SEPTEMBER 2023 Vol - 1 | Issue - 1 | Digital Edition | Article Since 2023

# PENDULUM

*"To Infinity and Beyond!"*

## *Article related to Marine field*

Monthly Edition from Pondicherry Maritime Academy

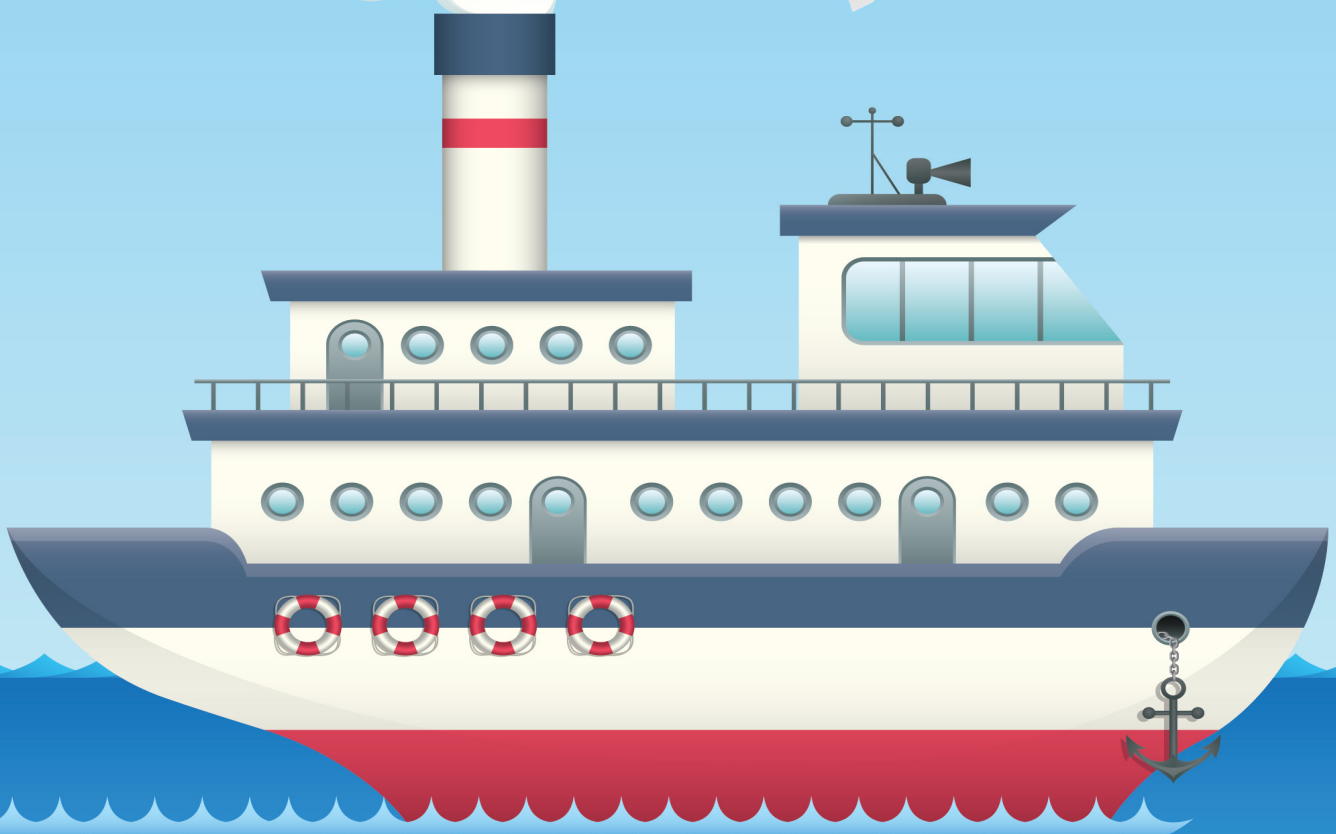
# PONDICHERRY MARITIME ACADEMY

*Approved by Directorate General of Shipping, Govt. of India - MTI No: 403021*

"A1" (OUTSTANDING INSTITUTE) GRADED BY DNV

# World Maritime Day SPECIAL OFFER

## September 2023



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PMA and its Pendulum magazine and web adhere to the following principles:

1. Provide accurate, verified, and engaging reports.
2. Maintain fairness and impartiality in coverage.
3. Publish stories regardless of potential dissent or controversy.
4. Follow legal, objective, accurate, and ethical journalism standards.
5. Avoid unnecessary profanity; editors will decide what qualifies.
6. Edited quotes for profanity will be noted and shared with sources for approval.
7. Journalists can request non-profane quotes when necessary.
8. Letters, opinions, and commentaries are from contributors or invited experts.
9. Cover community, state, national, and international news relevant to readers.
10. Reserve the right to withhold or request revisions for unprotected speech or grammatical errors.


## WEBSITE:

https://pondicherrymaritime.com/magazine

## OWNED, PUBLISHED AND PRINTED BY:

Pondicherry Maritime Academy

No : 236/1,262/1,Vanur,Manaveli main road

-Mettupalayam, Poothurai. Tamil Nadu-605111

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# Editorial Board

## Message from Chief of Editor

### Mrs. Arul Josphin Mary | Director of PMA Chief of Editor

On behalf of our editorial team, I would like to offer a word of thanks to our reader, data contributors, marine authors, editors and anonymous reviewers, all of whom have volunteered to contribute to the success of the magazine and for its mission towards in the maritime education and research. Without research, education system cannot be fulfilled to meet the industry requirements **IMO's** dream about **GREEN VOYAGE 2050** and government of the India dream about **MARITIME INDIA VISION 2030,** we encourage contribution to ensure continuity of a successful maritime magazine We also welcome comments, suggestion that could improve the quality of the magazine Thank you, we trust and hope will find the magazine more informative in the future / ahead endeavor.

## Editorial board Members

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Er.Maheshkumar Anbalagan
Faculty - MAIN EDITOR

Mrs.Sakshi Jain
SECTION EDITOR

Mr.Mani Bharathi
ASSOCIATE EDITOR

# ADITYA-L1

## Science Objectives:

**The major science objectives of Aditya-L1 mission are:**

- **Study of Solar upper atmospheric (chromosphere and corona) dynamics.**
- **Study of chromospheric and coronal heating, physics of the partially ionized plasma, initiation of the coronal mass ejections, and flares**
- **Observe the in-situ particle and plasma environment providing data for the study of particle dynamics from the Sun.**
- **Physics of solar corona and its heating mechanism.**
- **Diagnostics of the coronal and coronal loops plasma: Temperature, velocity and density.**
- **Development, dynamics and origin of CMEs.**
- **Identify the sequence of processes that occur at multiple layers (chromosphere, base and extended corona) which eventually leads to solar eruptive events.**
- **Magnetic field topology and magnetic field measurements in the solar corona**
- **Drivers for space weather (origin, composition and dynamics of solar wind .**

इसरो isro

**Source: ISRO**

# Chandrayaan - 3

*The Mission to MOON*

***'Simple man'***

***Project director for Chandrayaan-3***

*P Veeramuthuvel*

*villupuram district, tamil nadu*

***Landing Site: Moon South Pole Region***

**Source: ISRO**

# Forecasting Maritime Accidents - 1

Capt.Suresh Jagadeesan

The word 'Forecasting' is generally used by the Meteorological department to predict the weather in certain areas.

The weather is cyclic in nature and it is due to rotation of the earth around the sun.

Forecast of weather for a given area necessitate the continuous analysis of the weather over a very much larger area over a longer period of continuous observations. In forecasting weather, there are several meteorological factors involved, and hence an accurate study is required.

Forecasting of weather is possible because it is the science; even it is involved of studying of multiple factors of the nature. But human behavior is the study of psychology. Until few years back psychology was considered as an art subject and not as science subject and hence prediction or forecasting is not at all possible. But now psychology is best defined as the science of behavior and cognitive processes. In other words psychology means any observable action or reaction of a living organism, and which can be observed and measured.

The human behavior –actions can be observed and measured. Every human being, on certain conditions of environment to certain stimuli will response similarly. However, there could be deviations, because there are innumerable factors are involved in one's behavior, if carefully studied and accurately analyzed using modern techniques, the actions of human can be predicted.

Hence, it is possible to forecast / predict maritime accidents on studying behavior pattern or markers of seafarers onboard a ship.

If we start studying any Marine accidents, the root causes of those incidents are lies on human behavior of the operators (Human error).

**Liberian Shipowners' council ltd had issued a Safety bulletin which indicates the following**

- Cost of "human error" = +$1,000,000/day excluding criminal indictments etc.
- "Human error" responsible for 70 - 90% of all industrial accidents
- Human error costs the maritime industry $541 million per year, as per the findings of the United Kingdom Protection and Indemnity (UK P&I) Club [4].
- A study of 6091 major accident claims (i.e., over $100,000) associated with all classes of commercial ships, conducted over a period of 15 years by the UK P & I Club, revealed that 62% of the claims were attributable to human error [4–6].
- Human error contributes to 84–88% of tanker accidents [7, 8].

**The following are few behavioral Markers of seafarers - Observable, non-technical behaviors**

- Stress
- Imperfect information processing
- Fatigue
- Workload
- Poor decision making
- Cognitive overload
- Poor interpersonal communications
- Lack of situation awareness

Few examples are

## Grounding of Exxon Valdez

- The cause of the incident was investigated by the National Transportation Safety Board, which identified the four following factors as contributing to the grounding of the vessel:
- The third mate failed to properly maneuver the vessel, possibly due to fatigue and excessive workload.
- The master failed to provide navigation watch, possibly due to impairment under the influence of alcohol
- Exxon Shipping Company failed to supervise the master and provide a rested and sufficient crew for the Exxon Valdez.
- The United States Coast Guard failed to provide an effective vessel traffic system

The second example is the grounding of the TORREY CANYON. Again we have clear, calm weather--this time it was a daylight transit of the English Channel. While proceeding through the Scilly Islands, the ship ran aground, spilling 100,000 tons of oil.

- At least four different human errors contributed to this accident.
- The first was economic pressure, that is, the pressure to keep to schedule (pressure exerted on the master by management). The TORREY CANYON was loaded with cargo and headed for its deep-water terminal in Wales. The shipping agent had contacted the captain to warn him of decreasing tides at Milford Haven, the entrance to the terminal. The captain knew that if he didn't make the next high tide, he might have to wait as much as five days before the water depth would be sufficient for the ship to enter. This pressure to keep to schedule was exacerbated by a second factor.
- The third human error in this chain was another poor decision by the master. He decided, in order to save time, to go through the Scilly Islands, instead of around them as originally planned. He made this decision even though he did not have a copy of the Channel Pilot for that area, and even though he was not very familiar with the area.

- The final human error was an equipment design error (made by the equipment manufacturer). The steering selector switch was in the wrong position: it had been left on autopilot.
- Unfortunately, the design of the steering selector unit did not give any indication of its setting at the helm. So when the captain ordered a turn into the western channel through the Scillies, the helmsman dutifully turned the wheel, but nothing happened. By the time they figured out the problem and got the steering selector back on "manual", it was too late to make the turn, and the TORREY CANYON ran aground.

**The third example**

is the accident of the tanker Erica that happened on December 12, 1999. The ship's Master accepted the load of 30 844 t of oil although he knew and had to know that the hull could not meet the safety require-


ments. Namely, on the inspection in November 1999, i.e. a month before the accident happened, the tanks were found to be in bad condition due to corrosion and this had to be corrected within January 2000. So, in a short period the hull and tanks had to be repaired, but the Management set the ship on another, i.e. her last voyage in order to avoid off-work period.

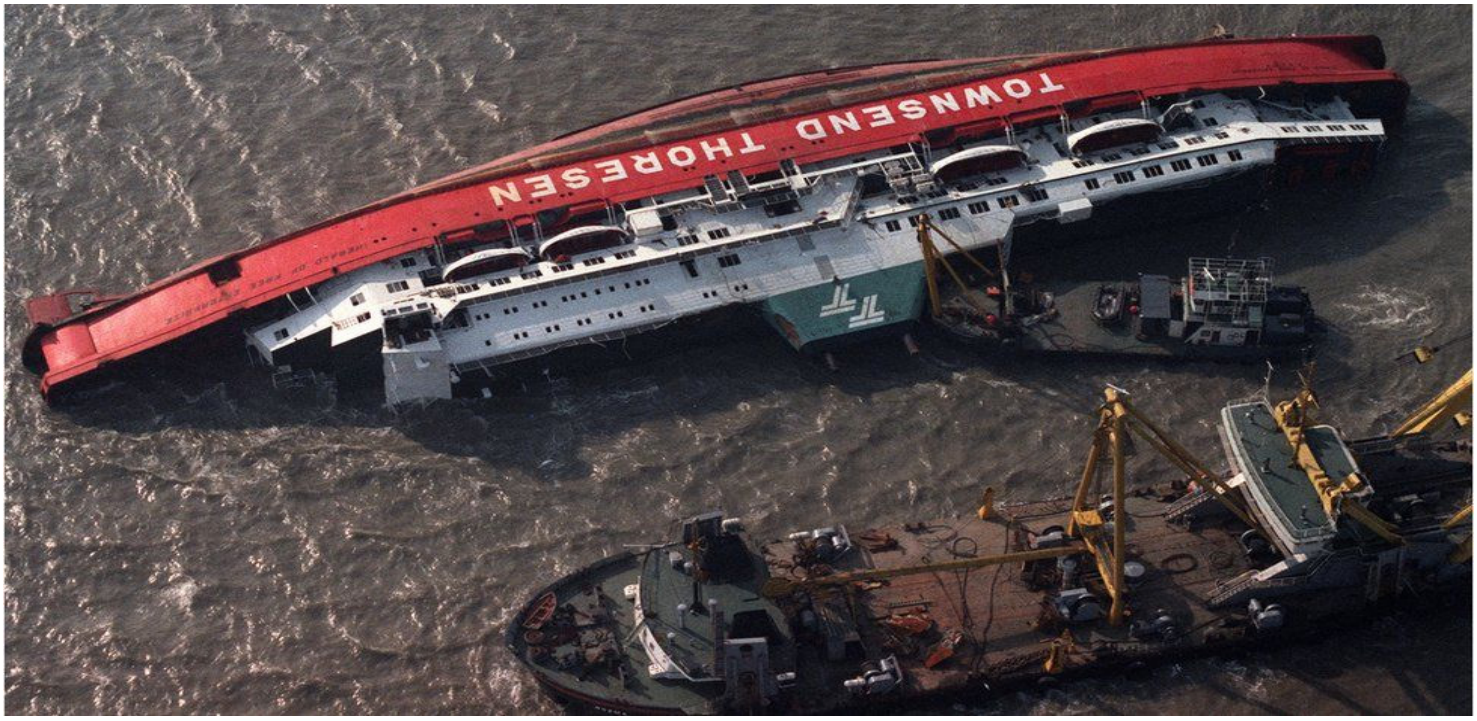
Master who could have opposed it on the basis of the ISM Code and with regard to the ship's condition, did not do it. He was trying to protect the interests of the Company better than prevent the environment pollution since he tried to exert negative influence on the officers who warned him of the hull breakage while there was still enough time to restrict the consequences of the accident. In that sense, Leadership Complacency effect is revealed since all the officers succumbed to the Master's will although they knew that his decisions would work against safety and environment protection. Thus, this is a clear example of the strong influence of Management Complacency combined with Leadership Complacency that in this case resulted in the pollution of Biscay Bay due to the 26000 t of oil that flowed out of the tanker.

The 4th Example is the Incident of Herald of Free Enterprise

The MS Herald of Free Enterprise was a Roll-On Roll-Off (RORO) ferry which capsized moments after leaving the Belgian port of Zeebrugge on the night of March 6, 1987, killing 193 passengers and crew. One of the root causes of this incident was the failure of the assistant boatswain to close the bow door (he had slept through his alarm) before dropping moorings.

The bow door remained open as the ferry set sail and the boat filled with water and capsized minutes later. The captain (master) of the ship had no view of the bow door and no indicator light or other means for him to confirm that the doors were closed.

The absence of a communication channel with deck crew meant that the captain had to make assumptions about the status of the rear door. This had previously been raised as an issue by a captain of a similar vessel, which had also gone to sea with bow doors




The following are few direct measurable behavioral Markers of seafarers;

If any one of the below is observed onboard a vessel, one can be sure of expecting any accidents.

**Violation errors**

Deliberate failure to adhere to procedures or regulations – Attitude problem

**Procedural errors**

Followed procedures but executed incorrectly – lack of interest / concentration

**Proficiency errors**

Error due to lack of knowledge or skill

**Anticipated**

Weather port congestion

**Unanticipated**

heavy traffic in shipping lanes; equipment malfunctions; engine failure; port officials, tug boats, line handlers

**Latent**

existing conditions that may interact with ongoing activities to precipitate a problem; equipment design issues; fatigue

**Communication errors**

Missing or wrong information exchange or misinterpretation

**Decision making errors**

Decision that unnecessarily increases risk

**Complacency Errors**

Too much self-confidence or egoistic pleasure in doing any task

# Flourish Or Perish -1

Feed Your Body Right: Go Low-Carb Now!
Eat Low Carbs, Live Longer.
Fight Free Radicals with Low Carb Foods!
Start Fueling Your Wellness Today!

Free radicals are often seen as the enemy, but they actually play an important role in helping us stay healthy. While it is true that free radicals cause damage to our cells, they also have a divine purpose. God didn't put them there to kill us - He put them there to help us.

We often think of free radicals as something that is harmful to our bodies, but in fact, they are beneficial (when they exist in right amounts) and essential (without which we die prematurely).

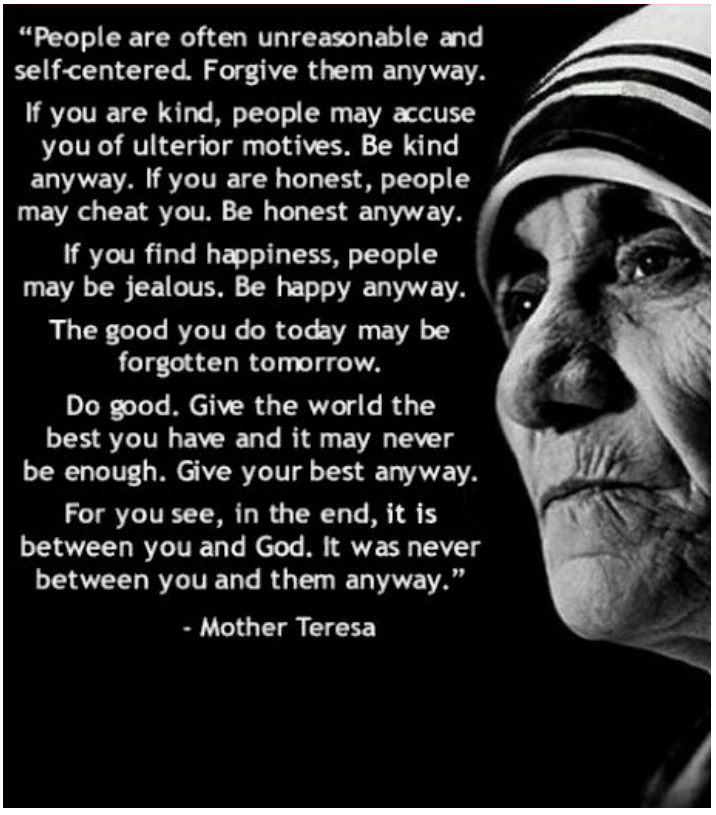
Free radicals are a type of molecule that helps the body perform certain functions such as Apoptosis, which is the process of assisted cell death ie death of weak, damaged and old cells that are draging down our body health. This process is essential for maintaining a healthy young body and immune system.

Glucose metabolism releases free radicals and excessive glucose releases excessive free radicals. Body needs a teaspoon of free radicals but our high carb diets dump a bucket of free radicals in our blood.

Again anti-oxidants are substances that help neutralize excess free radicals and thus protect us from damage caused by them

The key is finding balance between the benefits and risks of free radicals, so that we can enjoy their divine purpose without putting ourselves at risk for disease or premature aging and without the free radicals running Riot.

Ch.Er. Pradeep Kumar m.s.



# PONDICHERRY MARITIME ACADEMY

Approved by Directorate General of Shipping, Govt. of India MTI NO: 403021

# WORLD MARITIME DAY

## Directorate General of Shipping Approved Courses

***valid Till 30th Sep 2023


**Basic Courses**
-STSDSD

**Advance Courses**
-AFF, PSCRB, MFA

**Refresher Courses**
-RAFF, RPSCRB, RMFA, RMC, RUTC, RUT, RFPFF, RPST

### Basic Modular Courses

| | | SEP 2023 | OCT 2023 |
|---|---|---|---|
| 1 | BST + INDOS | 1,8,15,22,29 | 6,13,20,27 |
| 2 | STSDSD | 6,13,20,27 | 6,13,20,27 |
| 3 | PSFC | 11,25 | 9,23 |
| 4 | PSSR | 18 | 3,16,30 |
| 5 | EFA | 14,28 | 12,26 |

### Refresher Modular Courses

| | | SEP 2023 | OCT 2023 |
|---|---|---|---|
| 1 | R-AFF | 4,11,18,25 | 4,9,16,23,30 |
| 2 | R-PSCRB | 5,12,19,26 | 3,10,17,24,31 |
| 3 | R-MFA | 6,13,20,27 | 4,11,18,25 |
| 4 | R-MEDICARE | 7,14,21,28 | 5,12,19,26 |
| 5 | RUTC(ENGINE) | 6,13,20,27 | 4,11,18,25 |
| 6 | RUT(DECK) | 6,13,20,27 | 4,11,18,25 |
| 6 | R-FPFF | 5,12,19,26 | 3,10,17,24,31 |
| 6 | R-PST | 6,13,20,27 | 4,11,18,25 |

### Simulator Course

| | | SEP 2023 | OCT 2023 |
|---|---|---|---|
| 1 | ECDIS | 11,25 | 9,23 |

### Advance Modular Courses

| | | SEP 2023 | SEP 2022 |
|---|---|---|---|
| 1 | AFF | 11 | 3,23 |
| 2 | PSCRB | 4,25 | 16 |
| 3 | MFA | 18 | 9,30 |
| 4 | MEDICARE | 11 | 16 |
| 5 | SSO | 11,25 | 9,23 |
| 5 | CRISIS | 4,18 | 3,16,30 |

### Tanker Familiarization Course

| | | SEP 2023 | OCT 2023 |
|---|---|---|---|
| 1 | OCTF | 4,18 | 3,16,30 |
| 2 | GTFC | 11,25 | 9,23 |
| 3 | TASCO | 25 | - |
| 4 | GASCO | 11 | 23 |
| 5 | CHEMCO | - | 9 |

### Vertical Integration Course For Trainers

| | | SEP 2023 | OCT 2023 |
|---|---|---|---|
| 1 | VICT | 11 | 9 |

ALL ACADEMY
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### MARITIME RESOURSES MANAGEMENT

We also participate in a comprehensive risk mitigating training pogramme through the swedish club academy.

The course is based on cbt modules and discussions.

The mrm course is designed to minimise the risk of incidents by encouraging safe and responsible behaviour

**COURSE DURATION : 4 DAYS**

**COURSE STARTS ON EVERY MONDAY**

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## MEO CLASS II Preparatory Course[PCT]

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# Cycling for All

Some people think that cycle is a poor man's vehicle hobby for rich man and medical for the old peoples. In most of the cases, a child physical activity  starts when they start walking, after that they start to ride tri- wheeled walking cycles, the child enjoy riding the tricycle. In most of the cases, a child physical activity with equipment starts with Tri-cycle, two wheeler cycle irrespective of his/her status of being a rich, middleclass or poor family. Hence, it may be mentioned that the cycling activity starts in the beginning of childhood and it becomes a sport at 12 years of age.

In the history of Pondicherry everybody have used bicycle to travel from one place to another place. Even higher level officers and French peoples were used only cycles, they never use motor cycle and four wheelers. Whether known or unknowingly about the exercises, they keep their physical fitness properly by riding the cycle daily.

But now due to the increase of motor bikes and cars all the people in Puducherry forget to ride the cycle. Due to this, they lost their physical fitness and it leads to the diseases like blood pressure, diabetes, heart attack, lung diseases, back pain diseases.

During the Pandemic situation of corona virus people not able to go to gymnasium and group fitness activity, they started doing cycling activities to keep there fit-ness levels in good condition. And now more peoples are doing cycling from children's, middle aged peoples and old age peoples doing cycling to keep them fit and healthy.


Cycling is a low impact aerobic exercise that offers a wealth of benefits. It also varies in intensity, so it is suitable for all level of peoples. You can cycle  as a as a mode of transportation, and  for casual activity or as an competitive sport. Cycling is a wonderful workout that keeps you active. It can help to have a healthy lifestyle, both physically and mentally strong.

### 1. CYCLING IS GOOD FOR BEGINNERS

If you are new to fitness or from an injury,you can cycle at a low intensity. Riding a cycle is a simple activity. If you are difficulty in riding a bicycle,you can cycle a stationary bikes.

### 2.CYCLING TO LOSE WEIGHT

Cycling especially at a high intensity, can help lower your body fat levels, which promotes healthy weight management.

### 3.CYCLING LOWER THE CHOLESTEROL LEVEL

The healthy effects of cycling may help improve cholesterol levels, can boost your cardiovascular health and lower your chances of stroke and heart attack. Indoor cycling also have a positive effect

### 4. CYCLING MAY LOWER CHOLESTEROL

The health-enhancing effects of cycling may help improve cholesterol levels, which can boost your cardiovascular health and lower your chances of stroke and heart attack.
Indoor cycling has a positive effect on total cholesterol. It may boost HDL (good) cholesterol levels while lowering LDL (bad) cholesterol and triglyceride levels .

### 5. CYCLING BOOSTS MENTAL HEALTH AND BRAIN POWER

Cycling can ease feelings of stress, depression, or anxiety.

Focusing on the road or your cadence when cycling can help you develop concentration and awareness of the present moment. This may help take your focus away from the mental chatter of your day.

If you find yourself feeling lethargic, listless, or like your brain is moving slowly, get on your bike for at least 10 minutes. Exercise promotes the release of endorphins in your body, which helps you feel better while lowering your stress levels. As the study above found, exercise outdoors only increases these effects.You may feel more confident and content once you make cycling a regular part of your life.

### 6. CYCLING CAN HELP PEOPLE WITH CANCER

Cycling is a fantastic addition to your care plan if you have recovering from cancer. However, many cancer patients experience low energy and pain during treatment, so be sure to work with your care team, listen to your body, and exercise only if you're up for it.
Cycling can also help keep you lean and fit, which may reduce your risk for certain types of cancer, including breast cancer .If you have breast cancer, staying active may help reduce side effects of cancer treatment, including fatigue, and improve your overall quality of life .

### 7. CYCLING CAN OFFER A POSITIVE START TO EVERY MORNING

Beginning your day with a healthy activity like cycling

wakes you up by boosting your circulation and allows you to start your day with a sense of accomplishment. You may feel more inclined to make healthy, positive choices as the day progresses .

Fasted morning rides at a low intensity may burn fat, enhance endurance performance, and boost your energy and metabolism levels all day .

### 8. CYCLING MAY HELP PREVENT AND MANAGE MEDICAL CONDITIONS

Whether you want to prevent health concerns from arising or manage existing conditions, regular exercise is key. Cycling regularly is one way to avoid a sedentary lifestyle and its possible accompanying health concerns.

Regular exercise can help prevent heart issues such as stroke, heart attack, and high blood pressure . Cycling may also help prevent and manage type 2 diabetes .

In fact, regular cycling can lower mortality rates for people with diabetes by 24% and, if continued for at least 5 years, can decrease mortality rates by 35% .

### 9. CYCLING MAY REDUCE THE RISK OF CARDIOVASCULAR DISEASE

Cycling is a fantastic way to raise your heart rate, improve cardiovascular function, and enhance your overall fitness level.

### CYCLING EVERY DAY

It's possible to cycle every day, especially if you use your bicycle for transportation or ride at a low intensity.Take a break if you experience pain, fatigue, or muscle soreness.

If you're cycling for fitness, you may want to give yourself at least 1 full day of rest each week — especially if your rides are longer or higher in intensity. Exercise scientists agree that recovery is necessary to prevent injury and enhance performance.This is especially important if you ride at a high intensity or find your body getting sore in specific ways.

### STAY HEALTHY

Cycling is an enjoyable way to stay healthy and in touch with the world around you. If the weather is in your favour, hop on your bike and go the distance. Cycling is a wonderful way to explore your local area. And it beats the feeling of boredom that can come from repetitive workouts.

Just play it safe and use caution when necessary, especially on busy roads or during inclement weather.

When the weather is not conducive to outdoor cycling, indoor cycling is a great option that's somewhat less risky and offers many health benefits.

Either way you ride a bike, appreciate the satisfaction that comes from improving your fitness while having fun.

Those who are interested in participating in cycle Rally and Cycling Championship ,any age group can contact


**Contact :**

*P.S.Premkumar*, *Honorary General Secretary*,

Union Territory of Pondicherry cycling association,

Phone Number : 9944129466

The most powerful and quite useful TWO words in ENGLISH language are:


*"Use these words very often and as many times as possible, you will certainly be happy all the time."*

— **Mohandass G**

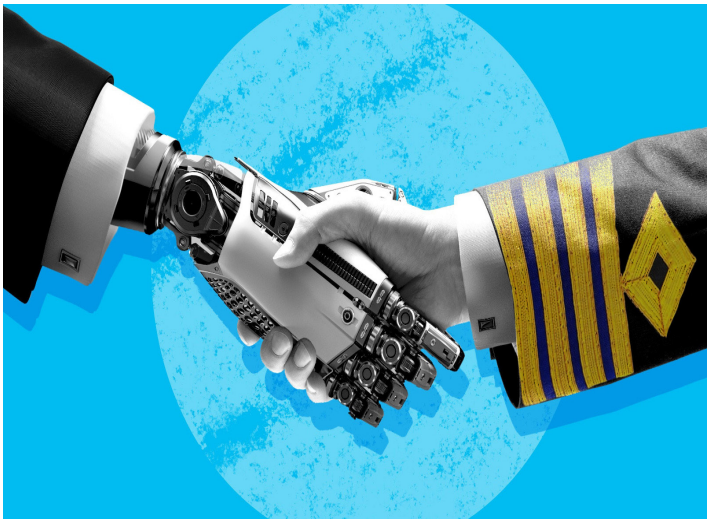
## Word/Sentence in Native Language Pronunciation: for Sound (Speaking)

| ENGLISH | HINDI | Spanish | French |
|---|---|---|---|
| Hello | Namaste | Hola | Bonjour |
| Good morning | Shubh prabhat | Buen día | Bonjour |
| How are you? | Aap kaise hai? | ¿Cómo estás? | Comment allez-vous? |
| I am fine | Mai theek hoon | Estoy bien | Je vais bien |
| Yes | Haan | Sí | Oui |
| No | Na | No | Non |
| Thank you | Dhanyawad | Gracias | Merci |
| Slow | Dheere | Lento | Lent |
| Fast | Jaldi | Rápida | Rapide |
| Upwards | Oopar ke or | Hacia arriba | Vers le haut |
| Down | Niche | Abajo | Bas |
| How much? | Kitna | ¿Cuánto cuesta? | Combien? |
| (As m money) | Mujhe do de do plz | (Como m dinero) | (As m argent) |
| Give me 2 please (as in quantity while buying) | Mujhe do de do plz | Dame 2 por favor (como en can-tidad al comprar) | Donnez-moi 2 s'il vous plaît (comme en quantité lors de l'achat) |
| I am travelling for work | Mai kaam ke silasile me yatra kar Raha hu | Estoy de viaje por trabajo | Je voyage pour le travail |
| I will be here for 2 days | Mai 2 din me aajaung | Estaré aquí durante 2 días | Je serai là pendant 2 jours |
| What time is my light? | Meri flight kitne baje hai? | ¿A qué hora es mi luz? | À quelle heure est ma lumière ? |
| Where is terminal/gate 1 a | Terminal gate 1A kaha hai | Donde esta la terminal/puerta 1 a | Où se trouve le terminal/porte 1 a |
| Where can i find a good restaurant? | Yaha par acha restaurant kaha milega? | ¿Dónde puedo encontrar un buen restaurante? | Où puis-je trouver un bon restau-rant ? |
| Help | Madad | Ayuda | Aider |
| Warning! | Chetavanee | ¡Advertencia! | Avertissement! |
| Alarm | Khatre ki ghantee | Alarma | Alarme |
| Extinguisher | Aag bujhane ki kal | Extintor | Extincteur |
| Fire | Aag | Fuego | Feu |
| Emergency exit | Apaatkaleen nikaas | Salida de emergencia | Issue de secours |

# Manned to AI Ships Era (iota/1)

## *"Investing on Yourself is the best investment".*

**2030** year going to be a massive change throughout the world in all the fields. Starts from pollution norms, recycling, **IIOT** etc. Technology developments will take over all industry in a prompt time. AI is the field of conceiving, designing and developing machines which should perform tasks that usually requires human intelligence.



AI is the art and science of developing machines running on intelligent algorithms that make them capable of thinking, acting and learning like human beings. In layman language we are expecting a intelligent machines in the field of engineering and technology. Scanner and sensors types going to increase more like thermal, light, proximity, chemicals, barometric, speech, audio, image.

Human Machine Interface to synchronization for commanding/operating the ship from shore requires.

Ch.Er. Abdul Rasheed

Education and training are required to meet **AI** and to with the emerging accomplishments, experts say that full artificial intelligence could manifest within a couple of years, and **Artificial Super Intelligence (ASI)** could exist in the 21st century possibly...

# Chandrayaan-3

## Chandrayaan-3 ROVER: Made in India. Made for the MOON!

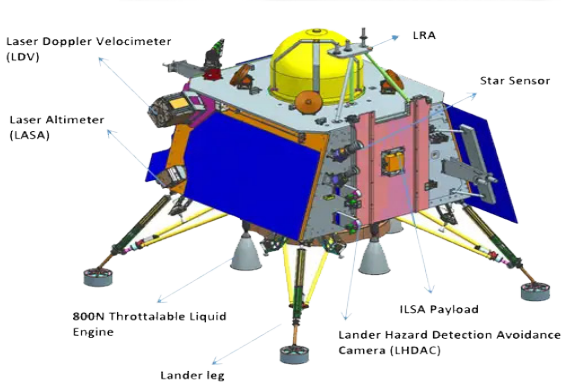
## The Ch-3 Rover ramped down from the Lander and India took a walk on the moon

With the successful landing of the Lander Module of ISRO's third lunar mission Chandrayaan-3, India has reached the Moon! It has also became the first country to land near the Moon's south pole.


The Lander Module (LM) of the Indian Space Research Organisation's (ISRO) third lunar mission Chandrayaan-3, launched on July 14, made a successfully landing on the Moon's surface on August 23, making India only the fourth country after the erstwhile USSR, the U.S. and China to make a soft landing on the lunar surface

Chandrayaan-3 is a follow-on mission to Chandrayaan-2 to demonstrate end-to-end capability in safe landing and roving on the lunar surface. It consists of Lander and Rover configuration. It will be launched by LVM3 from SDSC SHAR, Sriharikota. The propulsion module will carry the lander and rover configuration till 100 km lunar orbit. The propulsion module has Spectro-polarimetry of Habitable Planet Earth (SHAPE) payload to study the spectral and Polari metric measurements of Earth from the lunar orbit.

**Lander payloads:** Chandra's Surface Thermophysical Experiment (ChaSTE) to measure the thermal conductivity and temperature; Instrument for Lunar Seismic Activity (ILSA) for measuring the seismicity around the landing site; Langmuir Probe (LP) to estimate the plasma density and its variations. A passive Laser Retroreflector Array from NASA is accommodated for lunar laser ranging studies




**Rover payloads:** Alpha Particle X-ray Spectrometer (APXS) and Laser Induced Breakdown Spectroscope (LIBS) for deriving the elemental composition in the vicinity of landing site.

Chandrayaan-3 consists of an indigenous Lander module (LM), Propulsion module (PM) and a Rover with an objective of developing and demonstrating new technologies required for Inter planetary missions. The Lander will have the capability to soft land at a specified lunar site and deploy the Rover which will carry out in-situ chemical analysis of the lunar surface during the course of its mobility. The Lander and the Rover have scientific payloads to carry out experiments on the lunar surface. The main function of PM is to carry the LM from launch vehicle injection till final lunar 100 km circular polar orbit and separate the LM from PM. Apart from this, the Propulsion Module also has one scientific payload as a value addition which will be operated post separation of Lander Module. The launcher identified for Chandrayaan-3 is LVM3 M4 which will place the integrated module in an Elliptic Parking Orbit (EPO) of size ~170 x 36500 km.

## THE MISSION OBJECTIVES OF CHANDRAYAAN-3 ARE:

1. To demonstrate Safe and Soft Landing on Lunar Surface
2. To demonstrate Rover roving on the moon and
3. To conduct in-situ scientific experiments.

## TO ACHIEVE THE MISSION OBJECTIVES, SEVERAL ADVANCED TECHNOLOGIES ARE PRESENT IN LANDER SUCH AS,

1. Altimeters: Laser & RF based Altimeters
2. Velocimeters: Laser Doppler Velocimeter & Lander Horizontal Velocity Camera
3. Landing Leg Mechanism.
3. Inertial Measurement: Laser Gyro based Inertial referencing and Accelerometer package
4. Propulsion System: 800N Throttleable Liquid Engines, 58N attitude thrusters & Throttleable Engine Control Electronics
5. Navigation, Guidance & Control (NGC): Powered Descent Trajectory design and associate software elements
6. Hazard Detection and Avoidance: Lander Hazard Detection & Avoidance Camera and Processing Algorithm

To demonstrate the above said advanced technologies in earth condition, several Lander special tests have been planned and carried out successfully viz

1. Integrated Cold Test - For the demonstration of Integrated Sensors & Navigation performance test using helicopter as test platform
2. Integrated Hot test – For the demonstration of closed loop performance test with sensors, actuators and NGC using Tower crane as test platform
3. Lander Leg mechanism performance test on a lunar simulant test bed simulating different touch down conditions.

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# September Month Birthday

**Er. krishnaraj G**
**14-Sep**

**Er. Neelanjan Banerjee**
**14-Sep**

**Mr. Kalia perumal**
**22-Sep**

*"Cheers to more fun, more memories, and more cake!"*

# Advent of Led Lights in Marine Industry - 1

LED makes its way across more and more in Marine/ Industrial applications. In today's maritime industry, the term 'Energy Efficiency' is of sheer importance in all aspects of shipping operation. From main engine to cargo operations, energy efficiency has become the base to set up and plan any machinery or procedure. Electrical system being the most important network onboard ships, it is important for ship owners and operators to make their energy efficiency plans considering the same.

Use of energy efficient LED lighting in place of conventional lamps and tube lights on ship, contributes to more savings and add up to its energy efficiency model. An incandescent globe (bulb) can provide a life span of 1000 hrs and a fluorescent lamp can be used up to 7500 hrs. However, far better performance can be achieved by LED lights which have lifespan of about 50,000 hours and 60% less energy consumption. Implementing this would not only reduce the maintenance hours but also bring down the operating costs in thousands every year, which includes the generator fuel cost and operation/maintenance cost of the lights.

Benefits of using LED lighting onboard ships:

Less time in dangerous situations: LED bulbs last an average five times longer than traditional bulbs. This means crew spends up to 80% less time up on ladders and lifts replacing them.

Reduces vessel's electrical load: LED lights use approximately 50% less energy – with higher-end fixtures saving as much as 70%. Less energy used by your lighting means more energy can be utilized elsewhere on vessel.

More horsepower to where you need it: With less energy used by lighting, more horsepower can be directed to pumps, motors and hydraulics. This also lessens the load on switchboard, giving it longer life.

Lowers operating costs: Reducing the energy needed for vessel's lighting by 50% – or even 70% with higher end solutions – lowers costs to generate that energy, too. Generators will last longer and need less fuel to create the energy needed.

Reduces maintenance costs by up to 80%: LED lights are more durable and less prone to failures due to vibration, temperature, and impact – perfect for maritime vessels. LED bulbs are shatterproof and can withstand impacts that traditional bulbs won't. Their temperature resistance is well-suited to extremes of hot sun and cold water, not to mention rapid shifts in weather. And vibration is always a long-term and permeating condition on any vessel.

Increases small target visibility by as much as 50%: This helps crew pinpoint hazards both on and off the vessel.

Ch.Er. Magesh Shanmughm

# Fun Facts

1

***Sea Lions are the only animals who can clap to a beat!***

Sea Lions are not only adorable creatures but are also the only animals capable of clapping to a beat.

***Astronauts grow taller in space!***

When astronauts venture into space, the lack of gravity allows their spines to stretch out, making them taller. How cool is that?

2

3

***It snows metal on Venus!***

Venus, our neighbouring planet, is known for its extreme conditions.

Did you know that it even has “snow”?

Don’t expect fluffy white flakes like on Earth! The snow on Venus is made of metal!

Imagine a world where it rains metal. Venus is truly out of this world!

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