Samundra Spirit

QUARTERLY IN-HOUSE MAGAZINE FOR SAMUNDRA INSTITUTE OF MARITIME STUDIES (SIMS), MUMBAI & LONAVALA

OCT 2011 . ISSUE 15


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SAMUNDRA INSTITUTE OF MARITIME STUDIES (SIMS)

A Training Commitment of Executive Ship Management Pte Ltd (ESM), Singapore
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  Approved by Directorate General of Shipping, Govt. of India & The Maritime and Port Authority of Singapore (MPA), and affiliated under Indian Maritime University (IMU)
- **4-YEAR B. TECH. (MARINE ENGINEERING) - AUG 2012 BATCH**
  Approved by Directorate General of Shipping, Govt. of India and affiliated under Indian Maritime University (IMU)
- **1-YEAR GRADUATE MARINE ENGINEERING (GME) - MAR 2012 BATCH**
  Approved by Directorate General of Shipping, Govt. of India & The Maritime and Port Authority of Singapore (MPA)

DECK CADETS (DNS)

- One year Diploma in Nautical Science at SIMS, Lonavala.
- Minimum 18 months of practical shipboard training before 2nd Mate's examination.

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- Four years B.Tech Marine Engineering course at SIMS, Lonavala.
- 6 months shipboard training before appearing for Class IV examination.

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- One year training in Marine Engineering at SIMS, Lonavala which includes 6 months hands-on practical training in the **Ship-in-Campus**.
- 6 months shipboard training before appearing for Class IV examination.

Eligibility	DNS	B. Tech. Marine Engineer	GME
Age & Marital Status	• Not more than 20 years for **10+2** candidates; 22 years for **B.Sc** candidates; 25 years for **B.E/ B.Tech** candidates as on date of joining • Unmarried	• Not more than 20 years as on date of joining • Unmarried	• Not more than 25 years as on date of joining • Unmarried
Academic (Results must be obtained at 1st attempt)	**All Board (Class XII):** Minimum Av Score - 60%, PCM Minimum - 60% **OR** **B.Sc** - Physics / Chemistry / Maths / Electronics with min of 55% in final year along with min of 55% in PCM during Class XII **OR** **B.E/B.Tech** - Degree from an AICTE/UGC/DEC approved institute with min 55% in final year	Passed in 10+2 or equivalent exam with Physics, Chemistry, Mathematics and English as separate subjects with PCM average of not less than 60%	Degree in **B.E/B.Tech (Mechanical / Naval Architecture)** from an **AICTE** approved institute, **Deemed University** with min marks of 55% in final year
Language	English shall be one of the subjects with min marks scored of 50% in Class X or XII or degree		
IMU - CET	Candidates must clear IMU - CET		N.A.
Medical	Physically fit and meet the standards laid out by DG Shipping (**including eye sight**)		

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Samundra Spirit

OCT 2011 ISSUE 15

Background of cover picture -
Resistance Test in Towing Tank experiment at SIMS, Lonavala

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SAMUNDRA SPIRIT is a quarterly in-house magazine produced by Samundra Institute of Maritime Studies (SIMS) for private circulation.

Our Editorial Team wants to hear from you!

If you wish to submit any feedbacks and/or contributions, feel free to write to the Editor at: samundraspirit@samundra.com

**Please note we reserve the right to publish your letters/articles or an edited version of it in all print & electronic media.*

EDITORIAL NOTE

"Simplicity is the ultimate sophistication"

- Leonardo de vinci

The last issue of the year 2011 is in your hand and we have put together yet another compilation of simple thoughts, ideas, musings and stories of our in-house talents of writers. Though writings on engineering aspects dominate this issue, they are all practical wisdom based on personal experiences in the past. They are invaluable knowledge guide to the future generation of seafarers and we are sure they would also benefit any new comer to the industry some way or other.

Our endeavour has been to simplify the complex information and awareness of the world of ships and maritime industry to the level of understanding of newcomers and uninitiated readers. I am happy to point out that the entire range of writings continue to have the flavour of originality as we touch upon topics ranging from ship board management and planning in "QUE SERA SERA, What will be, will be..." to the history of utilization of wind energy in the "Economy of Sail and Scale of Economy". While our challenge remains to get the technical expertise translated into simplified topics, what makes the articles interesting is the writers' enthusiastic straight talking from the heart to deliver the message. Our sincere hope, all the intuitive and uncomplicated writings actually make the magazine more interesting and appealing to the general readers.

The regular features like "Know Your Ship" is of particular interest for our young readers. They are lucid presentations of practical facts known to only those who have lived large part of their lives on board these vessels. The writings from the young cadets or ex-cadets on board ESM vessels contain personal anecdotes and comprehension equally interesting and educative to those who will follow them on board in months. First hand account of two junior officers of crossing the den of Somali pirates - "Force 8 all well - Force 2 Danger ahead!" indeed makes interesting reading.

We are proud to present the technical paper "Resistance test in Towing Tank "on the experimentation made by our R&D team in SIMS, Lonavala. No doubt, a fascinating reading on the research activities simultaneously conducted in this in-house training institute.

The icing on the cake for this issue is however nothing else but the message from veteran journalist and columnist Mr. Kuldip Nayar who has joined our Governing Council as a member. A piece of India's journalistic history himself, his words on the quality of SIMS training is indeed great source of motivation to all in SIMS and ESM. Thank you Sir.

Finally, the month of October is the beginning of the great festive season ahead. We wish all our readers best wishes for the Indian festival of lights Deewali on 26th October followed by Christmas and New Year before we return with our next issue on 15th January 2012.

Till then, be happy and be safe.

Sikha Singh

Message from Mr. Kuldip Nayar

I have travelled by sea only once in my life. Then I was a student, returning from London. It was one of the Indian ships which took a fortnight to reach Bombay. I recall that after three days, most passengers did not come to the deck for a walk. The ship was rolling all the time and they were sick.

A couple of days later, the hall in which we ate became mostly empty. I was told that most passengers were in their cabins, vomiting all the time. I do not know how I turned to be a good sailor but I do recall that on the entire bench where I sat for meals was empty! There were only two of us, one from South India. Murti, eating both meals. Both of us became good friends, talking about the ship's whimsical travel.

Food was alright in the first few days. It had freshness and variety. But afterwards the menu was the same everyday, with the egg powder used indiscriminately. There was never any fruit although some desert was there, again with the egg powder appearing in different shapes.

I am sure things have got revolutionalised since. There are big ships, luxury liners and exclusive boats. I just have not had the time or leisure to go to one of the cruises which I believe they are in great demand. Expensive no doubt but the people who travel through them are affluent, not like the students returning from the studies after exhausting their resources.

Now there are regular cargo ships of various types and sizes. Even then, 65 years earlier, they were there. But their number was small because the trade between the countries was limited. The UK and Europe were sending little but importing huge part of our natural resources. I recall how even our small ship carried many wooden boxes which joggled with us, the passengers, when the sea was rough.

I must admit that I came to know even the concept of a ship or complexity of shipping only about four years ago when I visited Samundra Institute of Maritime Studies, first at Mumbai and then at Lonavala. True, it was a stationary training vessel but it was pulsating with life and giving the experience of being on board. There were no passengers but here we saw the custodians who piloted the ships through difficulties and dangers. I wonder whether the Titanic would have sunk so easily if the training of the crew had been so hard and so disciplined as I saw at the Samundra Institute. The fact that the institution has grown every year and has found more clients than it can serve indicates that the top class training which anticipates all types of exigencies is the secret to tomorrow's shipping industry.

My best wishes to all the faculty and staff in their endeavour to make SIMS the leading force in the world maritime training and to the cadets to train hard to be able to lead not only the Indian but the global maritime industry in not so distant future.

Kuldip Nayar
Veteran Journalist & Columnist
Member of Governing Council, SIMS

QUE SERA SERA

What will be, will be ...

Jims Andrews
Engineering Faculty
SIMS, Lonavala

The History:

The vessel had a history of main engine related troubles and hence it was customary for the engineers to carry out scavenge and under-piston spaces cleaned after every voyage. Further the Piston-ring damage being a recurring issue, it was imperative for the concerned engineers to carry out detailed inspections through the scavenge ports whenever the opportunity presented itself. Prior to this particular incident, a routine inspection was thus already conducted at the anchorage at Fujairah after a rather short voyage from Karachi.

Following thorough inspection of the piston rings through the scavenge ports, the third engineer somehow suspected that broken piston rings in main engine unit #4 were broken and promptly reported it to the Chief engineer. The time in hand was indeed short, but as a prudent measure and due to relatively longer voyage fixed to the east coast of India, it was decided to replace the damaged piston rings then and there while the bunkering operation was going on. The entire engine room staff was put on the job, which was to be carried out at a frantic pace, to complete it in time and prevent any off-hire.

What happened next?

At the start everything went smoothly and the crew were about to lift up the piston when the first warning bell struck. The engine room crane, with the piston dangling down precariously, refused to move an inch either way. To add insult to the injury was the fact that, once pulled out of the cylinder, all the piston rings were found intact was a case of wrong diagnosis in the first place.

What remained to be done was to put the piston back in its place, make the connections, and then proceed with the voyage. But the piston had been already moved off-centre and it was not possible to lower it down the liner until it was properly aligned with the cylinder and the engine room crane wouldn't budge! No effort was spared in making the crane work but all in vain. The bunkering operation was completed and the ship officially went off-hire. The pressure on the ship staff to deliver mounted with each passing minute and the morale touched an all time low as nothing happened even after working round the clock on the crane for over 24 hours!

Eventually the owners had to summon shore assistance to make things moving, literally. It was largely immaterial in the end that the trouble with the crane turned out to be a minor electrical fault. The engine crew, despite being physically and emotionally drained by that time, boxed back the piston quickly once the crane was made operational. Unfortunately, almost 36 hours of valuable time was lost by the time the vessel finally sailed out of the bunkering port.

But it seemed that the troubles had not ended yet. Only a short time had elapsed after giving full ahead when the duty engineer noticed steam issuing from the vicinity of unit #4. The speed was reduced immediately and the engine stopped eventually for further investigations. It was evident that the jacket cooling space of the particular unit was steaming which ultimately led to the failure of all rubber rings and 'o' rings in the system. Subsequent investigation of the incident hinted at the failure of the engine room staff to open the jacket cooling outlet valve of the particular unit after the maintenance work.

All the concerned 'o' rings, including those of the liner, had to be renewed before using the unit again. But the chain of events, by now, had made the owners doubt the competency of ship staff in safely carrying out the routine job. The master was instructed to proceed back to the bunkering port where expert shore assistance would be made available on arrival. The vessel, though seriously handicapped with one unit cut-off, eventually made the port safely. Time off-hire - almost 48 hours!

The shore workshop efficiently carried out the job and the vessel once again ventured out to the oceans, with her crew hoping for a good sleep and rest to over come the severe exhaustion and lack of sleep for days.

However, if at any time the Murphy's Law "Anything that can go wrong, will go wrong" could have been justified was definitely in this particular moment! The vessel had hardly sailed for 12 hours when the high-pressure line connecting the fuel pump to the forward fuel valve of unit #4 ruptured. Fortunately, the incident led to no untoward mishaps, except that the vessel had to be stopped quickly and that too in a Traffic Separation Scheme with a fair amount of traffic in the vicinity.

The latest incident had no bearing on the previous chain of events, but was a development, which popped up at just the most inconvenient instant. But the solution to this new issue was comparatively simple; they just needed to replace the defective pipe with a new spare pipe - half an hour job at the most. However, the ship did not have any spare in the first place, this despite the fact that the said component was included in the critical spares list.

The vessel had started drifting dangerously in a potentially vulnerable area and the ship staff once again found themselves in a quandary. There remained in the ship's spare locker a single spare pipe for the aft fuel valve, which was of a different construction to that of the forward one. This, although considered very unsafe, was finally cold bent and modified into something, which could fit the forward connection. The engine finally came alive and the vessel at last was underway and made the next port without any further hitches. Total time the vessel was off-hire - a little under 4 days.

Needless to say, though wrong diagnosis of the engineers was the immediate cause, looking back, the fact that his seniors failed to make the proper planned maintenance would be the ultimate diagnosis of the entire episode.

Abhijit Nalwade (left) &
Sajal Sengupta (right)
R&D Department
SIMS, Lonavala

Resistance Test in Towing Tank

The R&D team in SIMS, Lonavala, has carried out resistance test in towing tank experiments to achieve noteworthy results for future application in the ship building industry. Model testing in a towing tank is the standard procedure to predict the resistance of a ship. The resistance offered by the model during the towing test multiplied by the speed at which it is towed gives the power required to run the ship model. On the basis of this, the power required for running the actual ship at maximum speed can be easily calculated with the help of scaling laws. Model ship is normally not equipped with appendages, such as a rudder and propulsion system due to scaling problems.

The resistance offered by a ship to move through water may be resolved into two principal components: frictional resistance and residual resistance. The frictional resistance arises from frictional forces set up by the flow of water along the surface of the hull, and is consequently influenced by fouling and the coatings of paint used for its prevention. The residual resistance is due to pressures developed in pushing the water aside, and arises from the form of the hull.

Wiliam Froude, the first to formulate reliable laws for the resistance that water offers to ships, recognized that the residual resistance of a model could be scaled up to give the residual resistance of the full-scale ship by use of the principle of similitude developed by Newton. However, the frictional resistance follows laws of its own and cannot be so treated. Froude consequently studied the frictional resistance of towed planks in order to determine empirically the relations between frictional resistance; length, surface area, and speed. Armed with this information, it is possible for testers to estimate the frictional resistance of a model. This value is subtracted from the total resistance of the model to obtain its residual resistance. The residual resistance is then scaled up to give that of a full-sized ship. The frictional resistance, calculated for the full scale from the plank tests, is added to give the $tFr = V / \sqrt{g(LWL)}$ the ship. This is the fundamental procedure in all model testing.

Froude number is the dimensionless quantity relating inertia force with the gravitational force.
where, Fr is Froude number, V is the velocity of the ship in m/s, LWL is length of waterline in m and g is acceleration due to gravity in m/s2.

For example, if the container ship is running at 12 m/s velocity having 180m LWL , the Froude number in this case is 0.2857.

The Froude number for ship model and prototype has to be same as per scaling laws, as this relationship gives most accurate results for predicting power of actual ship from the power calculated in towing tests. Applying the above equation, it gives the speed at which the model is to be towed if the desired speed of actual ship and the scaling ratio are known.

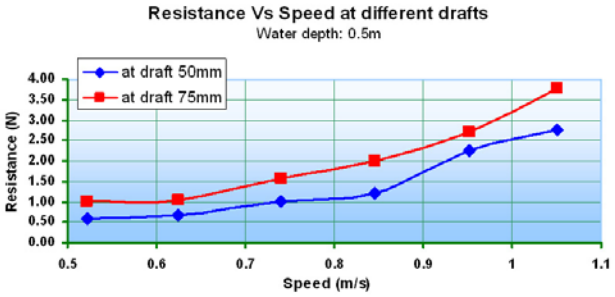

Fig.1. Comparison of resistance at different drafts

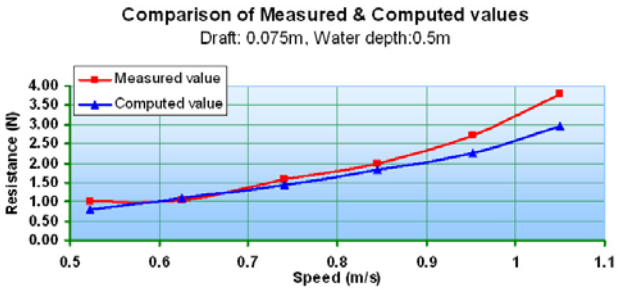

Fig.2. Comparison with computational results

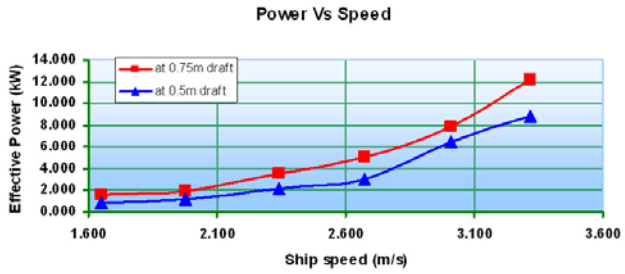

Fig.3. Power variation at different draft (experimental results)

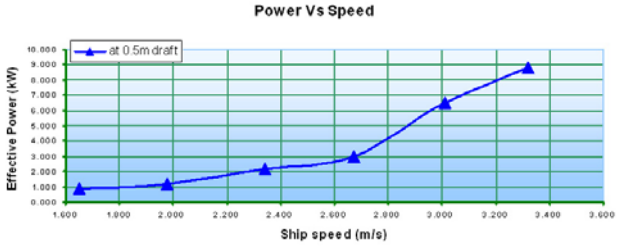

Fig.4. Power variation at 50mm draft

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Know your Ship
Product Tankers

Capt. Jitendra Pandey
Marine Superintendent
ESM, Singapore

Oil Tankers are ships designed to transport oil in bulk. Broadly categorized into Crude Tankers and Product Tankers, Crude Tankers are designed to carry large quantities of crude oil from the point of extraction of mineral oil to the refineries all around the world. In the refineries, the Crude Oil is refined into various grades of products. These different products are then transported to various places for end users by comparatively smaller tankers called Product Tankers. Product tankers are designed to safely handle various Petroleum Products and Petrochemicals. In a nutshell, Product tankers are some of the most versatile form of tanker vessels in the industry today.

Oil tankers are one of the most economical modes of transporting oil that have definite advantages and flexibility next to fixed pipelines which require heavy capital outlays and are subjected to other restrictions.

Oil tanker classification:
Oil tankers are often classified by their size as well as their occupation.

Oil tanker size categories			
Average Freight Rate Assessment (AFRA) Scale		Flexible market scale	
Class	Size in Deadweight Tonnes	Class	Size in Deadweight Tonnes
General Purpose tanker	10,000–24,999	Product tanker	10,000–60,000
MR (Medium Range)	25,000–44,999	Panamax	60,000–80,000
LR1 (Large Range 1)	45,000–79,999	Aframax	80,000–120,000
LR2 (Large Range 2)	80,000–159,999	Suezmax	120,000–200,000
VLCC (Very Large Crude Carrier)	160,000–319,999	VLCC	200,000–319,999
ULCC (Ultra Large Crude Carrier)	320,000–550,000	Ultra Large Crude Carrier	320,000–550,000

Product tanker classifications:
The Product Tankers are divided into segments depending on the size of the ship. The three most common segments are the LR2, LR1 and MR segments.

MR Tankers (Medium Range): An oil tanker with coated tanks between 25,000 and 50,000 tonnes dwt. The MR Product Tankers provide the transport for the refined oil which is transported intra-regionally between different refineries. They are much less frequently transporting oil over longer distances.

LR1 (Long Range 1): An oil tanker with coated tanks and larger than 50,000 dwt, with a breadth below 32.31 m and a length below 289.5 m – usually below 80,000 dwt. The product tankers in the LR1 segment are usually employed on the medium distance voyages in the Middle East, Northern Europe, the Caribbean and the Far East.

LR2 (Long Range 2): An oil tanker with coated tanks and with a breadth above 32.31 m – usually above 80,000 dwt. The LR2 segment holds the largest size Product Tankers. When carrying clean products these ships usually trade on the long voyages out of the Middle East to the Asian countries and Northern Europe. When carrying dirty products these ships usually trade on the long and medium voyages out of the Black Sea to the Mediterranean and the US and out of the Baltic and North Sea to Northern Europe and the US.

Tank coatings:
The oil intended to be carried determines the coating requirement in the cargo tanks of an Oil Tanker. Crude oil does not require any tank coatings as the purity of the Oil is of no concern. The Product Tankers have coated tanks e.g., Epoxy coated tanks to maintain the specifications of the Oil Products being carried by the Product Tankers, as well as prevent corrosion of the tank structures exposed to these products. There have been many developments in the tank coating systems available for use and these provide better resistance to cargoes and prolong durability of tanks.

Handling various grades of products:
Most often Product Tankers are designed to carry more than one grade of products (usually three to four grades, which can be kept segregated with double valve segregation). All the tanks have pipe lines passing through them with isolating valves, which must be properly lined up and maintained during the entire voyage to keep the products segregated in order to prevent the contamination of different grades. Vapour contamination of the cargoes is also avoided by independent means of venting, such as Pressure/ Vacuum valves during the entire voyage and during loading and discharging operations. Improper handling of tank valves or venting arrangements may give rise to cargo contamination and cargo getting off-spec resulting in huge cargo claims.

Loading and discharging operations:
Once the tanks are cleaned and prior the tanker reaches the load port for loading of cargo the Chief Officer must test all the critical cargo, equipment and alarms. ESM's Tanker Operations Manual provides detailed procedures for such operational checks prior arriving at load port. After arrival berth, a detailed pre-transfer meeting must be conducted with the Terminal Representative to agree on the most vital issues during the operations. International Ship Shore Safety Checklist must be filled and duly signed by both the ship's and the terminal representative before the Operation commences.

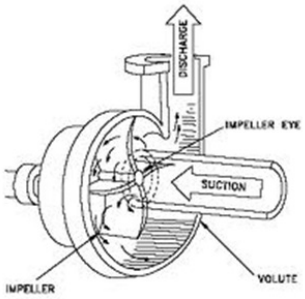
Inert gas:
The quality of Inert Gas is of critical importance for these types of tankers. Many vessels are fitted with Inert Gas Generators which produce high quality inert gas. Poor inert gas quality can not only stain and damage the coating in the long run but also directly affect the quality of the cargo. Some of the higher grades such as Jet A1 require the testing of the IG being generated, for soot and other contaminants.

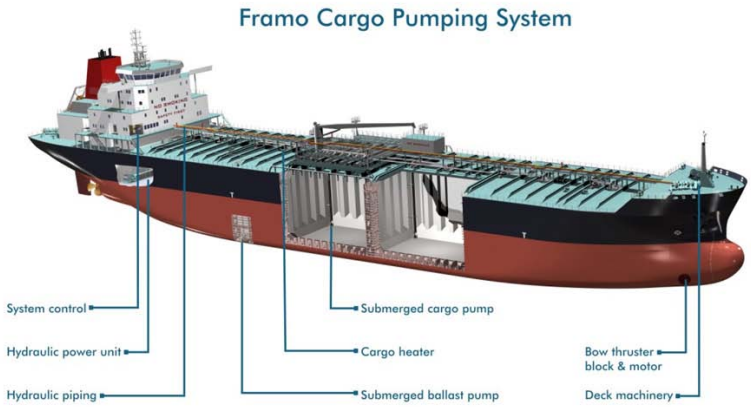
Tank designs:
The Product Tanker tank design is extremely efficient and ensures great flexibility with cargo carriage. All the stiffeners and structures are usually placed out of the cargo tank area. This facilitates in having smooth sided cargo tank bulk heads without the strengthening members and structures in the cargo tank side, which assists in easier cleaning of Cargo Tanks. The stiffeners are given on the deck and in the ballast Tanks. The Cargo Tanks are in pairs of wing tanks. The Ballast Tanks are 'J' type tanks. The Ballast Tanks assist in providing the vessel with a double skin as required by the MARPOL to prevent pollution by oil from the Cargo Tanks,

which are protected by Ballast Tanks from getting breached by an external contact .

Pumping Systems:
The Product Tankers usually have two main type of pumping systems, the Deep-well Submersible Pumps and the conventional Centrifugal Pumps. Though other pumping systems are also prevalent they are rather infrequent. Most of the modern MR Tankers are now being fitted mostly with the Deep Well Submersible Pumps, usually by FRAMO.

product tankers may have these pumps driven through an electrical motor instead of a steam turbine arrangement. The Cargo Tanks are divided into different groups catered by different 3 or 4 Centri





Deep Well Submersible Pumps are located in the Cargo Tanks and are submerged in the cargo. Each Cargo Tank has one independent pump leading directly to the manifold which assists in direct loading and unloading from the tank. This facilitates in better carriage of different grade of products. The ship usually does not have a cargo pump-room on such installations.

Centrifugal Pump:
The Conventional Centrifugal Pumps sit with the cargo pumps in a cargo Pump Room. The pump is driven through a steam turbine placed in the engine room and connected through a drive shaft passing via an oil/ vapour-tight gland arrangement in the bulkhead separating the pump room and engine room. Some

Conclusion:
Refining is a multi billion dollar industry and these tankers - be it the MR's or the LR's are crucial to its sustenance. For a seafarer these tankers are relatively easy to handle and at the same time challenging when compared to the crude tanker as cargo custody and stewardship is more intensive. Ship's personnel need to be extremely careful with cleaning of tanks and watch out for any situations which may result in failure of the tanks at the load port or cause the cargo to go off-spec when in the ship's tanks.

Product tankers have evolved over the years both in size, design and sophistication and will remain a very integral part of the tanker business for the foreseeable future.

Resistance Test in Towing Tank,
continued from page 6

The following experiment was carried out:-
A 1:10 wooden scaled model of a boat (assuming ship for ease of abbreviation) is constructed & tested at SIMS wave flume/ towing tanks facility. The particulars of model are -
Length overall = 740 mm; Extreme breadth = 204mm; Extreme depth = 150mm; Weight of model = 8.5 kg; Speed range: 0.5 m/s to 1m/s; water depth = 0.5m

Two sets of test were performed-
i) with model weight = 8.5 kg ; draft = 50mm
ii) with model weight =12 kg ; draft = 75mm

A digital-force gauge was used to measure total resistance of model on real time basis. The model was free to heave & pitch and restricted against roll & yaw.

Results & Analysis:
The total resistance & effective power of ship are calculated. A computational geometry of same model was created and analyzed in ship design software. The experimental results matched well with the computational results at a draft of 0.075 m while solving with Hultrop method. The comparisons of two results are shown in fig.2.

Power calculation:
The outcome of above results are -

1. The increase in resistance is 60% when there is an increase in draft of 50%. (fig.1)
2. At lower speed, computed & experimental results match well while at higher speed say 1m/s, the experimental values exceed by 29% than the computational values. (fig.2)
3. A 63% increase in effective power is observed when there is an increase of 50% draft. (fig.3)
4. The power varies as square of velocity as shown in fig. 4. At low speed (say up to Froude's number 0.28) the major component of drag is frictional drag and as the speed increases wave drag predominates.

Conclusions & Recommendations:
The resistance prediction algorithms are useful only within certain limits of hull dimension (such as Froude's number, L/B ratio, B/T ratio etc.). Thus the comparison of computational & experimental results can be made only within those limits. The experiment was conducted with draft of 75mm & results were compared with computational one (using Hultrop method). Results agree well up to maximum speed of 1m/s i.e. supplied by the motor. Further investigation of few parameters such as model length & breadth are the future scope of project.

Looking for alternative Energy Source

Development in the Auxiliary Wind Propulsion Systems in Shipping Industry

Gaurav Chaturvedi
Fleet Manager
ESM, Singapore

The shipping industry is entirely dependent on fuel oil and annually uses about 2 billion barrels of oil. That is a significant 5.5 million barrels per day; 1 barrel equaling to 117.35 litres. Even at today's prices for bunker fuel, the cost of fuel often accounts for more than the ship operating expenses. The reasons behind the projected rise in fuel costs are the increase in oil prices, shortage in the supply of heavy fuel oil due to the modernization of refineries and emissions regulations that are already in force or are planned for the near future and at this rate, it is anticipated by some classification societies that fuel costs for ships will double within the next 10 years.

In addition to the rising price of oil, ship operating costs are increasing due to new legal regulations coming into force and for the first time in the history, shipping companies are required to significantly reduce their ships' emissions for reasons of safeguarding the environment.

In April 2008 the IMO approved a reduction in sulphur emissions for the shipping industry. From the year 2020 shipping companies either have to use distillate fuels with a limited sulfur content of 0.5% instead of heavy fuel oil or have to use capital intensive scrubbing technology to clean their exhaust gases.

Furthermore, the IMO is currently working on a regulation on the reduction of CO_2 emissions from shipping in the form of a CO_2 indexing scheme. Thus, shipping companies will also be burdened with emissions-based levies in the future based on their carbon footprints.

Looking at these negative developments, alternative source of Wind Energy is one of the most economic and environmentally friendly energies available in abundance on the high seas.

There are several major advantages in using the wind energy. Firstly it is a sustainable and a clean source of energy. Wind power generation produces zero carbon dioxide emissions, which is important with the increasing global concern over climate change. Wind energy is also a renewable energy, since it does not deplete our natural resources like coal or petroleum based products.

One of the most important is that wind power is the least expensive of all other forms of alternative energy. Unfortunately, the wind power potential remains largely untapped as less than one percent of the world's energy is derived from wind power.

Using wind power to supplement the diesel propulsion power for ships has distinct advantage of reducing the fuel oil consumption and thereby emission of NOx, SOx and green house gases. It's a win-win solution from an environmentally friendly point of view.

Wind energy is an innovative technology, combining inventiveness, trendsetting design and environmental benefits.

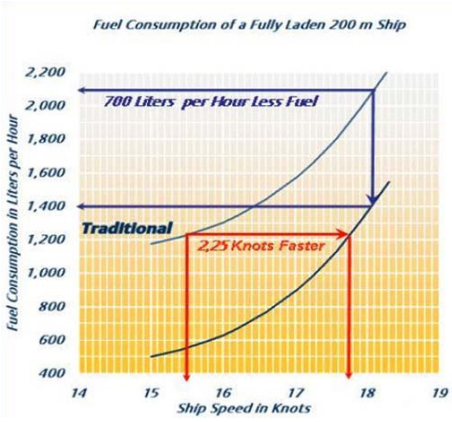
Auxilliary Wind Propulsion Systems:
Shipping companies are seriously considering this attractive option by way of hybrid approach, where wind powers the auxiliary systems and works in conjunction with the ship's engines for propulsion.

Depending on the prevailing wind conditions, wind propulsion systems can reduce a ship's average annual fuel costs by 10 to 35% by using the Towing Kite System. Under optimal wind conditions, fuel consumption can temporarily be cut by up to 50%.

The Towing Kite System uses remote controlled sails which assist to provide a pull to assist vessel's propulsion. Such systems can be retro or outfitted with the sail equipped auxiliary wind propulsion system on existing and newbuilding vessels.

Currently, the Towing Kite propulsion systems can provide an effective load of between 8 and 16 tons. New designs under construction can provide effective loads in range of 32-130 tons.

An effective traction force of 8 tons corresponds to approx. 600 to 1,000 kW installed main engine power on average - depending



Continued on page 12

Economy of Sail against Scale of Economy

Fig. 1.

Research into the ships of the 1890's; that is 120 years ago indicates the interesting phenomenon of a general transition of wooden sailing ships changing to steel hulls which resulting in the reduction of the age of sail while introducing coal boiler steam power.

As an example, the fig.1 shows a typical British foreign going four hatch cargo tramp ship and detailed examination shows a square sail yardarm stowed vertically against its fore mast, ready for utilisation in ocean voyages when the wind was near or aft of the beam.

Although not quite so clear in the scale of the photograph, there is also a gaff and forward running stays and halliards that would allow triangular foresails and after 'spanker' or mizzen sails to be used when the wind was 45 degrees from ahead or more abeam.

Sailing rigs are of course greatly forgotten in the eyes of the modern mariner, although sailing schooner trade continued around North Europe into the 1960's.

Machinery power, electronics, and technical know how have long displaced the mariner of those days whose work was mainly out on deck with 'one hand for the company and one for himself' - as a matter of preventing being washed overboard.

The sailor's accommodation was in the fo'csle which meant that even going for food was a walk along the deck to the galley down aft, dodging the seas washing on board in the process.

Returning back to more modern times, there have been attempts in the commercial merchant fleet to reintroduce sail or even kite assisted power as a means of economy and environmental advantage. Two good examples are 'Walker Wingsail' of the 1980's and the deck mounted winch controlled kite device that would pull a ship downwind (hopefully not overboard!).

Size, displacement tonnage and block coefficient factors of ship hulls have of course followed the merchant economy of scale pattern and in so doing, have taken the sense of wind power design further from a modern conclusion.

While there have been sail powered, multi masted passenger cruise ships trading in Carribean, Mediterranean and other luxury oriented markets, the thought of delivering a container or specialist liquid cargo on a JIT, (just in time), basis is somewhat frustrated when endeavouring to harness wind power for that purpose. And yet…

An enormous number of electricity generating giant wind turbines are being constructed and employed on land and near coastal zones around the world. These are quite prone to spasmodic inefficiency when the wind velocity falls, but the development towards less fossil fuel combustion continues.

Before considering the attachment of a wind turbine to the deck of a ship, as a yacht owner has already tried on a catamaran hull, or trailing an Archimedes screw astern of a modern ship, to enhance electrical generation, there are natural equations to balance.

Clearly the hull displacement, breadth, depth and water line length are major factors and in that direction a well known equation can be employed for a small displacement craft that remains immersed in water. The hull speed of smaller craft can be calculated by the following formula:-

Olaf Olsen
Advisory Consultant
SIMS, Lonavala

$$v_{hull} \approx 1.34 \times \sqrt{LWL}$$

Where: "LWL" is the length of the waterline in feet, and "vhull" is the hull speed of the vessel in knots. The concept of this hull speed equation is not used in larger ship design, where considerations of speed to length ratio or Froude number are considered more helpful; but that opens up a much more technical discussion.

Lightweight hulls that can plane and lift out of water to reduce their waterline length at increased velocity, have been successful in light displacement ferries and fast rescue vessels. Thereby we can consider the SWATH concept of lightweight stowage on a deck supported by underwater catamaran hulls; but the dependency on heavier bulk cargo deadweight delivery with economy cannot conform to that ethos.

Meantime, and in conclusion, two modern day photographs are shown to demonstrate that sail power continues; one of a sail training ship and one of a personal hobby craft, both capable of ocean crossing and contributing to environmental economy.

Enclosed Spaces:
The ever present Danger

"Enclosed Spaces" is a term that a seafarer would often hear about in today's shipping industry both onboard and ashore. The reason why this seemingly innocuous pair of words has so much focus is attributed to the accidents that have resulted onboard vessels in such spaces over the years. It must be said that operations involving enclosed spaces today have strict controls and thankfully there is a reasonably wider awareness of the dangers associated with such spaces onboard the vessels.

Pre entry check

Capt. Rahul Hakim
Marine Superintendent
ESM, Singapore

The below is in a first person narrative from Capt. Hakim:

On that particular day of 13th May 1994, I was going through another normal day as a cadet on a 40,000 DWT product tanker. She was on a regular run between Singapore and Hong Kong. This vessel was a 12 year old one recently taken over by the company. An extensive upgradation effort was underway to improve the condition of the vessel, with sand blasting of decks being carried out. A sense of urgency hung in the air for cosmetic enhancement of the ship because the vessel was calling Singapore and we were expecting a visit from ship's Superintendent . In the midst of all this maintenance work tank cleaning operations were also in progress in preparation for loading the next cargo of Jet A1 a cargo of high priority and expense. Since the deck crews were busy with maintenance work, the tank cleaning/ gas freeing operations were being handled by the Chief Officer, the pumpman and the two cadets one of whom was this writer.

The tanks had already been gas freed and washed and we were in the process of stripping the unpumpable washings from the bottom of the tank with a Wilden pump. The pump was to be lowered into the tank manually and positioned close to the after end of the tank to be able to strip out the remaining washings. The two cadets were assigned the task of having all the tanks stripped out and ready for the next cargo. Between my colleague and I, we were to take turns individually entering the tanks to position the pump in the most ideal location of the tanks while the other stood on top to assist with lowering of the cleaning material, the pump and necessary equipment. In effect the cadet on top was the one supervising the entry from the deck in turn.

There was a 3 way communication between the cadet in tank, the cadet standing by at the top of the tank and the OOW on bridge who was maintaining an "Enclosed space entry" log.

No Enclosed space entry permit was issued at that point of time. We had started at 6 in the morning and had to complete 9 tanks by evening. By around 1800 hrs the other cadet went for his dinner and the chief officer came on deck to help me with the stripping of the last tank, 'Slop starboard'. The Chief Officer was keen on completing the job so that he could start re-inerting of tanks at the earliest, as we were arriving Singapore the following afternoon.

Gas checks were carried out using a combination meter for measuring oxygen and LEL (Lower Explosive Limit) of hydrocarbons. We had ensured that all tanks being entered were checked for gas and found to be within the safe limits of 20.8% oxygen and 0% LEL. Once the tank entries completed. I lowered the extension hose of the gas meter into the tank and watched the readings as I had done all day. After a moment the instrument indicated a "flow fault" alarm. The Chief Officer upon observing this asked me to get new batteries. My response to him was that none were left in deck stores and that we would have to get some from the engine stores. He was annoyed and anxious as the light was quickly fading and to work in darkness meant more time would be wasted in rigging up a pneumatic light, getting flash lights, more man power, etc.

So he asked me "Last gas check carried all ok, right?" Having been on the job since the morning and nearing exhaustion I was only too keen to get this tank out of the way and get some much deserved rest. So I confirmed that the gas checks performed earlier were satisfactory and the tank was ready for entry. The bridge was informed that all gas checks had been carried out and found to be in order.

The Chief mate and I then entered the tank with AB standing by on deck. As we were descending into the tank we could smell some Naphtha fumes but nevertheless continued with our entry in the tank. Since it was already twilight, the tank was dark and only when we reached the last stringer platform we realized that there were quite a bit of washings still remaining in the tank.

Chief Officer decided to lower the Wilden pump into the washings and allow the pump to work on its own without any one in the tank to monitor. The last thing I remember was trying to fit the suction hose to the suction inlet of the Wilden pump and when I opened my eyes I saw a very anxious Chief Officer and Master staring at me, I found myself on the open deck with the entire crew assembled. I was very heavy-headed, feeling highly intoxicated and trying to comprehend what had just happened .

It was only after I had an opportunity to recover somewhat; I realized that both Chief Officer and I had lost consciousness in the tank. Thankfully the AB who was standing by the tank entrance had the presence of mind to carry out a communication check;

as more than 15 minutes had elapsed since our last communication. After repeated calls to us in the tank, getting no responses, the AB alerted third officer on bridge, who immediately raised the ship's general emergency alarm.

With the Master taking charge, a rescue party led by Bosun and other crews was put in place and after some gruelling minutes lost in preparation and anxious moments of rescue both Chief Officer and I were finally hauled out of the tank.

Once on deck the Chief Officer regained his consciousness after a few minutes in fresh air, he was also very light headed but there was fear in his eyes for me. Apparently my pulse had dropped and my breathing had become so shallow that they were not sure if I would "make it". The Captain with the help of the second mate used the resuscitator coupled with CPR for the first 3 minutes to which I suddenly woke up with a long gasp. I lived to see another day and am lucky enough to be able to share this near death experience in an enclosed space with you all!

In retrospect, many drastically wrong actions and activities were associated with this incident, in terms of bad practices or procedural violations.

However, my intention is not just to highlight the deficiency in the system or its implementation on a particular vessel a couple of decades ago. I am happy to point out that there are robust and comprehensive company procedures in ESM's manuals and effective mandatory practical training course being offered at our in-house institute to prevent such a situation on our vessels today. My aim is to alert a fresh inexperienced cadet to the fact that it makes little sense risking his life or those of others when they are on board. Every bit of precaution included in the enclosed space entry procedures is well worth the time and effort. It may sound cliché but the fact remains that there's no such work which demands any unsafe practice for its implementation. Further, even the junior-most and inexperienced staff onboard the vessels today cannot claim to be ignorant of the dangers of enclosed spaces and ignore the company's "permit to work" procedures. This is not only a requirement but an utmost responsibility for all working on board, to safeguard their own life and that of the fellow seafarers.

Be safe always!

Looking for alternative Source for Shipping, continued from page 9

on the ship's properties (propeller efficiency degree, resistance, etc.).

The sails are used in parallel to assist the main engine for propulsion, if wind conditions allow. The main engine's propulsion power remains fully available, if required. This dual propulsion solution offers the flexibility required to minimize operating costs and reduce emissions considerably.

It is believed that investment in such systems has a return-time of about 5 years for Ship-owners.

Towing kites:
The mechanism of Towing Kites is easy to understand. At first sight, it seems impossible that a relatively small kite can propel a cargo ship. The explanation lies in the fact that the altitude at which the kite flies lies a few hundred meters above the ocean surface, where the wind is much more powerful and steady. At an altitude of 200 metres, twice as much wind can be harvested with the same sail surface - which translates into traction that is four times higher, since the wind pressure is equal to the square of the wind speed. Therefore, kites of size of football fields and can have the capability to cut fuel costs by half!

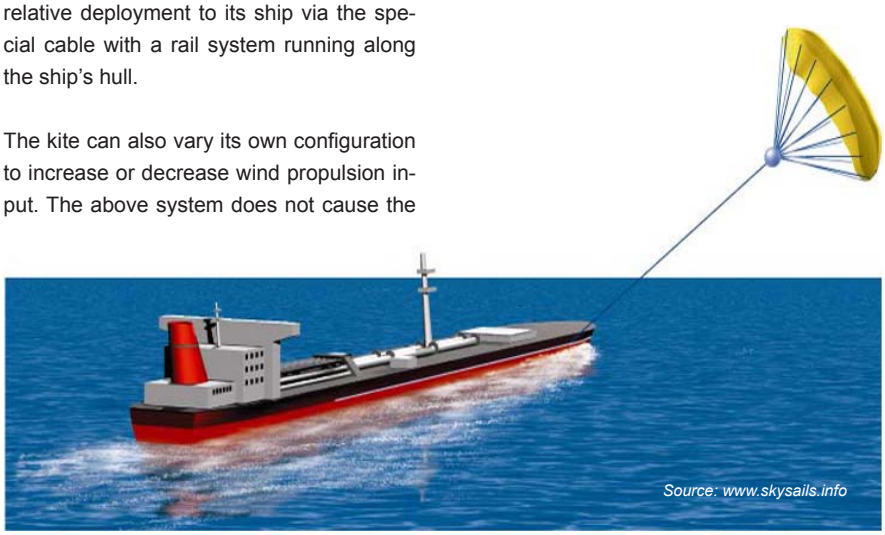
These are large aerodynamic kites shaped like a para-glider, which are automatically deployed and retrieved via use of a winch placed on the forecastle mooring mast. The kites operate using a special cable 100-300 meters above the ship. At this height as mentioned above, the ocean winds are strongest and consistent. The kite is computer controlled to consort wind speed and direction with ship course, engine usage, and speed through the water. The kite varies its relative deployment to its ship via the special cable with a rail system running along the ship's hull.

The kite can also vary its own configuration to increase or decrease wind propulsion input. The above system does not cause the vessel to heel.

A research commissioned by Shipping Corporation of India had studied performance of its vessel Annapurna on Mumbai-Durban-Mumbai route using the hybrid propulsion model. It was established that the use of modern wing sail in ship propulsion will reduce diesel fuel consumption considerably. According to the findings of this research these wing sails could be retrofitted on existing ships. From the estimation it was clear that the use of wind energy in ship propulsion may save 8.3% of fuel. For the route Mumbai-Durban-Mumbai, the total saving in diesel fuel was 61tonnes/ annum by using sail assist device for the M.V. ANNAPURNA ship. The researchers stated that since India is importing 70% of her fuel oil requirement; the use of wind energy in ship propulsion may partially reduce this dependency. Hence it was recommended that India should invest in the R & D in this area; in view of its huge international shipping trade.

Future forward:
In the long run, with advances in solar, wind, and wave technology manufacturing, it is not unreasonable to think we will have zero-emission seagoing vessels that are just as, if not more, efficient than our current vessels.

Attempts being in the industry to develop a system that will allow the ships of the future to be powered in a greener and more eco-friendly way using these limitless sources of energy resulting reduced fuel consumption and noxious gas emissions whereby ship owners and operators will be able to reduce the CO_2 footprints of their fleet.


Source: www.skysails.info

Passing Out of GME-10 Batch

Chief Guest, Mr. S.M.Iyer, Resident Director, ESM (1st row, 7th from right) with SIMS staffs and graduated cadets

Chief Guest Mr. Iyer receiving a Guard of Honor

Mr. Iyer with the award winners

GME-10 graduates from SIMS

Yet another moment of great joy and achievement for the SIMS, on 20th August, 2011 when 80 smartly uniformed graduate marine engineer cadets marched passed the parade ground in confident strides towards the next phase of their career on board ESM ships. The staff, faculty and their parents and guardian looked on with pride when the cadets presented the guard of honour to the chief guest Mr. S.M.Iyer, the Resident Director, ESM, Indian operation. Later the cadets took their oath to be responsible marine engineers at a valedictory function held at the institute auditorium.

Celebrating the joyous occasion

Addressing the cadets, Mr. Iyer, a veteran marine engineer who hung his seaboots after years of sailing as chief engineer prior taking his position in the manning field, pointed out to the young marine engineers that the year long training at SIMS was just beginning of a "career that requires excellent performance onboard". The hard work and good attitude are the precursors which will lead to their success in this profession. Mr. S.M.Iyer, further highlighted that ESM is the only international ship management company which recruits 100% Indian seafarers and hence the career opportunities in ESM is much wider and extensive compared to others for all the graduating cadets from SIMS. Apart from offering sailing opportunities in a wide varierty of ships ranging from bulk to oil, gas and chemical tankers, the cadets can look forward to a career ashore once they are ready for the demanding shore jobs. He added that as a policy ESM gives preference to its own sailing staff over others from outside to fill in any vacancy ashore. However, he stressed that all positions are filled on merit only and hence it's important for them to hone their knowledge and capability basis honest and hard work on board.

Chief Guest, Mr. Iyer meeting the staffs

Four high achievers later received awards from Mr. S.M.Iyer for their accomplishments during the course of the training. Cadet Prem Kumar received the first price for being best in academics while the second prize went to Cadet Bharath Rajappa. Best Hands on Training was bagged by Cadet Vidya Sagar and Cadet Chandra Kumar received the award for best in HSSE. Having won the second prize for a technical paper competition conducted by MERI-Castrol, Mumbai, Cadets Neeraj Ambare, Gurupratap Singh, Digvijay Pratap Singh, Vijin Babu, Arpit Rastogi each received a certificate of merit for their work on "Hull Protection- A Challenge to coat Ship's Hull with Non Pollutant Paints".

Mr. Iyer during his speech

Cadets performance for the guest

List of Prize Winners:

(as seen on bottom left picture, left to right)

Mr. Biju Baben (GME Course In Charge)
Cdt. Vidya Sagar (Best hands on Training)
Cdt. Bharath Rajappa (Best In Academics Second Prize)
Cdt. Prem Kumar (Best in Academics First prize)
Mr. Maneesh Jha (SIMS, Vice Principal)
Mr. SM Iyer (Resident Director, ESM)
Mr. S. Viswanathan (SIMS, Principal)
Mr. NS Soman (Acting dean,Engineering)
Mr. MB Prasad (Engg. Faculty)
Mr. Upendra Kumar (Engg. Faculty)
Mr. Abhiram Wakankar (Engg. Faculty)
Cdt. Chandra Kumar (Best In HSSE)
Cdt. Vijin Babu (Technical Paper Presentation Second Prize)

On Board Hydraulic Tightening Tools:

Using them correctly

Dharmendra Nath Pathak
Sr. Tech. Superintendent
ESM, Singapore

Hydraulics is used in every engineering field. It utilises the basic principle that liquid is practicably incompressible and pressure is transmitted equally in all directions. Hydraulics has several advantages over other operational methods. It can reach areas which may be inaccessible to humans and performs better operation and control. Its main advantage being the fact that with application of significantly lesser force, a greater amount of work can be done! It also eases the manual work load by manifolds. Following are some of the practical examples pointed out by a senior Technical Superintendent.

But why use Hydraulic Stud and Bolt Tensioning?

Accurate and Repeatable:

Accurate stud tension is difficult to attain using torque, because friction has a significant effect on the torque–tension relationship. If the operator failed to lubricate the threads and nut surface and torqued dry, the resulting stud tension would be way below, even noted to be 6 times less than required.

Fast Operation:

Using hydraulic tensioners is usually faster than using torque wrenches, the time can be cut to almost one–third.

Even Flange Closure:

Using hydraulic stud tensioners on a bolt pattern allows even flange closure and even gasket loading. No pinched gaskets or over–stressed studs, which is possible when using one torque wrench and a star torque pattern.

But…… & yes I mean it !!……only if we keep to basic usage principles we can get the advantage and prevent trouble. Below enlisted a few cases from my personal kitty to share with you for providing a better understanding:

Case 1:

Generator engine; Make/Model: Daihatsu 6 DL 26. Failure of connecting rod bolts, causing major damage to connecting rod, crankpin, crankcase door, cylinder liner, cylinder head and piston. Crank shaft had to be replaced, entablature, liner, piston and other associated spares renewed. It took 3 months to re-commission the engine. Repairs cost more than 150,000 USD.

Case 2:

Main engine; Make/model: MAN KSZ 600
Piston crown holding bolts shearing off frequently during operation and in one case damaged the diaphragm plate necessitating repair to be conducted by shore workshop.

Case 3:

Main engine; Make/model: 8MAK 600
Exhaust valve holding bolts slackening during operation causing the complete exhaust valve body to move up and down with piston movement.

Case 4:

Main engine; Make Model 8MAK 600
Fifth Engineer was trying to open the hydraulic nut by a tommy bar, at which time failure of jack's O-ring took place and oil spewed out at 600 bar pressure injuring his fingers very badly necessitating his hospitalization and sign-off from the ship.

Case 5:

Main engine; Make/model: KHI B & W, 6S50MC-C.
Vessel was carrying out overhaul of main engine on a two year old vessel. Hydraulic jacks were found leaking and ship-staff kept renewing seals one by one till they exhausted all O-rings and job had to be abandoned.

Does any of these sound familiar? I am sure they do. Let us examine the details of some of the incidents mentioned above.

Main engine make MAN KSZ 600:

Main engine piston crown had four studs whose nuts are required to be tightened by hydraulic jacks at 600 bar. When I joined the vessel it was reported to have had three cases of stud failures and once it was so severe that diaphragm plates were badly damaged and holed requiring repair by shore workshop. Upon investigation found that under normal condition with the two available jacks on the same stud and raised to 600 bars, one jack allowed the nut to be tightened by 0.8 turn whereas the other jack allowed 1 full turn.

Upon calculations basis bolt elongation, it was evident that even though the common applied pressure was 600 bar, the jacks were transmitting 600 bar & 500 bar respectively. It was very easy for us to conclude that two studs each out of this set of 4 studs were being tightened corresponding to unequal hydraulic pressure. So during operation one set, tightened at higher pressure, would take the load which should normally be taken by 4 studs and thus would fail and then exposing remaining 2 again for a load meant for 4 studs with similar result. This was a 20 year old ship anyway. As a good practice, besides checking the pressure and connections, we started counting the turns on the nuts for each of the 4 bolts which needless to say must be the same. This engine was under observation for next 3 years and no failure was reported thereafter.

Generator engines:

We all now know that the torque spanners used for tightening the generator connecting rod bolts should never be trusted alone and must be observed for actual angle turned. The hydraulic pressure must be applied as per maker's instructions, normally recommended to be done in steps or firstly by a preliminary tightening followed by a final one.

Basic checks during operation of a hydraulic tightening jack:

Reference to the picture with this article, two clearances are important and must be un-

derstood well by all persons involved with the use of the hydraulic jacks.

Clearance A:
Clearance between piston of the jack (which gets threaded on the stud) and jack cylinder which sits on top of spacer ring. This clearance is called the lift of the jack and nowadays most of jacks come with marking for maximum lift

This lift should be monitored closely to prevent seal ring from failure due to exposure to hydraulic pressure without support from backup ring.

This clearance is to be maintained above zero when slackening the nut on the holding down stud. Jack piston would come down with the stud as the length of de-stressed stud is reduced. If the jack piston touches the jack cylinder under stress then it would not be possible to release the piston threads. To achieve this while slackening the studs, we should unscrew the thread of the piston ½ to ¾ turn before starting to jack up. This will ensure some positive 'clearance A' when the stud is de-stressed.

Clearance B: This is the clearance between the nut being loosened and the jack cylinder. This should be always ensured to be positive i.e. at no time the nuts should touch the cylinder. If the nut touches the jack cylinder then lift of the stud during tensioning period would be restricted resulting in faulty or insufficient tightening as seen in incident no.2 of piston crown bolts failure.

Preventive actions to avoid incidents:

1. Read and follow the maker's recommended tightening procedure.
2. All the connections in hydraulic circuit must be snap tight.
3. Pre-establish the final angle of turn, the nut is destined to achieve the tightness.
4. Ensure that angle of turn is same for all nuts in a set.
5. In case the value of hydraulic pressure is more than 600 bars, do the tightening in 2 steps as the design may limit it being achieved in one go.
6. Find the maximum lift allowed for a hydraulic jack during operation to prevent O-ring failures.
7. Correct PPE to be donned to preventing injuries, in the worst case scenario of high pressure hydraulic oil leaks.
8. If no reference mark is available, make your own marking prior operations.
9. After the job is over, release the pressure in the hydraulic chamber and press down the threaded portion with hoses connected prior stowing back.

Engine Room Ventilation

Design, Operation & Maintenance

S.Viswanathan, Principal
SIMS, Lonavala

The machinery spaces of a merchant ship require supply of fresh air in order to maintain a positive pressure inside the space. This ensures the combustion requirements of internal and external combustion equipments running at their peak power. Additionally, it helps the air compressors to provide excess air to cool off motors, keeping machinery spaces free of smoke, oily mist and even water vapour due to steam leakages. Finally, the excess air supplied provides a cool and comfortable environment for the engine crew to operate and maintain the equipments on day-to-day basis. Indeed, this is good enough reason that the engineers and engine room ratings must understand and appreciate the design philosophy of the ventilation systems and their operational and maintenance requirements for ensuring their optimum performance.

Design Criteria: The ship designer calculates the air mass and volume required to be delivered to the machinery spaces for each and every equipment at peak load conditions under various heads as follows:-

- For combustion - Air required for Main Engine, Auxiliary Engine, Auxiliary Boilers, Incinerator, Diesel Engine for Emergency Air Compressor
- For storing of air – Main, Auxiliary, control & emergency air compressors and Air compressor fitted to Sewage Treatment Plants
- For cooling of Electric Motors
- To compensate for exhaust from purifier rooms.
- To compensate for normal leakages through various sources.

In addition to the above, an excess air quantity is also delivered to maintain a pressure slightly more than atmospheric pressure inside the machinery space.

Machinery spaces are provided with electrically driven axial flow fans fitted on the upper deck and the airflows through ducting to various locations in engine room. Inside machinery space where there is a risk of fire, air ducts are provided with a shut off flap at the exit as a safety device. Usually four fans are fitted for supply of fresh air to engine room; one of them can also be used as exhaust fan when required.

Operational Aspects: Since the design requires all the fans operating in supply mode at sea (peak fresh air demand), any one fan having tripped or stopped will reduce the quantum of air with telling effect on the machineries. In ports and anchorages, the requirement of fresh air reduces drastically, necessitating stopping of one or two fans. Even the choice of fan required to be stopped must be decided by the lay out of engine room and equipments location. If excessive pressure is developed due to insufficient consumption of air, it will be difficult to open and shut engine room doors. Keeping skylights and steering entrance door from Engine room side will definitely reduce the pressure and fresh air supply of engine room leading to higher engine room temperature and causing exhaust temperatures of diesel engines to rise.

Maintenance: Due to almost continuous running of the fans during the life of the vessel and different trading areas of the world, over a time period, dust builds up on the blades, casing of the fans and ducts. Even a fine layer of dust reduces the efficiency of the fans drastically reducing the airflow and increasing the amperage of the driving motor. This can also be plotted against time to get trends to guide the ships' staff. Ship staff can clean fan casing and blades at regular intervals.

Conclusion: Sufficient air supply to Ship's machinery space ensures clean, cool and livable environment in addition to keep the equipments without overheating and unnecessary wear and tear. Remember breathing fresh, clean air is not only healthy for all life forms, but also for a ship's machinery space.

Danger of High Oxygen Content in Inert Gas System

* We invite responses from our learned readers as to the causes and lessons learnt through this case study. Please send your responses to samundraspirit@samundra.com.

S.Viswanathan, Principal
SIMS, Lonavala

This incident relates to consequence of mishandling and misreading the Inert Gas system when the author was sailing as a second engineer in a crude oil tanker of 89000 DWT. The vessel was on a regular run between Persian Gulf and Mumbai and a round voyage was of around ten days duration, i.e. three voyages a month.

During one of the cargo discharging operations, the Inert Gas System (IGS) was found in-operable due to Uptake Valve not opening fully. This prevented the control system from enabling the operator to start the system when required. Subsequent investigation pointed out the errors and mistakes which are a good learning experience for all ship board engineers.

Events leading to the incident:

The Inert Gas system was fitted with an Uptake valve of 'flangeless butterfly valve type' and operated by a pneumatic linear actuator. During last few operations of Inert Gas system, Chief officer(C/O) was having difficulty in starting the Inert Gas System from the Cargo Control Room(CCR) panel and ship's electrical officer(EO) was summoned for assistance. Looking up at the mimic panel provided on the CCR panel, EO deduced the uptake valve not opening fully as the cause for IGS not starting. He promptly went to the location of the uptake valve and adjusted the micro-switch fitted on a sliding bar to touch the position indicator on the valve by a few millimeters. This caused the switch to transmit the valve position to the CCR panel and IGS could be started.

This condition was noticed in every subsequent operation of the IGS and routinely the EO assisted C/O in starting the IGS by repeating his past actions of adjusting the micro-switch. The repeated temporary measures taken by EO without analysis in subsequent voyages resulted in Oxygen content rising above 8% levels. After a few weeks, any form of adjustment to the boiler combustion system was not able to reduce the oxygen content, in spite of full load on the boilers.

Investigation:

When the cargo discharging operations could not be started because of high Oxygen content in the Inert Gas, Chief engineer was finally called and on learning the actions of EO in the past few weeks to the IGS, he instructed the engineers to closely inspect the operation of the uptake valve. Realizing that the valve was not fully opening, it was then dismantled.

Further investigation with the watchkeeping engineers revealed the Root Cause of the problem and the complete ignorance about the operating procedure of IGS.

Extent of damage/delay:

1. Inert Gas System was not able to deliver Inert Gas to tanks below 8% Oxygen content, due to which cargo discharging operations had to be delayed by more than a few hours.
2. Avoidable, breakdown and unplanned maintenance had to be carried out to fix the problem and prevent prolonged off-hire or possibility of shifting of ship to anchorage by the terminal.
3. Monetary loss to ship owner due to delays.
4. Bad reputation for managers with Charterers.

From the details provided and your knowledge about the diesel engines, please provide answers to the following regarding this case study:

1. What was the primary cause for the problem with the uptake valve disc and how it could have been fixed in the first place?
2. Why did the partial opening of uptake cause the oxygen content in Inert Gas to rise?
3. What are the suggested Measures to prevent recurrence of this problem on a IGS plant operated by flue gas?

Responses for - Auxiliary Engine break down: Issue 14 (July 2011)

Based on the positive number of feedbacks and responses from our readers on the previous case study, here's a compilation of the answers received.

The background of the incident narrated clearly suggests that, due to the space constraints, the exhausts of all the four auxiliary engines had a very rare arrangement of discharging into a common uptake. With each engine equipped with an individual hydraulically - operated isolating valve, this itself was a compromise on the original design. By virtue of location, any isolating valve in an exhaust pipe is exposed to extreme temperature and a highly corrosive environment, and is very much liable to soot deposits.

1. Based on the furnished facts, the primary cause of the incident could be pinpointed as a restriction in the exhaust passage of the engine in question. This restriction could have resulted from any of the following:

a. sizable amount of soot deposits in the exhaust passage, especially on and around the flap valve.
b. Malfunctioning of the valve or the actuating mechanism.
c. Any restriction in the hydraulic line actuating the valve mechanism. It is understood that there needs to be a filter in the hydraulic system and there is no mention in the narrative about the inspection of the same. Hence it could be safely assumed that the filter was partially /fully choked.

2. Any restriction in the exhaust passage would directly result in improper scavenging, leading to an incomplete combustion. This phenomenon, over a length of time, would have an adverse effect on the engine performance along with a deterioration of the engine condition as a whole. Piston rings, liner and the inlet and exhaust valves are all liable to be affected. This explains the fall in compression and peak pressure values as highlighted. This would also lead to blow-past which is manifested by the deterioration in crankcase oil quality and the presence of exhaust gas at the crankcase vent.

3. It is evident from the sequence of events that engine room staff had failed in diagnosing the primary cause until very late. It is illogical to suggest that they would have overlooked such an obvious reason if they had any knowledge of the system in the first place. Hence the root cause of the unfortunate breakdown could be narrowed down to the lack of awareness of the current arrangement. It could be asserted here that the modification was indeed very rare and not something the crew would have come across in their previous vessels.

Similar incidents can be prevented in the future if the following measures are enforced.

a. The gaps in the essential knowledge level of the on-signer and off-signer crews should be effectively plugged by following an established handing over – taking over procedures.
b. Proper procedures and intervals for the routine maintenance of critical components like the flap valve in question should be laid down and followed religiously.
c. A logical sequence should be followed while carrying out troubleshooting and prejudices to be avoided strictly.

SIMS ex-cadets joined ESM managed Fleet during the Last Quarter


3O Anish Aravind
DNS-03


3O Thomas A. Joseph
DNS-04


3O Ranjith Vallamala
DNS-03


3O Nidhin Shankar
DNS-03


3O Vijeesh Raj
DNS-03


3O Anshul Kumar Singh
DNS-04


3O Pious Baby
DNS-05


3O Vignesh Vidyadharan
DNS-05


3O Prateek Saxena
DNS-04


3O Deepak Dinesh
DNS-04


3O Piyush Singh
DNS-05


4E Sandip Patil
GME-06


4E Marimuthu Ganesan
GME-02


4E Ansari Mohamad Faizal
GME-06


4E Sethuraman Karthikeyan
GME-06


4E Sharma Ashish Kumar
GME-06


4E Jegan Mohan
GME-06


4E Ananth Angayasamy
GME-06


4E Azaruddin Dange
GME-05


4E Sharma Varun
GME-05


4E Karki Manish
GME-05


4E Satyam Shibam
GME-05

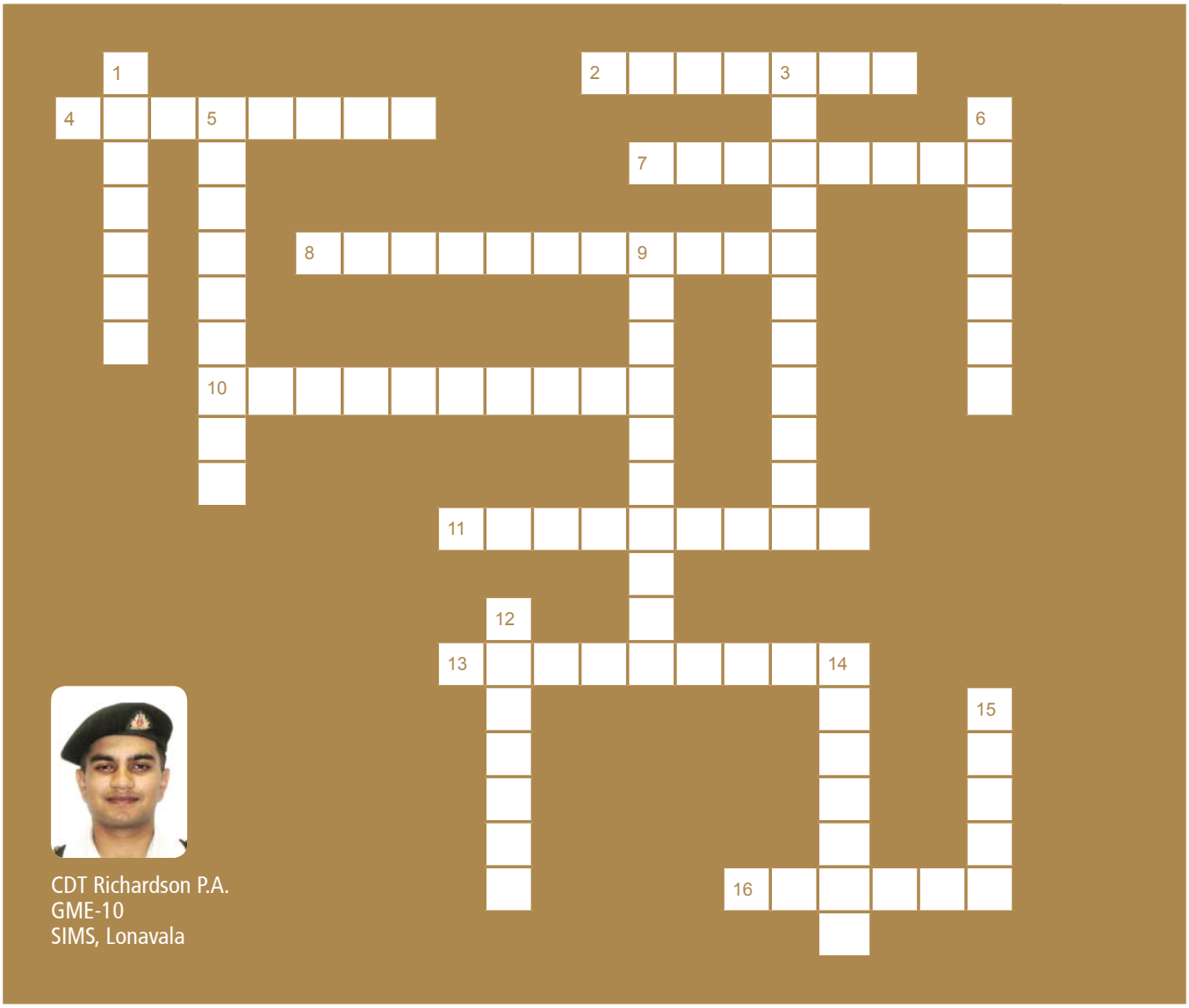

4E Kingston Vitalis
GME-06


4E Saurabh Kumar
GME-06


4E Vinodh Sellamuthu
GME-06


4E Anish Nair
GME-06


4E Sandip Sharma
GME-05



CDT Richardson P.A.
GME-10
SIMS, Lonavala

Crossword Puzzle

Across

2. _____ Corrosion occurs when two surfaces forming part of a machine in theory constitute a single unit undergo slight oscillatory motion of microscopic nature.
4. High _____ content in Fuel Causes high temperature corrosion.
7. The Crankcase doors and relief valve are incorporated in the _____.
8. Ability of fuel spray droplets to spread across cylinder.
10. A Swirl Effect of air charge in cylinder.
11. Internal Fluid Molecular friction causing resistance to flow.
13. Fuel valve lift cards are very useful for obtaining the characteristics of _____ when the engine is running.
16. Mixing of two grades of fuel bunkers leads to _____ formation.

Down

1. _____ is a phenomenon which affects material that are subjected to cyclic or alternating stresses.
3. Excess velocity of fuel spray causing contact with metallic engine parts.
5. _____ Compression of a gas is compression under constant enthalpy conditions.
6. Water wash in turbine side of T/C must be carried our at_____ speeds.
9. _____ pipes are often used for lubrication of bearing inside M/E.
12. If exhaust at one end of cylinder (top) and scavenge air entry at the other end (bottom), it is known as _____ scavenging.
14. SECA stands for _____ emission control area.
15. A simple gas turbine flow uses the _____ cycle which is a constant pressure cycle.

Answers:

1. Fatigue 2. Fretting 3. Impingement 4. Vanadium
5. Adiabatic 6. Reduced 7. Bedplate 8. Penetration
9. Telescopic 10. Turbulence 11. Viscosity 12. Unifiow
13. Injectors 14. Sulphur 15. Joule 16. Sludge

Photographer:
CDT Shailesh, GME-12
SIMS, Lonavala

Photographer:
CDT Keshav Rana, GME-10
SIMS, Lonavala

Force 8 - All well
Force 2 - Danger ahead!

The weather has changed tremendously in the erstwhile calm waters in the Gulf of Aden - (Geographical Limits: on the North-west - the Southern limit of the Red Sea [A line joining Husn Murad (12°40 N 43°30 E) and Ras Siyan (12°29 N 43°20 E)] on the East. The meridian of Cape Guardafui (Ras Asir, 51°16'E)- as the local Somali pirates on tiny skiffs zip around brandishing their guns. They terrorise the passing merchant vessels and sometimes even manage to hijack a vessel or two for deriving a hefty ransom from their owners.

Not that piracy in the history of maritime industry is something new. In fact, both go back hand in hand for centuries- sometimes in full collaboration and with complicity of the royalty or eminent persons of the society and sometimes in the garb of seeking adventure and discovering new geographical horizons by daring mercenary seafarers.

The pirates of Somalia of today do not seem to fall in any of these categories; mainly driven by economic necessities of a population forced to living far below the poverty levels. But, the damage and the nuisance they are creating is far damaging for the shipping industry and finally for the world economies.

Immediate brunt is, of course, borne by none other than the innocent seafarers crossing the region in various ships. Here's an interesting perspective of two of them, 3/O Pradyut Shukla and 3/O Abhay Pratap Singh- both ex-cadets of SIMS who have had the opportunity to sail across the GOA on board an ESM managed vessel.

Gulf of Aden/ Somalian Waters

1.5 Years ago:
Time: 2100LT: SAT-C Prints an EGC- "WIND FORCE EXPECTED TO BE FORCE 8 TO 9.
Master comes on bridge and the atmosphere is likely to be tense with anticipation of howling winds and creaking sounds due heavy rolling and pitching. Periodic weather fax is to be taken and hourly weather to be logged down in the deck log book. Bridge Team can feel the dangers coming ahead with expected heavy weather and wind force 8 to 9.

Present Day:
Time: 2000LT: SAT-C Prints an EGC- "Wind Force expected to be 2 to 3. Sea state expected to be calm.

Master comes on bridge and doubles up the watches to maintain a sharp and vigilant lookout. All ship staff feel that this is a dangerous situation as they don't wish to make it too easy for pirates to board the vessel and thoughts of Gods/Allah/Christ comes into respective minds.

These changes of situations have been forced by the despicable Somali Pirates operating in the regions of Gulf of Aden/Off Oman / Indian Ocean waters with impunity. There has been a tremendous rise in the number of pirates from Somalia as they are doing one of the most lucrative jobs in their country. The story is that if one pirate succeeds in getting the ransom, he can live life King Size in his nation. The major reason behind these acts may have been due to the poor governance by rulers of Somalia, but other than these possibilities for monetary benefits of the pirates is endless.

Ex-Cdt Pradyut Shukla (left) &
Ex-Cdt Abhay Pratap Singh (right)
M.T. Alpine Mia

"Citadel", a word which was not known by the older Masters, is now one of the most familiar words even amongst the Cadets.

Looking back, hostel wardens told us that after passing out from SIMS there will be no parade in your life How wrong they were! We are continuously carrying out parade in Gulf of Aden under escorts of Navy vessels, which we call the Naval Convoys.

Barbed wires /Razor Wires were only seen outside Big Luxury Villas, High security buildings, office buildings or jails. Now they can be seen on the biggest and the smallest ships (Floating Villas) - particularly trading across the Gulf of Aden.

All these counter measures have evolved

and are still evolving so as to deter the ever innovative piracy activities. A commercial ship, which does not have any weapons or trained soldiers can only use the weapon of "Deterrence". Once a pirate boards your good vessel, except for informing all concerned authorities the safest measure at that moment would be to surely have all ship's company securely locked away in Citadel! Failing which if even one of the crew members is encountered by the Somali Pirates then "your hands should be visible over your head.

Patrolling by the Naval Warships from around the world has indeed boosted the confidence of the seafarers; though it is difficult to state the real impact of it on the pirates. The threat seems to have decreased after the onset of the monsoons; as during the last three months there were hardly 2-3 ships hijacked by the pirates.

Not that I am tempting my fellow seafarers, but let me tell you, the stories which we heard about the pirates in the olden days or the movies such as Pirates of the Caribbean are being watched live by the sailors while sailing across the Gulf Of Aden, Indian Ocean, etc. Only difference is we are renaming the film "Pirates of Somalia".

Above all, the good news is that still the mighty shipping trade has not stopped and today over 2000 ships are crossing the G.O.A every month evading the pirates' net and whatever miniscule number of unfortunate vessels which get hijacked are sooner or later coming out of their clutch as the owners pay the ransom and get their crew free.

Bottom Line is that, piracy is an age old tradition of the sea which the shipping trade has bravely encountered along with the rough sea and the seafarers have always come out successful to welcome the calm and smooth seas at the end of that choppy passage.

A grand salute to all mariners who have made this profession so special and interesting and which is still going strong!

Following my Dad's Footstep

It is true that childhood memories play vital role in shaping a persons life. My earliest memories involve an endless stretch of blue hues and a rolling ship atop fiery and stormy water. My infantile senses were first accustomed to the scene at sea, the scent of fresh water and the taste of salty breath on my tongue. That is how the ocean came to be my first childhood friend.

I vividly recall the times on board the times when my two year old self would stand alongside my mother on the deck and stare at the nothingness for hours together. These few times have won me the opportunity to spot dolphins! My mother often laughs at how would try to convince her to let me jump into the ocean, touch the dolphin and then comeback.

Apart from that, the other thing that had capacity to hold my attention for long was "Pappu Akka" the term I had coined for the crane. I used to love watching through the portholes as the crane loaded and unloaded cargo into the latches which I learn are called holds.

I remember how I used to watch my father's sailors hat at every chance I would get and slip it on my all too small head. He would smile at me and tell me that one day I would make fine sailor. Those words invoked my love for everything shippie.

In the consequent years Popeye came to the favorite cartoon. As I grew older, machines and engines made a special place in my heart and wall piece of "Why ship is called a she" became the most cherished item in my room. Bit by bit all of this instigated the passion of becoming a marine engineer in me.

Even before I had finished primary school, I knew what I wanted from life, and that day forth there was no looking back. The adventures and busy life, the opportunity to go globetrotting and learn spattering of languages and the lucrative characteristic of the job held me captive. I had my heart and soul set on being a mariner.

Of course, every decision comes with opposition. A number of people gave it their best shot to try and dissuade me from my passion citing a whole lot of reasons. However nothing had the ability to deter my resolution.

After four Years of B.E. Mechanical Engineering and endless amount of dreaming, here I am, in SIMS - one of the India's finest Maritime Institute. SIMS has already started growing on me, and I am sure it will hold great meaning in my life because it is the key that will open out to the part of my old childhood friend.

Just one week into GME course and I could already start sense of beginning of my Journey from a man, to a sailorman. I can't wait for the day when little kids (like I used to be) will paint at me and tell their mothers, "Look Mom! He is a sailorman, just like Popeye!"

Now that I know I have got what I have always dreamed about, I have to reply all those who asked me why I was particular about this profession. I quote here one of my favourite poems which speaks for my own feelings and aspirations related to my chosen profession.

"I must go down to seas again, to the vastness of the sea and the sky, and all I ask is tall ship and star to guide, and the wheel's kick and the winds song melting into the ship. A grey dawn breaking. I must go down to the seas again, ie. a wild call and a clear that may not be denied.

And all I ask is a windy day with the white cloud flying, and flung spray and the blown sprame and the sea-gulls crying."

I must go down to seas again to the vagrant gypsy life, To the gull's way and whales way where the winds like wetted knife, and all I ask is merry yarn from a laughing fellow rover, and quite sleep and sweet dream when the long tricks over.

PS- The poem is written by Joan Masefield.

CDT Sujay Suresh
GME-12
SIMS, Lonavala

Inspiration
(An ode to my brother)

When the sky is painted rustic metal
With a tinge of anguish of the clouds
I will stand on the rocks
And look towards the sea,
I will search for your face
And hope you will remember me

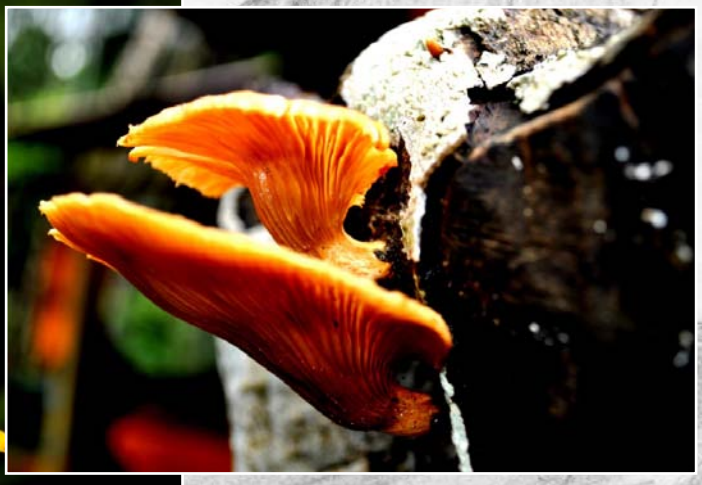
When my faithless heart is broken
When my morals seem weak
When my trust starts wearing
It's only you whom I will seek

And when the day comes, when my patience ends……
I will take your name
Faith shall heal me from my sorrow
And hope shall I tame…

(For my brother sailing somewhere in the sea)

CDT Digvijay Singh Rawal
DNS-13
SIMS, Lonavala

Artist: CDT Vinay Ambure
GME-12
SIMS, Lonavala



Photographer:
CDT Shailesh, GME-12, SIMS, Lonavala

Inter-house Indoor Game Championship 2011

The games for the 4th Inter-house indoor championship at SIMS Lonavala was held from 23rd to 29th August 2011 and boasted the participation of 145 candidates on five different events.

The events comprised of Table Tennis singles & doubles, Carrom singles & doubles and Chess. All the matches were played in a knockout format that led to the finals on the 29th August 2011. The spacious lobby of the Circular Lab building served as the venue, within which the faculty, staff and the cadets gathered for a glimpse of some breathtaking action.

The overall championship was bagged by Godavari House with a total of 26 points. Kaveri House gave good chase and finally ended up with a tally of 18 points to finish as the first runner up. The faculty members even engaged in a friendly game of table tennis thereafter and attracted loud cheers from the Cadets.

	Position	Name
TT singles	Winner Runners up	CDT Rohan Ferrad CDT Rajesh Singh
TT doubles	Winner Runners up	CDT Anuj Pratap Singh & CDT Vijay Pandey CDT Dhanraj S Gokal & CDT Vaibhav Saigal
Carrom singles	Winner Runners up	CDT Prakash Singh Bisht CDT Sanju Xavier
Carrom doubles	Winner Runners up	CDT Rohit Singh & CDT Sanju Xavier CDT Prakash Singh Bisht & CDT Shashank Shekhar
Chess	Winner Runners up	CDT Rahul Karippayil CDT Vaishak Dileep
Overall	Winner Runners up	Godavari Kaveri

ICRA revalidates Top Grade Status for SIMS

SIMS, Lonavala, retains its Grade1 status following an inspection for fresh mandate for revalidation of grading by grading society ICRA on 20th September, 2011. The outstanding grade achieved indicates that "the institution has resources and processes consistent with those required for delivering the highest quality of maritime education and training, with respect to the courses graded", as per the auditors.

It is a great moment for the institute, which has achieved highest rating for all the 20 courses conducted in one go against the seven courses opted for previous year. This year the scope of the mandate has increased by 11 newly approved DGS (Directorate General of Shipping) courses and 02 courses under approval by DGS.

The approved courses are:-

Name of the Course	Grade
Diploma in Nautical Science (IMU)	ICRA GRADE 1
Graduate Marine Engineering programme	ICRA GRADE 1
B Tech Marine Engg	ICRA GRADE 1
Oil Tanker Familiarization Course (OTFC)	ICRA GRADE 1
Chemical Tanker Familiarization Course (CTFC)	ICRA GRADE 1
Engine Room Simulator – OPS Level (ERSO)	ICRA GRADE 1
Engine Room Simulator – MGT Level (ERSM)	ICRA GRADE 1
Gas Tanker Familiarization Course (GTFC)	ICRA GRADE 1
Specialised Training Programme on Chemical Tanker Operations [CHEMCO]	ICRA GRADE 1
Specialised Training Programme on Oil Tanker Operations [TASCO]	ICRA GRADE 1
Specialised Training Programme on Gas Tanker Operations [GASCO]	ICRA GRADE 1
Free Fall Life Boat Course (FFLB)	ICRA GRADE 1
Fire Prevention and Fire Fighting Course (FPFF)	ICRA GRADE 1
Personal Safety and Social Responsibility [PSSR]	ICRA GRADE 1
Elementary First Aid [EFA]	ICRA GRADE 1
Proficiency in Survival Techniques [PST]	ICRA GRADE 1
Advanced Fire Fighting Course (AFFC)	ICRA GRADE 1
LPG Tanker Cargo & Ballast Handling Simulator (Operational)	ICRA GRADE 1
LPG Tanker Cargo & Ballast Handling Simulator (Management Level)	ICRA GRADE 1
Electronics Chart Display Information System [ECDIS]	ICRA GRADE 1

Tapti lifts First Inter-house Cross Country Championship Trophy

SIMS Lonavala held its very first Inter house cross country championship on the 24th September 2011 at its campus as an elite group of finalist, who were previously short listed during the heats stages on house levels, were all set to race a distance of 6km under the morning sun for the top spot.

The competition started right from the flagging off by Captain Deepak Tamras, dean nautical, as spectators witnessed an immediate flurry of action as the entire lot of finalists pushed forward to take the early lead. But the race soon settled down to a more sedate pace as each of the runners found their rhythm and by the end of the first lap, the leaders of the pack were becoming obvious as a select group of runners pushed well clear from the rest of the lot. The fast pace which the runners set for themselves didn't falter as they instead improved on it, much to the joy of a very vocal crowd.

Cadet Tadak Nalo of Godavari house looked very much the favourite once he crossed the halfway mark as he eventually finished the race literally a league above the others, clocking an incredible 22 minutes and 37 seconds. Enjoying a lead of almost a full minute over that of his nearest rival, Tadak's feat was definitely laudable. Cadet Ranjodh Singh touched the finish line next with a timing of 23 minutes and 36 seconds, while Cadet Digvijay Singh Rawal came third. Tapti house lifted the rolling trophy for the overall champions, with Kaveri house finishing as runners up after giving good chase. Ganga and Godavari came third and fourth respectively.

But it was not the end of the race, as an already electric atmosphere lighted up even more with the Mini Cross Country race for the staff being officially flagged off by Mr. Soman, Dean Engineering. A good majority of the staff sportingly took part in the 1500 metres race; and the best part of the day was when most of them were seen determinedly finishing the race in good time. The cadets did the cheerleader's duty this time around, clapping and egging the participants on. There were indeed a few tight finishes in the end.

Mr. Mukesh Kumar Sharma emerged as the winner of the race for the staff, with Mr. Sachin Gaikwad following behind. Captain Vivek Tyagi addressed the gathering during the prize distribution ceremony and lighted up the occasion with few encouraging words for the participants. Mr. S Viswanathan, Principal SIMS Lonavla, gave away the trophies for those who emerged victorious.

Visitors' Comments - Third Quarter, 2011

This is a wonderful experience I have ever had in my life. Writing on full behalf of the Colombo Dockyard PLC- Sri Lanka, I would like to pay my heartfelt gratitude to your organization and the institute. I just want to thank you & I wish you all the best for your institute.

Mr. RMP. Ratnayake, Senior Executive (Safety)
Colombo Dockyard PLC., Colombo, Sri Lanka

An excellent training establishment. Very impressive with modern training tools.

Mr. Ajay Mangesh Wagle, General Manager
Global Cadet Administration, Maersk Singapore Pte Ltd

Very impressive facility with a very professional approach towards training is evident. I am sure the institute will give the industry an excellent service.

Mr. Rajeev Nayyer, Head S&P
New Building Essar Shipping, Ports and Logistics, Mumbai

Very nice setup with impressive models and labs.
Very impressive layout of Campus.

Mr. Nathanael Leong, Assistant Manager
Global Cadet Administration, Maersk Line Crewing, Singapore

Happy
Diwali

Samundra Spirit's Editorial Team wishes you and your family a safe, happy & prosperous Diwali on 26th October, 2011

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▲ A part view of SIMS, Lonavala pre-sea campus

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