENNAI - 603 112.
TAMILNADU, INDIA

Internship Project –

"AUTOMATIC SMOKE DETECTION AND ABSORPTION"

A Report On Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	**BHARANI .R**	**2121A**	**ANS17066**

April & 2020

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(Under Section 3 of UGC Act 1956)

BONAFIDE CERTIFICATE

This is to certify that the project entitled ""**AUTOMATIC SMOKE DETECTION AND ABSORPTION**""submitted by cadet**. BHARANI.R** Reg.No: ANS17066…Batch 16……in the Department of autical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt.YESHWANTHRAJ
Associate Professor
Department of Nautical Science

Signature

Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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(Under Section 3 of UGC Act 1956)

INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme **: B.Sc**

Year of study and Batch/Group **: Batch-16/ Group -6**

Name of the Mentor **: Capt.Yeshwanthraj**

Title of the assigned internship **: "AUTOMATIC SMOKE DETECTION AND ABSORPTION "**

Nature of Internship **: Individual/Group**

Reg No of Student **:** ANS 17066

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

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Name of the Student	BHARANI.R
Register No and Roll No	ANS 17066& 2121A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP-5
Semester	**VI**
Title of Internship	**AUTOMATIC SMOKE DETECTION AND ABSORPTION**
Duration of Internship	1 MONTH
Mentor of the Student	**Capt. Yeshwanthraj**

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	8
2	Adequacy & quality of information recorded	10	7
3	Drawings, sketches and data recorded	10	8
4	Thought process and recording techniques used	5	3
5	Organization of the information	5	3
6	Originality of the Internship Report	20	14
7	Adequacy and purposeful write-up of the Internship Report	10	7
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	5
9	Practical applications, relationships with basic theory and concepts	10	7
10	Presentation Skills	10	7
Total		**100**	**75**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

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PROJECT ON

AUTOMATIC SMOKE DETECTION AND ABSORPTION

INTERNSHIP PROJECT REPORT - APRIL 2020

Department of Nautical Science.

CONTENTS

1. OVERVIEW

There has been several incident as the smoke has the main culprit in many of accidentwhich caused suffocation and later on breathing problem. Inhalation of smoke has beenreported to cause inflammation of lungs and airways causing them to swell and block oxygenthis can lead to acute respiratory distress syndrome and respiratory failure. This can beprominent in ship as is a confined space which will trap thesesmoke inside.

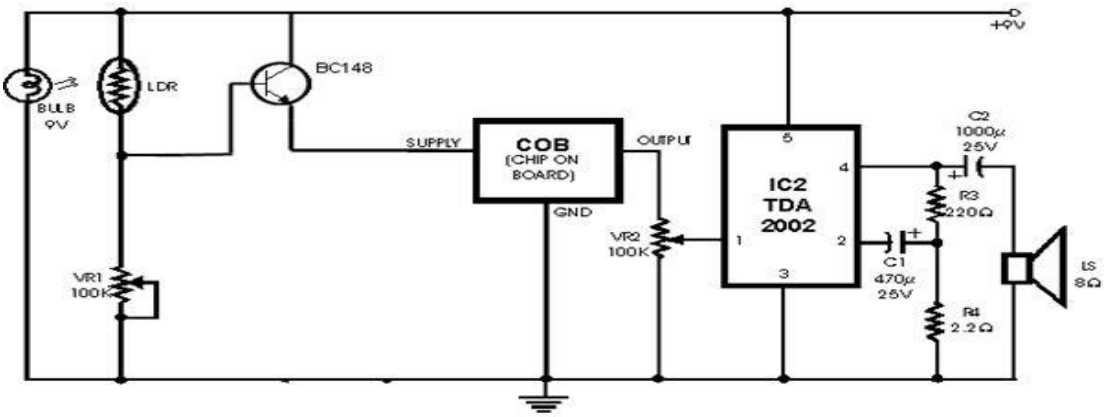
In order to counter this hazard in a cabin or engine room we are in a serious
need of a fast working and efficient smoke detector and a smartly designed smoke absorber
to work real-time in absorbing the smoke and be discharging it .

2. WHY WE NEED SMOKE DETECTORS ON SHIP

The best way to deal with fires on board ships is to prevent them rather than letting them occur. Breaking out of fire in a place where no fire exist is called “ignition”, whereas “flash” is a term used for fire eruption in a new place as a result of flames from an existing fire in a nearby place (the ignition source).

Fires on board ships can be prevented by finding and rectifying leakages of fuel oil, lubricating oil, and exhaust gases.

3. GRAPHICAL EXPLANATION



4. PARTS & WORKING

Sensors and detectors are placed at various locations on the ship to detect the possibility of a fire and avoid an emergency situation on board the vessel. There are many types of detectors used to detect fire and one of them is a smoke detector. Smoke is one of the earliest signs of fire in most cases and therefore detection of smoke is important in the detection of fire.

Working:

Photoelectric smoke detectors work on the principle of detecting the presence or absence of light, and responding to it by sending an appropriate alarm, which could be audio or visual in nature. Normally it consists of a sensor which has light falling on it from a source. If the light is interrupted due to the presence of smoke the alarm goes off. This is a pretty convenient method of detecting the presence of smoke but the only disadvantage is that unless the smoke is thick it cannot be detected using this technique. This means that before the actual detection takes place, fire might have already began. The advantage of this type of smoke detector is that it has less possibility of raising a false alarm, because of its relatively low sensitivity.

5. MILESTONE

Day 1. Discussion regarding the project and expressing one's opinion

Day 2. Finalizing the project and discussing it with captains and chief engineers

Day 3. Appraisal (gathering of information) and study regarding the project

Day 4. Discussing the budget of the projects

Day 5. Final discussion and ordering of parts

Day 6. Making of the project report

Day 7. Testing received parts

Day 8. Understanding the project and parts

Day 9. Cutting and re-purposing Plywood pieces

Day 10. One day spent in the workshop for making Box shape for miniature Accommodation

Day 11. Assembling the parts of the project ie. Inside machinery

Day 12. Study of Installed parts

Day 13. Giving the final design of the ship by spray painting the accommodation and other touch-ups

Day 14. Experimenting the working project model and making final adjustments

6. REFERENCE

https://youtu.be/QsgtYCl5tgE

7. PHOTOGRAPH:

Projects Photo:

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Internship Project –

"CRUDE OIL WASHING"

A Report On Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	**HARSATH.P**	**2155A**	**ANS17100**

April & 2020

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BONAFIDE CERTIFICATE

This is to certify that the project entitled "**CRUDE OIL WASHING**" submitted by cadet**. HARSATH.P** Reg.No: **ANS17100** Batch 16……in the Department of Nautical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt.K.Rajesh
Associate Professor
Department of Nautical Science

Signature

Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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Name of the Programme : **B.Sc**

Year of study and Batch/Group : **Batch-16/ Group -6**

Name of the Mentor : **Capt.Dr.K.Rajesh**

Title of the assigned internship : **"CRUDE OIL WASHING"**
"

Nature of Internship : **Individual/Group**

Reg No of Student : ANS 17100

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	**Signature of the Internal Examiner**	**Signature of HoD/Programme Head**
		

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Name of the Student	HARSHATH.P
Register No and Roll No	ANS 17100 & 2155A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP-5
Semester	**VI**
Title of Internship	**" CRUDE OIL WASHING "**
Duration of Internship	1 MONTH
Mentor of the Student	**Capt. Dr.K.Rajesh**

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10	Presentation Skills	10	8
Total		**100**	**76**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

CRUDE OIL WASHING

GENERAL

A crude oil tanker fitted with an inert gas system and approved fixed washing equipment in its cargo tanks can use crude oil from the cargo as the washing medium. This operation may take place either in port or at sea between discharge ports. It is most frequently carried out while the tanker is discharging cargo and permits the removal of oil fractions adhering to or deposited on tank surfaces. These deposits, which would normally remain on board after discharge, are then discharged with the cargo.

ADVANCE NOTICE

When it is required to carry out crude oil washing during cargo discharge, the master should inform the competent authority and the terminal (or vessel when ship to ship transfer is involved) at least 24 hours in advance, or in such time as is required. Crude oil washing should only proceed when their approval is received.

PROCEDURE FOR COW

Crude oil washing was made mandatory under MARPOL Annex 1 regulation 13 which states that every crude oil tanker which is 20000 dwt and above must be fitted with COW system for every cargo hold tank.

To perform Crude oil washing in correct and efficient manner every ship must have –

- Efficient and approved COW system and equipment manual
- Skilled Personnel onboard who are properly trained to perform the complete operation

The operation can be divided in to three phases where in following checks must be performed.

BEFORE OPERATION

- Confirm all pre arrival checks are performed
- The complete COW operation to be discussed with ship and shore staff
- Set a communication channel between ship and shore facility for COW operation-Ship shore interface
- Signal and Emergency signs to be discussed to stop the operation between shore and ship staff
- Inert Gas plant to be working and oxygen content must be less than 5 %
- Fixed Oxygen analyser to be checked and calibrated for proper functioning
- Portable oxygen analyser should be made available and checked for proper functioning.
- Oxygen reading in swash bulkhead tanks must be taken from both the sides
- All tanks must be checked for positive inert gas pressure
- Assign duties to all responsible ship staff. One person to be assigned to check the leakage in the pipe line system as soon as the operation starts
- Check all the equipments under COW system for proper functioning
- Check and Set the line and valves for ship to shore under COW system

OPERATION IS UNDER PROCESS

- The inert gas values to be frequently checked- Tank pressure and O2 value
- The crude oil washing must be done in the designated tanks as per the plan including the washing cycle
- A responsible person to be always present on deck
- All deck lines and valves must be frequently checked for any leakages
- Parameters and running condition of all the machineries involved in operation to be frequently checked
- Ullage gauge floats to be raised for the tanks which are being washed
- Trim should be sufficient to assist the bottom washing of tanks
- The level of holding tanks to be continuously monitored to avoid overflow

OPERATION FINISHED

- Drain tank wash line off crude oil
- Shut all the valves in the line used for the operation
- Stop and drain all the machines involved in the operation
- Drain all the cargo pumps after the operation is finished

Stop the COW operation immediately if you sense any kind of trouble such as failure of IG system or increase of O2 content and drop in the pressure of the cargo tank.

TANK WASHING MACHINES

Only fixed tank washing machines may be used for crude oil washing.

CONTROL OF TANK ATMOSPHERE

The oxygen content of the tank must not exceed 8% by volume.

PRECAUTIONS AGAINST LEAKAGE FROM THE WASHING SYSTEM

Before arriving in a port where it is intended to crude oil wash, the tank washing system should be pressure tested to normal working pressure and examined for leaks.

All machines which are to be used should be operated briefly to check for leaks beyond the shut-off valve. Any leaks found should be made good.

During crude oil washing, the system must be kept under constant observation so that any leak can be detected immediately and action taken to deal with it.

CONTROL OF VAPOUR Emissions

During crude oil washing, hydrocarbon gas is generated within the cargo tanks beyond normally existing levels. Subsequent ballasting of such cargo tanks could lead to considerable hydrocarbon gas being expelled to the atmosphere. Some port authorities prohibit such discharges. The emission of hydrocarbon gas from ballasted tanks can be avoided in one of four ways:

a) By the use of permanent ballast tanks of sufficient capacity to provide the minimum departure draught.

b) By containing gas in empty cargo tanks by simultaneous ballasting and cargo discharge where the ullage spaces of the tanks being ballasted are directly connected to those of the tanks being discharged.

c) By the gas compression method which requires that, on completion of the discharge, the tank pressure is at a minimum and all cargo tanks are made common via the inert gas line. While ballasting, the gases from the ballasted cargo tanks are transferred through the inert gas lines into all available cargo tank space and, with all vent valves, ullage ports, etc. closed, the gases are compressed within the vessel up to a safe margin

below p/v valve and breaker settings. The P/V valves, deck water seal and filled liquid breaker must be in good operational condition. All non-return devices must be closed to prevent the backflow of inert gas into the inert gas plant.

d) By combination of these methods.

The ullage spaces of all cargo tanks are connected by the inert gas main line. If the ballasting of dirty tanks can be connected while discharge continues from other tanks, judicious adjustments of ballast and discharge rates can prevent the gas pressure rising sufficiently to cause a discharge to the atmosphere. Where the ballast rate exceeds the discharge rate it may be necessary to reduce or even temporarily stop the flow of inert gas to the tank system.

SUPERVISION BYA QUALIFIED OFFICER

The person in charge of crude oil washing operations must be suitably qualified in accordance with the requirements laid down by the flag administration of the vessel and any port regulations in force locally.

PRECAUTION

A notice should be prominently displayed in the cargo and engine control rooms, on the bridge and on the notice boards of ships which have crude oil washing systems fitted. The following text is suggested

EXCLUSION OF CARGO OIL FROM THE ENGINE ROOM

If any part of the tank washing system extends into the engine room it must be blanked-off to prevent cargo oil from entering the engine room.

If the tank wash water heater is fitted outside the engine room, it must be blanked-off during crude oil washing to prevent oil from flowing through it.

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135, EAST COAST ROAD, KANATHUR, CHENNAI - 603 112.

TAMILNADU, INDIA

Internship Project –

"PORT OF SINGAPORE"

A Report on Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	MANISH KUMAR	2192A	ANS17137

April & 2020

AMET
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(Under Section 3 of UGC Act 1956)

BONAFIDE CERTIFICATE

This is to certify that the project entitled "**PORT OF SINGAPORE**"submitted by cadet. **MANISH KUMAR** Reg.No **ANS17137**...Batch **16**.....in the Department of Nautical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt. P.Rajendran
Associate Professor
Department of Nautical Science

Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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(Under Section 3 of UGC Act 1956)

INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme : **B.Sc**

Year of study and Batch/Group : **Batch-16/ Group 3**

Name of the Mentor : Capt. Rajendran.

Title of the assigned internship : **PORT OF SINGAPORE**

Nature of Internship : **Individual/Group**

Reg No of Student : ANS17137

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	**Signature of the Internal Examiner**	**Signature of HoD/Programme Head**
		

AMET
ACADEMY OF MARITIME EDUCATION AND TRAINING
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INTERNSHIP EVALUATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Student	**MANISH KUMAR**
Register No and Roll No	ANS17137 & 2192A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP -6
Semester	**VI**
Title of Internship	**PORT OF SINGAPORE**
Duration of Internship	1 MONTH
Mentor of the Student	Capt. Rajendran

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	6
2	Adequacy & quality of information recorded	10	6
3	Drawings, sketches and data recorded	10	7
4	Thought process and recording techniques used	5	3
5	Organization of the information	5	3
6	Originality of the Internship Report	20	15
7	Adequacy and purposeful write-up of the Internship Report	10	8
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	8
9	Practical applications, relationships with basic theory and concepts	10	9
10	Presentation Skills	10	7
Total		**100**	**82**

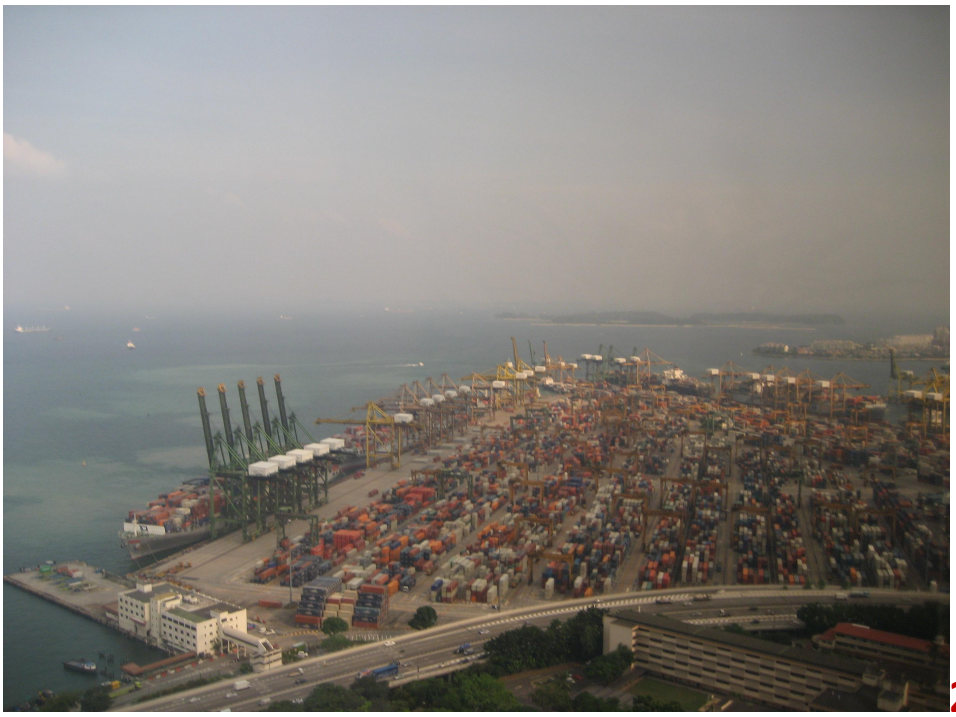
Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head

PORT OF SINGAPORE

The Maritime and Port Authority of Singapore (MPA) was established on 2 February 1996, with the mission to develop Singapore as a premier global hub port and international maritime center (IMC), and to advance and safeguard Singapore's strategic maritime interests.
MPA is the driving force behind Singapore's port and maritime development, taking on the roles of Port Authority, Port Regulator, Port Planner, IMC Champion, and National Maritime Representative. MPA partners the industry and other agencies to enhance safety, security and environmental protection in our port waters, facilitate port operations and growth, expand the cluster of maritime ancillary services, and promote maritime R&D and manpower development.

Port of Singapore

1890



2020

Port of Singapore

1. Port Detail

Port Authority: Maritime and Port Authority of Singapore (MPA)

Address: 460 Alexandra Road

#19-00 PSA Building

Singapore 119963

Singapore

Email: qsm@mpa.gov.sg

Web Site: www.mpa.gov.sg

Latitude: 1º 14' 21'' N

Longitude: 103º 49' 56'' E

Port Type: Deepwater Seaport

Port Size: Very Large

Max Draft: m

2. General Information

First Port of Entry: Yes

ETA Message Required: Yes

USA Representative: Yes

Medical Facilities: Yes

3. Harbor Characteristics

Harbor Size: Large

Shelter: Good

Maximum Vessel Size: Over 500 feet in length

Harbor Type: Coastal Natural

4. Entrance Restrictions

Tide: Yes

Overhead Limit: Yes

Swell: No

PSA
The World's Port of Call

5. Water Depth

Channel: 26 - 30 feet 7.1 - 9.1 meters

Cargo Pier: 11 - 15 feet 3.4 - 4.6 meters

Mean Tide: 3 feet

Anchorage: 31 - 35 feet 9.4 - 10 meters

Oil Terminal: 36 - 40 feet 11 - 12.2 meters

6. Pilotage

Compulsory: Yes

Available: Yes

Advisable: Yes

7. Tugs

Assist: Yes

Salvage: Yes

8. Communications

Telephone: Yes

Radio: Yes

Air: Yes

Telegraph: Yes

Radio Tel: Yes

Rail: Yes

9. Loading & Unloading

Wharves: Yes

Anchor: Yes

Beach: Yes

10. Lifts & Cranes

100+ Ton Lifts: Yes

50-100 Ton Lifts: Yes

25-49 Ton Lifts: Yes

0-24 Ton Lifts: Yes

Fixed Cranes: Yes

Mobile Cranes: Yes

Floating Cranes: Yes

11. Port Services

Longshore: No

Electrical Repair: Yes

Steam: No

Electrical: No

12. Supplies

Provisions: Yes

Fuel Oil: Yes

Deck: Yes

Water: Yes

Diesel Oil: Yes

Engine: Yes

13. Repairs, Drydock, Railway & Other Services

Ship Repairs: Major

Drydock Size: Large

Dirty Ballast: Yes

♦ **Port of Singapore**♦

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TAMILNADU, INDIA

Internship Project –

"MAJOR SEA PORT IN INDIA"

A Report on Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	SANJAY.M	2253A	ANS17198

April & 2020

AMET
ACADEMY OF MARITIME EDUCATION AND TRAINING
DEEMED TO BE UNIVERSITY
(Under Section 3 of UGC Act 1956)

BONAFIDE CERTIFICATE

This is to certify that the project entitled **MAJOR SEA PORT IN INDIA** "submitted by cadet. SANJAY.M Reg.No**ANS17198**…Batch **16**……in the Department of Nautical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt. C.Krishna
Associate Professor
Department of Nautical Science

Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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ACADEMY OF MARITIME EDUCATION AND TRAINING
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INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme : **B.Sc**

Year of study and Batch/Group : **Batch-18/ Group 6**

Name of the Mentor : Capt. C.Krishna

Title of the assigned internship : **"MAJOR SEA PORT IN INDIA"**

Nature of Internship : **Individual/Group**

Reg No of Student : ANS17198

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	**Signature of the Internal Examiner**	**Signature of HoD/Programme Head**
		

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Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Student	**SANJAY.M**
Register No and Roll No	ANS 17198& 2253A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP -5
Semester	**VI**
Title of Internship	**"MAJOR SEA PORT IN INDIA"**
Duration of Internship	1 MONTH
Mentor of the Student	Capt.C.Krishna

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	6
2	Adequacy & quality of information recorded	10	6
3	Drawings, sketches and data recorded	10	7
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6	Originality of the Internship Report	20	13
7	Adequacy and purposeful write-up of the Internship Report	10	7
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	7
9	Practical applications, relationships with basic theory and concepts	10	7
10	Presentation Skills	10	7
Total		**100**	**76**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

CONTENTS

Visakhapatnam Port- An Introduction

Visakhapatnam Port is one of 12 major ports in India and the only major port of Andhra Pradesh. It is India's second largest port by volume of cargo handled. It is located on the east coast of India and is located midway between the Chennai and Kolkata Ports

Although the need for building a port on the east coast to access Central Provinces was felt by the British in the 19th century, the proposal of Col. H.Cartwright Reid of British Admiralty for constructing a harbour at Visakhapatnam was approved by the Government only after the First World War. The Inner Harbour was built by the Bengal Nagpur Railway between 1927 and 1933 to facilitate the export of manganese ore from the Central Provinces. The port, built at a cost of ₹378 lakhs was inaugurated by Lord Willingdon on 19 December 1933.

During the Second World War, the military significance of the port increased. After India's independence, the port witnessed growth under the various Five Year Plans. Over time, the port has grown from one with 3 berths handling 1.3 lakh tonnes per annum to one with 24 berths and annual traffic of 65 million tonnes. The port was notified as a major port in 1964 under the Major Port Trusts Act, 1963. Under the Act, the Visakhapatnam Port Trust is in charge of running the port

Vision and Mission of Vishakhapatnam Port

Our Vision

To be the most preferred port in South Asia offering services of global standards.

Our Mission

To be a major partner in meeting the logistics requirements of the importers and exporters of the region

As it turned 86 Sunday, the Visakhapatnam Port Trust (VPT), which is acclaimed as the Eastern Gateway of India has drawn up a vision to become the most-preferred port in south Asia offering services of global standards and world-class logistics solutions.

Massive capacity expansion and modernisation plans are being implemented in a mission-mode in line with Visakhapatnam Port's growing strategic importance to trade with China, Australia, Indonesia, Singapore, Malaysia, South Africa, Nigeria and countries in the Persian Gulf.

Berthing

Visakhapatnam Port has three harbours - the outer harbour, inner harbour and the fishing harbour. The outer harbour has 6 berths capable of handling vessels with a draft up to 17 meters while the smaller inner harbour has 18 berths that are Panamax compatible. Vizag Seaport owns two berths in the inner harbour; berth EQ-8 is fully mechanised and berth EQ-9 berth is not.

The Dolphin's Nose Hill to the north of the entrance channel protects the harbour from cyclones that strike the east coast. The port is located on the area of a creek through which the coastal river Narava gedda joins the sea.

Facilities

Iron Ore & Pellets

Coking Coal & Steam Coal facilities

Alumina

POL

Containers

Cargo handling equipments

VIZAG PORT' HARBOUR FACILITIES AND BERTHING FACILITIES

Toggle navigation

HARBOUR & BERTHING FACILITIES

Home / Facilities / Harbour & Berthing Facilities

last update on : 30-MAR-2019

Harbour Facilities

Feature	Inner Harbour	Outer Harbour
Water Spread (Hectares)	100	200
Berths	18	6 +1 (SPM)
Max.Draft(Mtrs.)	14.5	18.10
Max. length (Mtrs.)	PANAMAX	Cape Size

Berthing FacilityAll dimensions are in meters

INNER HARBOR NORTHERN ARM – EAST SIDE **DAY TIME (BERTHING / SAILING)** **DRAFT (with dock water density)**				INNER HARBOR NORT **NIGHT TIME (BE** **DRAFT (with dock wate**
BERHTS	Length	Panamax	Others	Panamax

***East Quay-1 (ADANI)**	**280.00**	**14.50**	**14.50**	**14.50**
East Quay-5	**167.64**	**11.00**	**11.00**	**11.00**
East Quay-6	**182.90**	**11.00**	**11.00**	**11.00**
East Quay-7	**255.00**	**14.50**	**14.50**	**14.50**
**** East Quay-8 (VSPL)**	**255.00**	**14.50**	**14.50**	**14.50**
**** East Quay-9 (VSPL)**	**255.00**	**14.50**	**14.50**	**14.50**
***** East Quay-10 (IMC)**	**181.00**	**—**	**11.00**	**—**
*** Awarded to M/s Adani Vizag Coal Terminal Pvt., Ltd.,** ** Awarded to B.O.T. Operator **M/s. Vizag Seaport Pvt. Ltd.** ***** Awarded to IMC**				

INNER HARBOR NORTHERN ARM – WEST SIDE **DAY TIME (BERTHING / SAILING)** **DRAFT (with dock water density)**	INNER HARBOR NORTHERN ARM – WEST SIDE **NIGHT TIME (BERTHING / SAILING)** **DRAFT (with**	TIDE

				dock water density)		
BERHTS	Length	Panamax	Others	Panamax	Others	
West Quay-1	**212.00**	**13.50**	**13.50**	**13.50**	**13.50**	**0.5**
West Quay-2	**226.70**	**13.50**	**13.50**	**13.50**	**13.50**	**0.5**
West Quay-3	**201.12**	**13.50**	**13.50**	**13.50**	**13.50**	**0.5**
West Quay-4	**243.00**	**11.00**	**11.00**	**11.00**	**11.00**	
West Quay-5	**241.70**	**11.00**	**11.00**	**11.00**	**11.00**	
West Quay-6(WQ-MPL)	**255.00**	**14.00**	**14.00**	**14.00**	**14.00**	**1.0**
RE West Quay1	**170.00**	—	—	—	**11.00**	

West Quay-7	**280.00**	**14.50**	**14.50**	**14.50**	**14.50**	**1.0**
West Quay-8	**280.00**	**14.50**	**14.50**	**14.50**	**14.50**	**1.0**

INNER HARBOR WESTERN ARM		
Quay Berths	Berth length (Mtrs)	Permissible draft # (Mtrs)
Fertiliser berth	**173.13**	**10.06**
Oil Refinery Berth-1@	**183.00**	**10.06**
Oil Refinery Berth-2@	**183.00**	**9.75**

INNER HARBOR NORTH WESTERN ARM		
Green Channel Berth	**150.00**	**8.20**

*** Vessels with more than 160.0m LOA can be allowed at EQ-10, subject to availability of sufficient space at the adjacent berth i.e. EQ-9.**

 # Permissible draft of vessels is subject to availability of tide – details given under harbour facilities

**** For berthing 230.0m LOA vessel at WQ-6, 45.0m room to be left vacant on North side of West Quay-5.**
Night Restrictions**: 1) For vessels > 200m LOA, maximum permissible draught in dark hours is 13.5m** **2) Vessels above 195.0m or Beam more than 32.0m are handled by two pilots in dark hours** -
@ Subject to a max. 225 Mts. at one of the two berths

-

OUTER HARBOUR		
Berth	LOA (Mtrs)	Permissible draft # (M
Ore Berth-1 (ESSAR)	**300.00**	**16.50**
Ore Berth-2 (ESSAR)	**300.00**	**16.50**
Vizag General Cargo Berth (VGCBL) FOR 2,00,000DWT	**300.00**	**18.10**
Offshore Tanker Terminal	**280.00**	**17.00**
L.P.G.	**230.92**	**14.00**

CONTAINER TERMINAL (VCTPL)	**320.00**	**14.50**
Chennel Berth FOR 10,000DWT	**150.00**	**8.50**
Fishing Harbour	**70.00**	**5.50**

-

HANDLING FACILITIES OF VIZAG PORT

Iron Ore & Pellets

Functioning of the Mechanical ore handling plant known as ore handling complex comprises of the receiving system and the shipping system operated by M/s EVTL. The ore received through wagons is tippled and conveyed to the stacker for stacking in the receiving system. The receiving system consists of three wagons tipplers (one twin wagon tippler of 2700 TPH cap. and another tippler of 3000 TPH capacity) to tipple the wagons

The shipping system reclaims the cargo from the stacks and conveys through the conveyors to the shiploader for loading into the ships' hatches. The system consists of 3 bucket wheel reclaimers 4000 tonnes per hour capacity, a long overhead conveyor system (4.8 kms – one way), a surgebin of 2000 tonnes capacity and a ship loader with a assigned capacity to load iron ore at 8000 tonnes per hour. This shiploader which moves on rails can negotiate a 2100 turn and can dip deep into the hatch of a ship.

The loading conveyors (7 nos.) are all overhead conveyors running at about 10 to 12 metres above ground level. The conveyors are supported by means of a pre-cast RCC frames founded on piles. The pre-cast frames are spaced at about 20.0 m c/c, a walkway

of 1.0 m wide is also provided alongside of the conveyor for attending to maintenance. The conveyor is designed to run at a speed of 210 mtrs/minimum

Coking Coal & Steam Coal facilities

A deep draft berth at outer harbour (Vizag General Cargo Berth(VGCB) with a Quay Length of 356 meters to handle vessels of draft upto 18.10 meters is available for handling import Coking coal and Steam coal. The berth is capable of handling 2,00,000 DWT vessels and equipped with 3 ship loaders 2500 TPH (70,000 TPD), Conveyor systems, Stacker cum reclaimers rapid wagon loading systems.

Another Mechanised Terminal (EQ1) for handling of Steam coal vessels operated by M/s Adani Vizag Coal Terminal to handle vessels upto draft 14.50 mts with 2 Harbour mobile cranes to unload 27,000 TPD.

In addition, 7 Multipurpose berths in inner harbour which can accommodate vessels upto 14.50 mts draft and 2 Multipurpose B.O.T berths operated by Vizag Seaport Pvt. Ltd., equipped with Mechanized handling facilities are available. The other 2 B.O.T berths Viz., EQ10 operated by M/s AVR Infra Pvt. Ltd. for Liquid Cargo and WQ6 operated by M/s West Quay Multi Port Pvt. Ltd. for Multi Cargos. Other facilities include 3 nos. Harbour Mobile cranes at WQ berths and 1 Harbour Mobile Crane at EQ Berths are equipped in Inner Harbour.

Alumina

A fully mechanized facility for loading Alumina is available at the dedicated berth (WQ-5) with 242 meters length and permissible draft upto 11 meters. The facilities available at the berth include: 3 silos of 25,000 tonnes capacity each Mechanical wagon unloading system (1100 TPH) Conveyor system for loading(2200 TPH)

POL

A deep draft Oil Tanker Terminal (OSTT) for berthing tankers of size up to 150,000 DWT and draft upto 17 meters is available. the facility is equipped with three unloading arms at the terminal direct discharge from berth to the refinery tanks @ 5500 tonnes per hour through pipe lines.

Facility available for STS transhipment of crude from VLCC to smaller tankers.

An exclusive jetty with draft upto 14 meters is available to discharge LPG. A Cavern facility for LPG first of its kind in South Asia – a mined rock Cavern at a depth of 200 mtrs. below sea level (capacity: 60,000 T) is available. Two berths (OR1 & OR2) in the inner harbour are available for handling petroleum products

Containers

Container Terminal (VCTPL) is being operated by Visakha Container Terminal Pvt. Ltd. The terminal is the deepest terminal of the country with a facility to accommodate main line vessels up to 14.50 Mts draft. The terminal has a dedicated rail facility to handle full rake of 45 wagons. The terminal has a potential to handle 6 lakh TEU's in future years. The terminal is equipped with 4 Post Panamax RMQC's, 6 RTGC's and 6 Reach Stackers, and is ideally situated to serve as "Container Hub Port" on the East Coast of India.

Cargo handling equipment

Description	Capacity	Availability in Nos.
Electric Wharf Cranes	20 T	04

Harbour Mobile Cranes	**100 T**	**04**
Locos (General Traffic)	**1350 HP**	**04**
Locos (General Traffic)	**3100 HP**	**03**

Traffic

The Port of Visakhapatnam handled 56.39 million tones of traffic of which maximum proportion 49.53 % are imports followed by exports (42.25 %) and transhipment cargo(58.21%).Similarly,quantum of cargo about 38.53 million tonnes handled to overseas and remaining quantum handled to coastal (17.86 million tonnes). In respect of nature of the cargo, maximum quantum of cargo about 34.89 million tonnes (61.87 %) is dry bulk followed by liquid bulk (33.76%) and break bulk containers (4.37 %). Regarding commodity wise traffic ,out of 558.01 lakh tonnes, maximum quantum of cargo about 168.42 million tonnes handled by Port is POL products (30.36 %) followed by iron-ore and pellets (26.65%) cocking coal and Lam coke (13.4 %) and others (13.94%) thermal coal (4.83 %) and fertilizers (4.11 %)137.

Port Safety and Security

The discussions in the earlier chapter envisages that Ports play' a key role in the economic development particularly in the liberalization and globalization scenarios in short and long term perspectives. Besides this, the review of evolution of port studies and case

studies of ports are indicating origin, growth and development of port plays vital role particularly in the impact of port developments on cities, infrastructure developments in catchment areas of port. The main aim of the study is to determine the origin and growth of Visakhapatnam port as well as to assess its impact on city development in existing and future scenario.

Conclusion

As one of the leading ports in India, Visakhapatnam still continues to build its infrastructure for the future making sure that India's gates are open to all types of trade. With increasing safety standards and a efficiently working crew the port is set for accepting any ship into her berths

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135, EAST COAST ROAD, KANATHUR, CHENNAI - 603 112.

TAMILNADU, INDIA

Internship Project –

"INFORMATION ABOUT JNPT PORT"

A Report On Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	SUDHAKAR. R	2315A	ANS17260

April & 2020

AMET
ACADEMY OF MARITIME EDUCATION AND TRAINING
DEEMED TO BE UNIVERSITY
(Under Section 3 of UGC Act 1956)

BONAFIDE CERTIFICATE

This is to certify that the project entitled "I**NFORMATION ABOUT JNPT PORT** "submitted by Cadet.**SUDHAKAR. R** Reg.No **ANS17260**...Batch **16**.....in the Department of Nautical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt.K.Ravindranath
Associate Professor
Department of Nautical Science

DEAN/HOD
Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

AMET
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INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme : **B.Sc**

Year of study and Batch/Group : **Batch-16/ Group -5**

Name of the Mentor : Capt.K.Ravindranath

Title of the assigned internship :**INFORMATION ABOUT JNPT PORT**

Nature of Internship : **Individual/Group**

Reg No of Student : ANS17260

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	**Signature of the Internal Examiner**	**Signature of HoD/Programme Head**
		

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INTERNSHIP EVALUATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Student	**SUDHAKAR.R**
Register No and Roll No	ANS17260& 2315A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP-5
Semester	**VI**
Title of Internship	**INFORMATION ABOUT JNPTPORT**"
Duration of Internship	1 MONTH
Mentor of the Student	Capt.K.Ravindranath

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	8
2	Adequacy & quality of information recorded	10	8
3	Drawings, sketches and data recorded	10	7
4	Thought process and recording techniques used	5	4
5	Organization of the information	5	3
6	Originality of the Internship Report	20	18
7	Adequacy and purposeful write-up of the Internship Report	10	8
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	8
9	Practical applications, relationships with basic theory and concepts	10	7
10	Presentation Skills	10	8
Total		**100**	**79**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

INTRODUCTION

Mumbai Port has long been the principal gateway to India and has played a pivotal role in the development of the national economy, trade & commerce and prosperity of Mumbai city in particular. The port has achieved this position through continuous endeavor to serve the changing needs of maritime trade. Though traditionally designed to handle general cargo, over the years, the port has adapted to changing shipping trends and cargo packaging from break bulk to unitization/palletisation and containerization. Besides, it has also developed specialized berths for handling POL and chemicals. For decades, Mumbai Port was India's premier port. Even today, with the development of other ports, it caters to 10% of the country's sea-borne trade handled by Major Ports of the country in terms of volume. It caters about 19% of POL Traffic handled by Major Ports.

Having weathered and survived many a changes in maritime trade in its long history, Mumbai Port is today facing challenges posed by competition from adjoining ports and private ports, changing traffic patterns, inherent physical constraints and continuing labour intensive operations, *etc.* However, Mumbai Port is taking various measures to render cost effective and quality services to the trade.

CONTENTS

VISION $ MISSION

VISION

To ensure zero corruption organizational atmosphere with postive impact on performance of individual employees . To become the premier container port in south Asia

MISSION

To be equipped with state of the art and technology, efficiency and manpower which are at par with the international is conform to international standards and offer cost effective integrated logistics standards

- Ensure security with safety of life ,equipment and cargo
- Pressure the principles of eco –friendly
- Sustainable development

Coastally upgrade the competence, awareness, skills and motivational of port personal for continual improvements in all efficiency parameters. We, at the Mumbai Port Trust, provide integrated sea-port facilities for handling, storage and delivery of cargo/container to our customers' requirements. We are committed to:

- Strive excellence in port operations by improving infrastructure facilities;
- Improve our service processes and Quality systems continually;
- Establish quality objectives for improvement in our operations;
- Observe safety norms;

Through teamwork, total employee involvement, training and effective review system for continued sustainability.

Our aim is total customer satisfaction and continued happiness of all stakeholders


HYUNDAI

BERTHING FACILITIES

The JNP TRUST Container Terminal is operated by JNPT .It has a quay length of 680 meters (2,230sq) with 3 berths.

The Nhava sheva international containers terminal (NSICT) is linseed to a consortium led by p&o, now or port of DP world .commissioned in July 2000; it has a 600m (2000sq) quay length with two berths.

STORAGE FACILITIES

Annual cargo tonnage of bulk is 7.88 million tons and containers are 56.43 million tons. Annual containers volume is 5.05 million. The Nhava sheva international containers Terminal (NSICT) is leased to a contortion led by p & o now
a port of DP world. Commissioned is July 2000, it has a 600 meters (2000sq) quay length with two berths. Which can handle up to 62.15 million tons of cargo, i.e. totally
4.8 million TEUS (60 MTPA). There are three container terminals;

A) JAWAHARLAL NEHRU PORT Containers terminal (JNPCT) , THE NHAVA SEVA

B) INTERNATINAL CONTAINERS Terminal (NSICT) and the gateway Terminals India pvt ltd. Shortly, NSICT can handle up to 62.15 million tons of cargo. Gateway Terminals India (GTI) can handle 1.3 million tons

_PORT SAFETY AND SECURITY

Mainly Focuses On 3 Important Principles: Safety Of Workplace, Working Conditions And The Minimal Impact On The Environment. Mainly Port Safety and Security System Includes

- Port Security Assessment And Awareness
- Security Towards Internals And Externals
- Identification And Classifying Infectious Substances For Transport
- Procedures For Legal And Safe Shipping
- Measures , Procedures And Requirements Of Health and Safety At Port
- Essentials Of Reporting And Investigations
- Contingency Planning , Maritime Law , Safety And Environment Protections
- Principles Of Quality Management and Quality Management Software

S

- Threat Instigation Strategies

Vigilance corner CVC plays a pivotal role in uprooting and eradicating corruption among the government machineries vigilance department in JNPT is serving as a central agency & striving for the integrity and efficiency in the organization. Vigilance work can be successful and productive with the help of all officers and employees

TRAFFIC

Inp Accounts for More Than Half of Total Containers Volumes Handled at India's 12 Public Ports And Around 40% Of the Nation's overall Containerized ocean trade. Major exports from Jawaharlal Nehru port are textiles , sporting goods ,carpets , textile maichery ,boneless meat , chemical , machinery ,plastics , electrical maichery, vegetable oils and aluminum and other non – ferrous metals the port handles cargo traffic mostly originating from destined for Maharashtra , Madhya Pradesh ,Gujarat ,Karnataka, as well as most of North India

This department is responsible for the smooth and safe movement of containers in-out of the port in a manner the ensures optimum benefit of time and cost for EXIM community and provides ease of doing business

KEY FUNCTIONS OF THE DEPARTMENT:

- To mange the container terminal operations (main containers berth) in its entirety ensuring speedy loading and unloading of containers, receipt , stacking and disposal of containers at the yard , maintaining
- Management of receipt and dispatch of exports and import containers respectively by road and its associated activities
- Operating contracts for hiring the services of TTs , reach stackers ,conservancy ,allotment of paved area inside CT,claims ,arbitration , auctions etc
- Compliance of dock safety regulation and all related correspondence
- Preparations of budget for the year
- Ensuring proper co-ordination with other terminal for effective implementation of ITRHO to improve turnaround time of mixed rakes
- Co-ordination with external agencies such as concur other rail operation , other terminal for smooth operations

NHAVA SHEVA / JAWAHARLAL NEHRU PORT

NAVIGATIONAL FACILITIES

Anchorage

There are 63 anchorage points Anchorage Points (Points K3 and V1)

Buoys and Beacon

1. There are three light buoys moored South-East of Prongs Lighthouse, one flashing a green light every five seconds, the other group (2) flashing red light every 10 seconds and the third flashing red every 5 seconds. Prongs reef buoy is fitted with a radar reflector.

2. There are other important subsidiary light including the Dolphin Rock Light and Tucker Beacon Light.

3. 4 nos. Lighted floating buoys to mark the approach channel, 2 jetty end beacons at mooring dolphins 1 and 4 and 2 leading lights have been provided for night navigation. In addition the Elephanta patch beacon has been upgraded to improve its range.

Lighthouse

1. Kennery Lighthouse, which marks the Southern Boundary of the Port limits, is a light of the first order dioptric, group-flashing white, and shows groups of two flashes with a visibility upto 25 kms in clear weather. The name of this lighthouse has now been changed as KANHOJI ANGRE LIGHT HOUSE.

2. Prongs Lighthouse marks a reef Southwards from Colaba Point and dangerous ground which extends for a distance of 1.6 km. from it. The light is of the first order dioptric and exhibits at night, every 10 seconds, a white flash light with a visibility up to 27 kms.

3. About 3.2 kms ENE off Prongs Lighthouse is the Sunk Rock Lighthouse. It is unattended and shows red light with white rays flashing every 6 seconds

Vessel Traffic System (VTS)

A state-of-the-art VTS for control of ports operations, Surveillance and harbour navigation (Tracking and guidance of ships), having interface with Port MIS was earlier commissioned in September 1997 and the same has been replaced with new advanced stateof-art technology VTS and commissioned in September 2011. The fully computerised VTS employs three dual radars, 5 microwave links, two control stations (Mumbai Port Trust- BPX and JNPT control) one Radio Direction Finder, Differential Global positioning system, VHF & UHF communication system, CCTV system and Automatic Identification System (AIS). Major beneficiaries of VTS are Mumbai Port Trust, JNPT and Indian Navy.

OTHER FACILITIES

Integrated Port Operating System Port Community System

Port Community System (PCS) is a single window web application, which allows the port community and stakeholders to access the centralized repository to view transactions. The users of this system also can track and trace the cargo or container details. Through this application, they can also avail the real time vessel, finance, transport, cargo, and container status. In also covers online payment of bills and interface with Integrated Port Operating System(IPOS).

Sales d Cargo Sales System

The Sales branch mainly deals with the auction of the import or export cargo lying uncleared/unclaimed in the Major Port Trust Act 1963. This forms an important part of the

The details of uncleared/unclaimed cargo is merged as un cleared cargo (u/c) list into sale cargo line a unique lot no. is given, notices are generated and sent to respectiv for Bill of Entry formalities. The lots with Bill of .Entry formalities over are put into final auction list. The d generated as per Docks Scale Of Rates. Lots which are not sold are again put into auction sale as per cycle

Tender Management System

Tender Management System was developed to cater to the purchases/works of Civil, Mechanical and Planning and Research department. The Tender Management System

Integrated Port Operating System (IPOS) covers all operational activities of the port. The system caters to Vessel, Port, Cargo, Container, Rail and Operation Resource activities in five modules. The activities comprises of all transactions at the Port including Vessel, Sheds, Gate activities, Import and Export processing, Container Stuffing and Stripping (de-stuffing), Cargo Receipt and delivery, Labour/Equipment Booking, Documentation, Resource Allocation, Rail documentation and operations and the terminal management. incorporates the complete tender cycle. It includes Estimate Preparation, Proposal, Sale, Receipt and opening of tender till award of contract. It also includes Bank Guarantee, Billing, Income Tax, VAT remittance, e-TDS. The system also generates various reports, certificates and e-TDS submission files.

Integrated Material Management System

This system caters to the purchase requirements of stock and non stock items. The system allows online indenting of material, Annual Contract Management, Tender Management, Purchase Order Management, Goods Receipt Management, Material Inspection Management, Material Issue Management, online stock maintenance. The tender value, purchase order value etc. are calculated automatically in the system. All the items are codified in the system irrespective of its type i.e. stock or non stock item. System generates various reports like indent, recoupment memo, purchase order, acceptance letter, tender etc.

Stevedoring

Mumbai Port Trust is providing Stevedoring / Gear services for loading and unloading of various categories of cargo on board the vessel and Container loading, unloading, stuffing destuffing in the port. The operations are carried out efficiently by the skilled On Board Labour under the instruction of experienced On Board Supervisory staff in coordination with vessel agents and under the supervision of the master of the Vessel. Mb. P. T. is committed to offer time bound and prompt quality service to the Vessel Agents in accordance with the ISO quality policy

.

ADVANCE PAYMENT

On the basis of manifested quantity and commodity of cargo mentioned in IGM, advance payment is received on self assessment basis (Format of PDR – Annexure A). the Demand Draft and Pay Order is to be drawn in favour of "The Chairman, Mb. P. T." and must be deposited in account number 10996681184 in the State Bank of India – Extention Counter, Operation Service Center, Indira Docks.

GEAR CHARGES

The agents who use their own gears need not pay Gear Charges. In case, the Vessel Agent desires to use Port Gears for Stevedoring operation, they are required to pay Gear Charges as prescribed – Annexure B , in addition to stevedoring charges.

Dry Docks (Ship Repairing)

the existing facilities provide all major services for repairs to the ship. The impounding water to an extra height of 1.20m so that the depth of water.

During fair weather seasons the depth of water level can be increased even up a capacity and 8 Oxy-Acetylene outlets have been provided.

DETAILS OF FACILITIES AVAILABLE AT DRY DOCKS

Hughes Dock

	Dimensions of ship which can be accommodated		Electric Supply	Compressed Air	Cranes
	Length	Beam			
	Outer Inner Comp. Comp. 380 V Phase 250 Amplifier	30.48 m	415V 3 phase 60 cycles 230 V Single phase 130 V Three phase 32 V 50 cycles 24V A.C. * 110 V and 220 V DC supply	100 lbs. per sq. inch 500 C.F.M.	One no. electric crane of 5 tonnes capacity One no. electric crane of 20 - ton capacity
Outer Grove	123.44 m 170.84 m				
Middle Grove	146.30 m 125.12 m				
Inner Groove	169.16 m 125.12 m				
Without Caisson	304.04 m				

Additional Facilities:

The following additional facilities have been provided under "Modernisation of ship repair"

1. Workshop building
2. One sub-station on each side(i.e, two per dry dock). 3. Lightning mast to improve the visibility
4. Automatic fire fighting system.
5. Supply of salt water on one side of the dry docks.
6. Supply of fresh water on the side of the dry docks.
7. Supply of dry compressed air on one side of the dry docks.
8. Capstans at suitable location
9. 6Nos. water jet pumps
10. 6 Nos. grid blasting machines.
11. 10 Nos. spray painting machines.
12. 12 Nos. scaffolding sets.
13. Office building at MDD east only.
14. Sub-station with frequency convertor and various supply voltage.
15. Yard lighting.

Bunkering

Oil for bunkering can be obtained practically at all berths.

Cruise Terminal

The terminal is situated at Ballard Pier (BPX) within 5-10 minutes driving distance from the Taj Mahal Hotel, Museum, Art galleries, CBD of Fort, Colaba Causeway, Nariman Point and Marine Drive.

The Cruise Terminal has check- in baggage handling facilities, a lounge, duty free shop, curios and handicraft stalls and toilets etc.

Features :

- Dedicated Cruise Terminal at BPX
- Domestic Cruise at Ferry Wharf Shed no. 3

Details of the cruise passengers handled at Mumbai Port – both international and domestic – during the last six years is given in the following table:

	International Cruise		**Domestic Cruise**		**Total**	
	No. of calls	Passengers *	No. of calls	Passengers	No. of calls	Passengers

2007-08	25	14212	59	54917	84	69129
2008-09	30	17375	45	26247	75	43622
2009-10	33	27482	90	62032	123	89514
2010-11	42	27529	21	12063	63	39592
2011-12	40	36803	---	---	40	36803
2012-13	41	27827	---	---	41	27827

CONCLUSION:

Thus these are all the major specification of the busiest container port in India . Having set for itself a long term goal of achieving 10 million Tons by the year 2020=22 through addition of two terminals and the increasing the amount of facilities so it can reach a level one of best and biggest port of India and south

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TAMILNADU, INDIA

Internship Project –

"AUTO FIRE EXTINGUISHER SYSTEM IN SPEACIAL TYPE OF CONTAINERS FOR INFLAMMABKE CARGOES"

A Report On Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	VIJAY.G	2296A	ANS17241

April & 2020

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BONAFIDE CERTIFICATE

This is to certify that the project entitled "**AUTO FIRE EXTINGUISHER SYSTEM IN SPEACIAL TYPE OF CONTAINERS FOR INFLAMMABKE CARGOES"** "submitted by Cadet.VIJAY.G. Reg.No ANS17241...Batch 16.....in the Department of Nautical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt.K.Ravindranath
Associate Professor
Department of Nautical Science

DEAN/HOD
Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme : **B.Sc**

Year of study and Batch/Group : **Batch-16/ Group -5**

Name of the Mentor : Capt.K.Ravindranath

Title of the assigned internship : **"AUTO FIRE EXTINGUISHER SYSTEM IN SPEACIAL TYPE OF CONTAINERS FOR INFLAMMABKE CARGOES"**

Nature of Internship : **Individual/Group**

Reg No of Student : ANS17241

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

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Name of the Student	**VIJAY.G**
Register No and Roll No	ANS17241 & 2296A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP-4
Semester	**VI**
Title of Internship	**"AUTO FIRE EXTINGUISHER SYSTEM IN SPEACIAL TYPE OF CONTAINERS FOR INFLAMMABKE CARGOES"**
Duration of Internship	1 MONTH
Mentor of the Student	Capt.K.Ravindranath

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	9
2	Adequacy & quality of information recorded	10	9
3	Drawings, sketches and data recorded	10	8
4	Thought process and recording techniques used	5	4
5	Organization of the information	5	3
6	Originality of the Internship Report	20	18
7	Adequacy and purposeful write-up of the Internship Report	10	8
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	8
9	Practical applications, relationships with basic theory and concepts	10	7
10	Presentation Skills	10	8
Total		**100**	**82**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

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PROJECT ON

AUTO FIRE EXTINGUISHER SYSTEM IN SPECIAL TYPE OF CONTAINERS FOR INFLAMMABLE CARGOES

INTERNSHIP PROJECT REPORT - APRIL 2020

Department of Nautical Science.

Team members:

1. Jeevanandhan P (2418A) (G – 3 B.Sc.17)
2. Maiamuthan G (2422A) (G – 3 B.Sc.17)
3. Anusha (2440A) (G – 3 B.Sc.17)
4. Nandhupalanisamy (2427A) (G – 3 B.Sc.17)
5. Anbu E (2439A) (G – 3 B.Sc.17)
6. Vishal K (2474A) (G – 4 B.Sc.17)
7. Ramakrishanan (2461A) (G – 4 B.Sc.17)
8. Matheshwaran (2423A) (G – 3 B.Sc.17)

Mentor:

Capt. Gopal Srinivas (Associate Professor, AMET University)

CONTENTS

1. OVERVIEW

There are a number of issues driving container ship fire exposures, including the adequacy of fire-fighting capabilities, ongoing problems with misdeclaration of cargo, salvage challenges and how long it can take to access ports of refuge. Thus, a solution for such situation has come into existence, the use of nitrogen as a fire extinguisher.

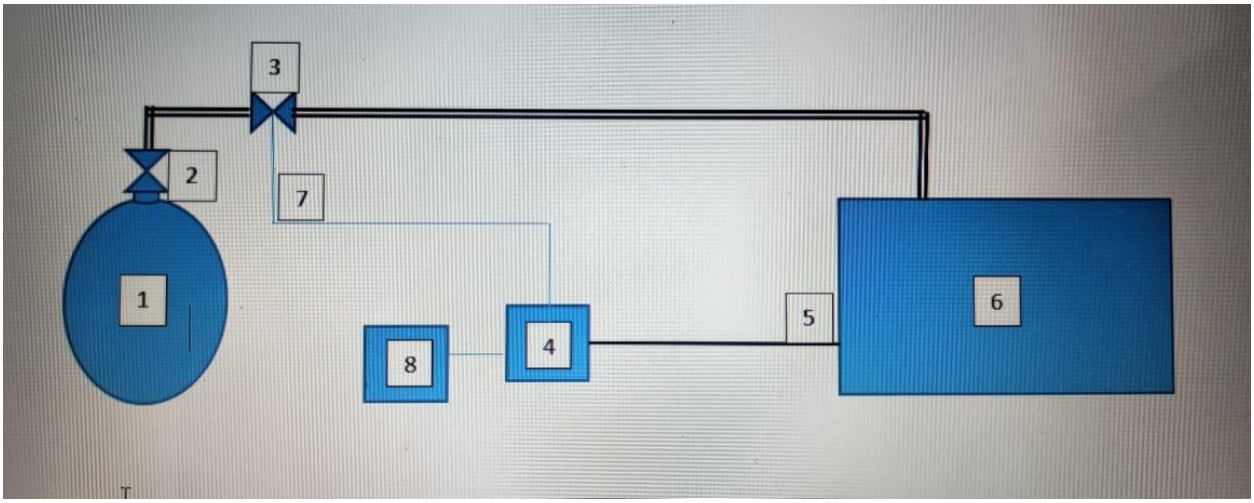
2. ADVANTAGES OF USING NITROGEN AS EXTINGUISHER

- ✓ No residual after usage, like water, foam, CO_2, DCP, etc.
- ✓ Cost efficient.
- ✓ No cargo damage after usage of Nitrogen as extinguisher.

3. EXECUTION DETAILS

1. A weather tight container with Flammable cargo.
2. Container fitted with temperature Sensor.
3. Sensor connected to the Extinguisher with electrical feedback.
4. Electrical feedback connected to the electrically operated valve of the Extinguisher cylinder.
5. Extinguisher contains high pressured nitrogen gas.
6. When the Sensor senses rise in temperature it sends feedback to the Controller.
7. The Controller triggered the Electric valve and the valve open.
8. The Nitrogen in the Extinguisher is released to put off the fire.

4. GRAPHICAL EXPLANATION



5. PARTS & WORKING

1 – INERT GAS CYLINDER

2 – BALL VALVE

3 – SOLENOID VALVE

4 – TEMPERATURE CONTROLLER

5 – TEMPERATURE SENSOR

6 – CONTAINER

7 – POWER TO SOLENOID VALVE

8 – POWER SUPPLY

Working:

- As the fire occur in the container, temperature of the container increase.
- That will be sensed by the controller. As the temperature raised more than the set temperature
- Power will be sent to the valve and the gas will have injected into the container
- Which cut off the oxygen and fire will be extinguished

Exceptional case:

- It can't be use for class D Fire.

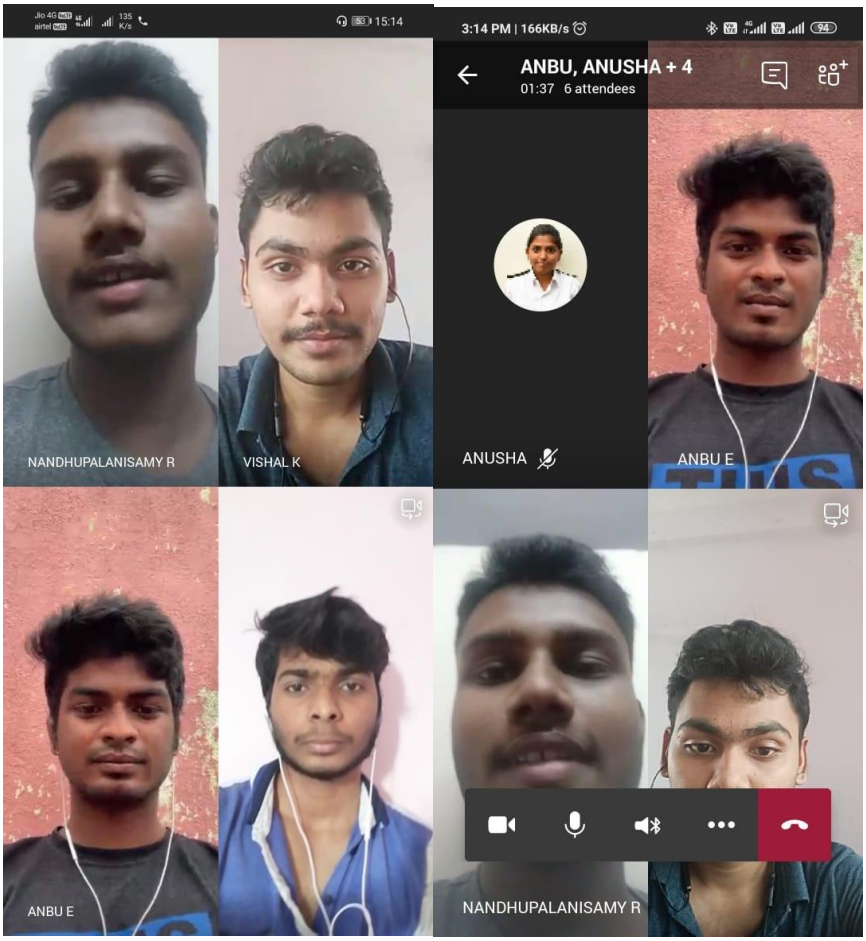
6. CONCLUSION

- No residual after usage like water, foam, CO_2, DCP, etc.
- Cost efficient.
- No cargo damage after usage of Nitrogen as extinguisher.
- It can't be use for class D Fire
- It should will be a Special type container for Flammable Cargoes.
- The Container need to be Air tight for more Efficiency

7. PHOTOGRAPH:

Projects Photo:

Online meeting on July 1 2020:



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TAMILNADU, INDIA

Internship Project –

"Temperature detection with LM35 sensor"

A Report On Internship In

Department of Nautical Science

By

SL NO.	CADET NAME	ROLL NO.	REG.NO.
1.	THEJAS. C.P	2285A	ANS17230

April & 2020

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BONAFIDE CERTIFICATE

This is to certify that the project entitled "**Temperature detection with LM35 sensor**" submitted by Cadet.Thejas.C.P Reg.No **ANS17230**...Batch 16.....in the Department of Nautical Science, AMET, Deemed to be University Chennai is a bonafide record of Technical work carried out by him / her under my supervision.

Signature
(Guide)
Capt.K.Ravindranath
Associate Professor
Department of Nautical Science

Signature

Capt. K.Karthik
DEAN/ HOD
Department of Nautical Science

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(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme : **B.Sc**

Year of study and Batch/Group : **Batch-16/ Group -5**

Name of the Mentor : Capt.P.Rajendran

Title of the assigned internship : **Temperature detection with LM35 sensor**

Nature of Internship : **Individual/Group**

Reg No of Student : ANS17241

Total No. of Hours Required to complete the Internship: 30 DAYS

Signature of the Mentor	**Signature of the Internal Examiner**	**Signature of HoD/Programme Head**
		

AMET
ACADEMY OF MARITIME EDUCATION AND TRAINING
DEEMED TO BE UNIVERSITY
(Under Section 3 of UGC Act 1956)

INTERNSHIP EVALUATION REPORT 2019-20

Name of the Department: NAUTICAL SCIENCE

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Student	**THEJAS.C.P**
Register No and Roll No	ANS17230& 2285A
Programme of study	B.Sc
Year and Batch/Group	III YEAR 16TH BATCH/ GROUP-4
Semester	**VI**
Title of Internship	**Temperature detection with LM35 Sensor**
Duration of Internship	1 MONTH
Mentor of the Student	Capt.P.Rajendran

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	8
2	Adequacy & quality of information recorded	10	9
3	Drawings, sketches and data recorded	10	8
4	Thought process and recording techniques used	5	4
5	Organization of the information	5	3
6	Originality of the Internship Report	20	16
7	Adequacy and purposeful write-up of the Internship Report	10	8
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	8
9	Practical applications, relationships with basic theory and concepts	10	7
10	Presentation Skills	10	7
Total		**100**	**78**

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head
		

CONTENTS

ABSTRACT

This project report entitled “Temperature detection with LM35 sensor” is based on a fundamental research. The main objective of this project is to provide ship’s cargo holds with an automatic temperature detection equipment fixed onboard which as a result will help in temperature detection of holds with greater efficiency reducing the efforts of manual labor.

The source of this project is from **INTERNATIONAL MARITIME SOLID BULK CARGOES (IMSBC) CODE** section 9.2.2.2, Class 4.2: Substances liable to spontaneous combustion and 9.2.3.3: Self-heating solids: MHB (SH).

The equipment’s used for the making of this project includes

1. LM35 Temperature sensor
2. Arduino board
3. Buzzer
4. Wires
5. Electronic display

Automatic temperature detection will allow for continuous monitoring of the temperature of cargo holds and provide ship with an extra hand for cargo monitoring and crew safety.

INTRODUCTION

In recent decades, with rapid increase in demands for various types of cargoes all over the world, shipping as one of the efficient means of transporting the cargo has also dominated over all other means. The number of fleets keep on adding on a day to day basis and the shipping industry growing swiftly. With the increase in demand, one should also consider the sudden rise in number of accidents happening all over the seas.

International maritime organization along with its different organs has drafted various safety guidelines compulsory to be adhered while sailing the seas. One such code namely "INTERNATIONAL MARITIME SAFETY FOR BULK CARGO" (IMSBC) CODE has provided various regulations for carriage of bulk cargoes. Hydrocarbons like coal cargoes are liable of spontaneous combustion and hence the temperature of the hold needs to be monitored regularly for the safe carriage of cargo and ship. Spontaneous combustion can lead to fire onboard along with the release of dangerous hydrocarbon gases which can be dangerous for ships and fatal to the crew.

Conventional method of lowering thermometers from pipes at various level inside the hold to obtain the temperature can be replaced by using temperature sensor to detect the temperature and an integrated buzzer to alarm at a threshold temperature.

The project is a temperature sensor made with an Arduino UNO and LM35 sensor and a few other components. The main aim of the project is to detect the temperature of the surroundings and produce an alarm as output if the temperature increases a certain threshold value.

The working of the project starts with the LM35 sensor that senses the change in temperature of the surrounding, and uses that temperature difference to produce a voltage signal which is processed by the Arduino to give an audible output alarming the temperature of the given surrounding.

METHODOLOGY

EQUIPMENTS REQUIRED:

1. Arduino uno
2. Breadboard
3. Wires
4. LM35 temperature sensor
5. Buzzer

CONNECTIONS:

- Connect arduino board to display.
- Connect gnd of lm35 temperature sensor to ground of arduino board.
- Connect Vout of temperature sensor to A0 of arduino board.
- Connect Vin of temperature sensor to 5v of arduino board.
- Connect input wire of buzzer to A1 of arduino board.
- Connect ground of buzzer to ground of arduino board.
- Input the code in Arduino software and upload it in board.

CONCLUSION

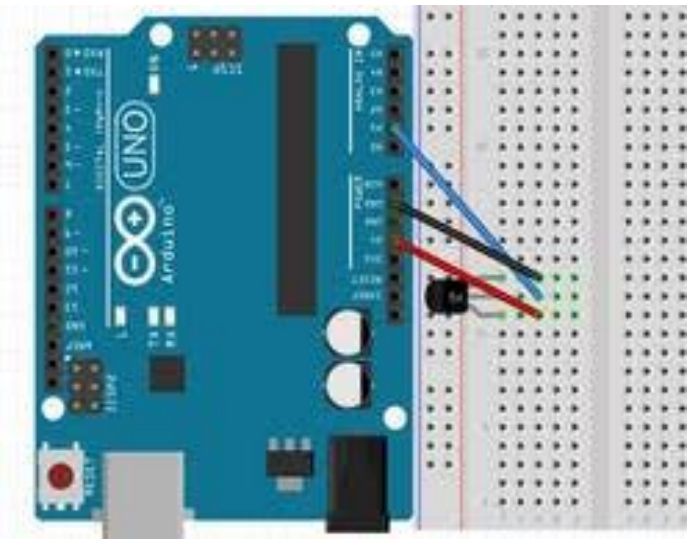
Global shipping went through significant changes and developments in the last few years. From the Spanish expedition commanded by the Portuguese explorer Ferdinand Magellan, whose ship Victoria was the first to circumnavigate around the globe, to Venta Maersk, the container ship which sailed recently in the northern sea routes guiding the global shipping to polar navigation, shipping has experienced significant technological advancements. Researches are carried oftenly for efficient trade, voyage, safety of ships and its crew and the safety of environment.

This project “temperature detection with lm35 sensor” allows the efficient detection and monitoring of temperature of cargo hold, substantially decreases the labor required for the frequent assessment of hold temperature and provide an extra hand for the safety of ship and its crew.

It provides substantial compatibility between technological advancement and safety of the ship. It will be helpful for safe cargo handling, efficient cargo operations and safety of life onboard.

LIST OF PHOTOGRAPH

LM35 SENSOR



LM35 CONNECTION WITH ARDUINO UNO