

PAYAM DARYA
SEPTEMBER 2019 | VOL. 12+1
Price: \$ 10



Nanotechnology in Maritime Environment

- Iran is a world's leading nanotechnology country
- We are getting close to zero-emission ships
- Autonomous shipping; more efficient use of fuel





BRIEF

INTRODUCTION

OF ISACO



Shanghai International Shipping Agency Ltd. wish to congratulate IRISL Group Managing Director for passing more than half a century worldwide transportation

Shanghai International Shipping Agency Group(ISACO) exists as a company initially invested and established by the Affairs Bureau of the Ministry Communications (MOC). Through the collection of social capital, the company has become a Leading shipping agency window in the region and today, the ISACO Group has a total asset of 50 Million RMB.

MAIN BUSINESS

- Shipping& Air Export & Import Booking Agent
- Railway Transport
- International Trading Business
- Customs Declaration
- Second Used and New Containers Selling& Buying
- Container Depot, Trucking and Warehouse Service

NATIONWIDE SHIPPING AGENCY NETWORK

Since September 2003 , Shanghai International Shipping Agency Ltd. (ISACO Shanghai) has been a member of the ISACO Group and as a result, is able to take full advantage of the nationwide shipping agency network that is in place . ISACO Group also has an I.T infrastructure in place to ensure smooth and efficient communications throughout the group and with Port Authorities.

BUSINESS BROADENING

From 2013, Shanghai Topray International Logistics Co.,Ltd acquiring company of Shanghai International Shipping Agency Ltd . And add new business region international Forwarding (Sea & Air Transport) and Railway transport service, and Trading business.

Shanghai International Shipping Agency Ltd.

Mr. Paul

Tel: +86-21-58998188
Mob: +86-13761368869

Ms.Nancy

Tel: +86-21-66769362
Mob: +86-18918750188
QQ: 516892625

Shanghai International Shipping Agency Ltd Shenzhen Branch
Hangmu(Shanghai) International Trade Co.,Ltd

Ms.Sandy

Tel: +86-755-82250086
Mob: +86-13725569313
QQ: 2733343094

Sino-Euro Trains ISACO Logistics Xuzhou Co,ltd

Mr. Elien

Tel: +86-516-85837066
Mob: +86-13816137221
QQ: 2885115387

Add: Rm 1205-1206, No#707 SinoLife Tower
Zhangyang Rd, Shanghai, China

E: paul@isaco-sh.com / nancy@isaco-sh.com

Add: Rm 5108, Diwang Building, No 5002 Shennan
East Rd, Luohu District, Shenzhen. China

E: mdmarketing@isaco-sh.com / md@isaco-sh.com

Add: Rm1703 Ruiyin Centre No2# North Xian
Road Xuzhou Jiangsu

E: md-xz@isaco-sh.com / peter@isaco-sh.com



We are delighted to have the opportunity to express our sincere felicitations to His Excellency Mr. Modarres Khiabani, IRISL's Vice Chairman & Managing Director on his well-deserved appointment Reach Holding Group (Shanghai) Co., Ltd.

Reach Group

Reach Holding Group (Shanghai) Co., Ltd. (Abbreviated as "Reach Group"), with headquarters located in Shanghai, China, is composed of three main business segments, that is, international shipping and logistics, international trading and hotel management. It is an outstanding comprehensive enterprise group which is cross-industry and cross-regional, with the main business in shipping services.

Half a Century of Quality Ship Management



**ROD Ship Management Company currently manages +80 ocean going fleet vessels.
We offer to manage your Ships with the highest standards & best quality of services.**

We assure most competitive budgetary management fee rates.

We provide:

Full Technical Management & Global Supply Services

Crew management & Complete training packages

Vessel conversion and new building supervision

QHSE and anti piracy services

Chemical cargo supervisory and vetting

Vessel inspections (Sales, purchases, vetting preparations, etc)

Core expertise with the following vessel types:

- > Bunker Vessels
- > Chemical Tankers
- > MR Tankers
- > VLCC tankers
- > Bulk carriers
- > Med. Size Container carriers
- > Mega size Container carriers
- > Multi Purpose vessels
- > General Cargo & Heavy lift Carriers

IRISL
GROUP

Call us NOW!

**1ST Floor - No.523 Asseman Tower
Shahid Lavasani (Farmaniyeh
Crossing) Pasdaran Avenue -
Tehran - IRAN**

Tel: +98 21 2384 2359

+98 21 2384 2360

Fax: +98 21 2612 5081

+98 21 2610 0440

Email : info@sealeaders.com

md@sealeaders.com

Web site: www.rodsmc.com



Technical competence

MAN PrimeServ

Service with passion

We at MAN PrimeServ understand that performance and reliability are paramount to your business. You need technical competence that drives your success. MAN PrimeServ's many decades of hands-on experience and its diverse portfolio provide this. With MAN PrimeServ as your partner you benefit from state-of-the-art technical and digital solutions that fit your individual situation. What's more, these benefits are brought directly to your business through a global network of local experts. Whatever the time and wherever you are in the world, you can count on MAN PrimeServ as a strong service solution provider for your needs.

To find out more about our technical competence, please visit:

www.man-es.com



PAYAM DARYA

MARINE INNOVATION

Published quarterly by IRISL
Volume 12 + 1, September 2019
ISSN: 1027-1058



Legal Representative:
Reza Barati

Editor-in-chief:
Fatemeh Moonesan
mounesan@irisl.net

Editor:
Saeedeh Rastkhiz

Journalists:
Behrooz Ghahremani
Seyed Majid Motahari
Vahid Baserh
Narges Ehsandar
Fereshteh Azizkhani

Designer:
Fatemeh Abedini

Cover Designer:
Hossein Torkashvand

Financial-Administrative Department:
Golnoosh Afrooshe

Photographer:
Ali Nazemi

Address:
No.523, Asseman Tower, Shahid Lavasani
(Farmanieh) Junction, Pasdaran Ave.
Tehran - Iran.
P.o.Box: 19395/1311
Tel: (+98 21) 26100368
Fax: (+98 21) 26100371

**General Manager of
Advertising Department:**
Mr. A. M.Sadeghi
To advertise in Payam Darya, please contact
Mr. A. M.Sadeghi at
Tel: +989121001769
Email: al_m_sadeghi@yahoo.com
m_sadeghi@irisl.net

CONTENTS

- 05 Technologies that transform the shipping industry!
- 06 Iran is a world's leading nanotechnology country
- 09 The achievements of Iranian experts in nanotechnology are tremendous
- 012 Biotechnology and nanotechnology, keys to marine industry
- 015 Nanotechnology applications in shipping industry
- 016 An overview of applications of nano technology in maritime industry
- 020 Reduction of sulphur oxide derivatives in combustion gas
- 023 Autonomous shipping; more efficient use of fuel
- 024 All hands on deck
- 027 Green ships / echo ships
- 032 We are getting close to zero-emission ships
- 036 Appropriate training, effective in improving situation awareness
- 040 Cruise industry to steadily rise in 2019
- 042 This port won't be impacted by sanctions
- 044 Developing countries get the lion's share of goods loaded and unloaded globally
- 046 The importance of training by using bridge simulation in respect of new technology to mitigate accident and incident
- 048 Bulletin

TECHNOLOGIES THAT TRANSFORM THE SHIPPING INDUSTRY!

By: Fatemeh Moonesan
Editor-in-Chief

Nanotechnology has a significant role in human required tools and products. This technology is considerably changing the way of life, at a time when productivity and cost-effectiveness is the human being's primary concern. In recent years, the presence of this technology has become very noticeable in the various industries; meanwhile, the maritime industry is well aware of the position of the nanotechnology and is trying to take full advantage of this knowledge for its development.

Presently, the growing concern about global warming trend has made people think about the ways of coping with the crisis, especially through producing low sulphur fuel used in the maritime industry. In this regard, scientists and researchers have begun production of low-sulphur fuel using nanotechnology, while the presence of Iranian scientists and researchers is highly significant in this field.

Nanotechnology in the maritime industry is not only applied to produce low-sulphur fuel, but also it is of great importance for manufacturing of suitable coatings which is used in the construction, maintenance and repairing ships as well as marine structures with high resistance.

This emerging technology will definitely reduce the environmental pollution and bring down the cost at the same time.

On the other hand, the adaptation of smart technology in shipping industry has become widespread. Currently, the world's first smart oil tanker has joined the global fleet. Moreover, the world's first autonomous container ship, called Yara Birkeland, with zero-emission is due to be launched this year. The arrival of autonomous ships, operating without crew, may not be considered as good news for seafarers. Marine industry experts and specialists believe that although this unmanned ship will eliminate the need of personnel on board, it doesn't mean removing the crew from the shipping industry and will result in considerable additional jobs ashore which require seafaring experience. It is the responsibility of the industry to prepare the manpower for their future job opportunities.

On the whole, new technologies are rapidly changing the nature of shipping. Fuel-efficient and environmentally friendly autonomous ships without crew, loading and unloading in fully-mechanized ports, will soon join the shipping industry. The maritime industry can navigate these developments to its best advantage through valuable knowledge of nanotechnology.

We would like to inform our dear readers that Payam Darya magazine has changed its name to Marine Innovation.

Secretary General of Iran Nanotechnology Initiative Council (INIC);

IRAN IS A WORLD'S LEADING NANOTECHNOLOGY COUNTRY

Although, nanotechnology in Iran is in its infancy, this industry has developed significantly in our country during last 16 years. Presently, 36,000 specialists are studying at universities. 600 nano products are produced by 216 companies and more than 10,000 scientific papers are written by Iranian scholars worldwide, and finally, nano products are exported to 49 countries. Considering the undeniable key role of Iran Nanotechnology Initiative Council (INIC), its supervisory and strategic role have led to continued development of the industry.

Dr Saeed Sarkar, the Secretary General of Iran Nanotechnology Initiative Council (INIC), explained how the industry was formed in the country and presented the performance of INIC in an interview with Marine Innovation magazine.

When was the beginning of nanotechnology studies?

From 1998 to 2000, countries such as Germany, the United States and Japan, continued their own practical planning for nanotechnology, and in 2003, the relevant headquarters was formed in Iran, while only 10 university professors were familiar with nanotechnology. In the first step, we introduced nanotechnology to the authorities and politicians in order to promote its growth, and in the second step, we brought it to universities, professors and doctoral students, and finally, we promoted it among the people; and after all these stages, we signed a 10-year strategic plan document in the field of developing the technology. Based on that document, the first 10 years allocated to human resource training, technology research and development, regarding a constant process of nano promotion and improvement. From this document's perspective, the goal of the development of nanotechnology technology in Iran was to produce wealth and to improve life quality of the people which were



welcome by the supreme leader. We organized postgraduate and PhD courses and today there are more than 36,000 specialists among graduate students in this field. I believe that every professional work requires its specialist. When nanotechnology strategic studies began in 2001, Iran ranked 57th in the world with only 10 authentic research papers, while according to the recent figures in 2018, this number increased to 10,000 articles, and currently we ranked fourth in the world. In reality, in a scientific discussion, one

should stand at the boundary of knowledge in order to be able to innovate, invent and to introduce new technology to the world. From a qualitative point of view, we have about 6% of the world's scientific articles which is far beyond the goals set for the first 10 years. Over the past eight months, the University of Georgia released a statistical result of the countries activities in the field of nanotechnology by 2015, based on which, Iran stood in seventh place in the world that year. According to the statistical result of this quality-based article, China surpassed United States,

there were South Korea and then India after United States; in the recent article that surprised the world, China takes the first place, followed by United States, India and Iran. Subsequently, by identifying various fields of activities of nano science, the name of each Iranian specialist was mentioned. As a result, Iran has made considerable advances in science and technology, and its significant effects are well observed in other areas.

Does Iran, with one percent of the world population, cover 6% of the world's

nanotechnology articles?

At the present time, Iran has 1% of the world's population and covers 6% percent of the world's papers, while the America and Latin America together share 4% of the articles, and Iran surpasses all European countries. China has the highest percentage.

Have you set up a new perspective and program from 2015 onwards?

From 2015, we launched the Second Strategic Plan with the aim of focusing on the penetration of nanotechnology in the industry, in which the development of domestic and international markets and international cooperation were our first priority. In nano science, we considered the use of nano science in the field of energy, especially solar energy, health responding to the people's need for treatment, water, environment, and construction as our other programs.

Is nanotechnology parallel to digital technology? In other words, are they complementary?

Nanotechnology and the digital technology are similar to each other in terms of their pervasiveness, and they are complementary. Some products are made directly on the basis of nano, and some of them are improved with a percentage of nano. In fact, nanotechnology is divided into three phases: 1. Countries have the ability to make nano. Fortunately, we have mass production of nanomaterials in Iran. 2. The penetration of nanotechnology in the existing industry can manufacture higher quality products, and if industry owners do not pay attention to it, they will soon lose their competitive



With the advancement of nanotechnology in the industry, we will be able to grasp competitive market of nano products in the world and in near future we can represent our greatest achievements to the world.



markets. With regard to this fact, we introduced more than 15 industrial areas in Iran concerning nanotechnology, such as water and environment industry, agriculture industry, oil and petrochemical industry, sports-related industry, textile industry, etc. One of the most important fields is shipping area, with thoughtful consideration of managing director, more than 30 types of nano industries are being used in shipping, which are very influential and create value added. Through the efforts of managing director, the Joint Council and the Joint Executive Committee have been established in this regard, and some contracts have also been signed. 3. Nanotechnology is smart through which, smart materials and drugs can be used and it should not be overlooked, because it enhances high value added. At this moment, there are smart colors which can be restored when they are damaged, or sensors for cancer detection, smart insulins that are injected into the body of the patient once a month, they would circulate in the body, inactive, until blood glucose levels start to rise. As glucose levels rise, the insulin would go to work to bring these levels back down. Another example,

which is about the patients who are at risk of heart attack, is a medicine that is injected into the heart muscle and prevents stroke during a heart attack. Of course, these items have not yet entered the market. In the past, there was a medicine imported from the United States at a cost of \$800 for cancer treatment, each cancer patient needs 18 of this medicine for each course, which currently costs 200 million tomans for the Iranian people; now we took measures and distribute this medicine to the pharmacies for a price of 100 thousand tomans, and the patients can have it just for 50 thousand tomans with their health insurance card.

In sum, our goal is to improve life quality of the people by using nanotechnology.

How many nanotechnology-based products have been manufactured in Iran?

The introduction of this technology to the industry is a sign of its wide promotion. Another part that we have been considering in nanotechnology is the water issue, which is a huge challenge to Iranian people, including: removal of heavy metals, arsenic, Lead, microbial contaminants from drinking water,

desalinization, industrial waste water treatment, and recirculation of environmental contaminated water, purification of grey water to be reused for water pool, and carpet cleaning services and indoor water for towers, in which this process is done without breaking the water molecules by using the nano filters. We have about 600 nanotechnology-based products, all of which are manufactured with Iranian's technical knowledge; we also sell this technology overseas. These 600 products have received nano- scale certification. Generally, 216 nanotechnology-based companies have been established in this field.

What measures have been taken to prevent the possible misuse of the name of Nano?

We have NanoProduct Certification Unit (NPCU) that monitors the products through doing various tests to certify them with nano standards, to be labeled in term of nanotechnology product. Unfortunately, there are profiteers who sell their counterfeit goods labeled as nano, making unfairly large profits without having any certification. When the products were approved by the Standards Organization

and the Ministry of Health, they are randomly purchased and retested, and if they do not have the same initial quality, they will be removed from the market and the company's label will be revoked.

What is Iran's world rank in nanotechnology?

There are no statistics for products in the world. We have 30 technologies and sometimes a company only used one nano structure component in its product and incorrectly offered its entire product as 100% nanoproduct. We participated in many international exhibitions and visited the European pavilion and realized the superiority of Iranian products in this field. We are world-class in nanotechnology in terms of diversity and quality, and we have worked well in the economical field. We have 100% growth in Iran's annual nanotechnology-based market. Last year, it was \$700 billion, and exports reached \$62 million in 2017. We also

have offices in some countries, including China, Indonesia, Turkey, Syria, Iraq and India. The quality of our products is high and prices are very reasonable.

Which countries do you export your products to?

Presently, we export our nano product to 49 countries, such as China, Australia, South Korea, Indonesia, Malaysia, Russia, Turkey, Latin America, Germany, Italy, etc.

What are the advantages of exporting products to other countries?

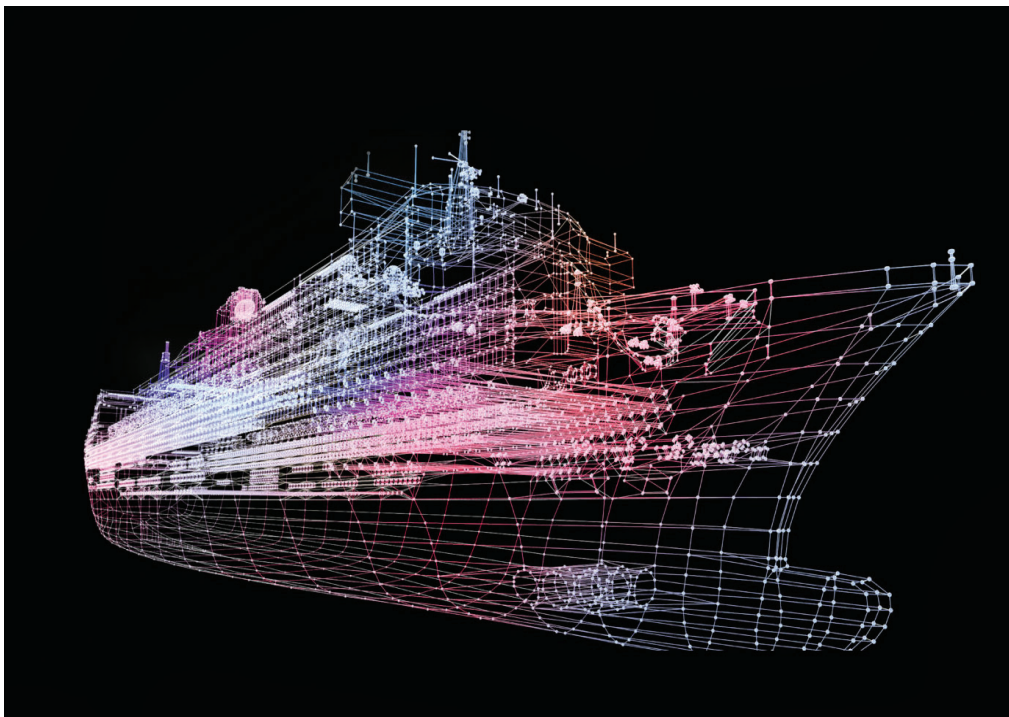
China is not able to produce some of the nano products which are manufactured in Iran. In China, a regular product is offered to the global market with low price. But our strategy is completely different from China, the product of the best quality and low price is produced in Iran. For example: Behran Filter Company was planning to purchase a nanofiber device from a European company, and because of the

sanctions, they put a price of one million and a hundred thousand dollars. We set up a nano-fiber production line on our agenda, and Behran's filter was very tough at first, and did not accept this device except for the European company, finally under the condition of testing the device in Europe, getting approval from the European standard and spending about 20 Thousand dollars for testing, they have been pleased to agree and now we have set up five lines of nano-fiber production at Behran factory. After commercialization of this equipment inside the country, its export arrangements were made. In the first step, Korea purchased the device in the form of an equipment contract, and so does China who purchased 10 equipment. We contracted to export \$ 6.5 million to China in 2017. We decided to develop the industry in the field of nanotechnology. The industry is a living creature that needs to be nourished and grown and the industry needs

technology. We can only claim to own the industry when we provide the technology for the industry. For this purpose, we are developing 29 machines in the field of nanotechnology and exporting them to China, Malaysia, Korea and other countries.

What is your vision for the future?

Nanotechnology has been based on the policy of creativity, seriousness, perseverance and having strong support of the Supreme Leader. This headquarter has been stable since its establishment, which is due to the Supreme leader's insights, and he always encourages us and observes all our activities. I do believe that one day, with the advancement of nanotechnology in the industry, we will be able to grasp competitive market of nano products in the world and in near future we can represent our greatest achievements to the world.



Nanotechnology and the digital technology are similar to each other in terms of their pervasiveness, and they are complementary.

THE ACHIEVEMENTS OF IRANIAN EXPERTS IN NANOTECHNOLOGY ARE TREMENDOUS

What role does nanotechnology play in Iran and the world? How this industry has managed to make a lot of changes in a limited period of time and persuade all countries to competing for grabbing a bigger market share. On the other hand, this question is raised that how Iran has managed to make remarkable achievements in nanotechnology area, In a way that, countries such as Korea and China are seeking Iran's nano products? Another question is that what is the role of Iran Nanotechnology Initiative Council (INIC) in promoting the quality and quantity of nano products, meanwhile, what measures have been taken by INIC for supplying low sulphur fuel through using nanotechnology?

These issues and a host of questions have persuaded us to hold a roundtable to discuss this emerging industry and its role in maritime industry with IRISL managers and experts, Iran Nanotechnology Initiative Council (INIC) and university professors.

The emergence of nanotechnology in the Iran's maritime industry has brought about new innovations which are unique and unparalleled. There is no shred of doubt that we will be witnessing further flourish and thrive of maritime transportation industry through using nanotechnology in near future.

The participants are Gholam Abbas Pourhaghverdi, chief executive officer of ship management company at IRISL, Hojatollah Farhoush , managing director and chairman of Khaybar company, Abdolreza Mohebbi, general manager of technical affair department , Mehdi Majid, R&D general manager, Mohammad Hossein Talezari R&D deputy general manager, Dr. Hamid Delavari, a faculty member of Tarbiat Modares University, Ali Asghar Najimi , deputy of industry department of Iran Nanotechnology Initiative Council (INIC) and Reza Soltanalizadeh , business development manager aviation and marine



The participants in the roundtable answer to the first question;

Would you please explain about the great transformations in maritime industry resulted from nanotechnology?



Gholam Abbas Pourhaghverdi: New nano technologies have a lot of potential in different industries such as telecommunication, computer and electronics. These have also considerable applications in other areas like producing fiber glasses, nanocomposites, vibration absorbers, sound absorbers, fire-resistant materials as well as maritime and shipbuilding industries.

Nanotechnology plays a significant role in creating suitable coatings for maritime industry, building new ships and high resistance marine structures. Fuels which are supplied by applying nanotechnology can release 10 times as much energy as the regular fuel release.

In recent years, the issue of nanotechnology has been proposed in Iran and plays a considerable role in development of maritime industry. Considering Iran's maritime industry is passing through its evolution era, using nanotechnology can result in an accelerated evolution.

Areas such as shipbuilding, offshore and port equipment constitute the major part of maritime industry. The useful application of nanotechnology in maritime industry has been recognized correctly at IRISL.

In late February, Dr Mohammad Saeedi, the former managing director and head of the board at IRISL ordered to the formation of a joint workgroup consisting of IRISL and INIC experts. Fortunately, during this period, a remarkable progress has been made. In the first step, workgroup managed to supply a series of ships' stores and spares as well as filters by using nanotechnology, moreover, other plans are currently underway.

I would like to express my deep gratitude and appreciation to Dr saeedi for recognizing this need wisely and at the appropriate time, Mr. Pourhaghverdi said.



Abdolreza Mohebbi: products which are manufactured using nanotechnology, have useful and effective application in maritime industries. I would like to express my sincere appreciation to INIC experts as well as our IRISL experts and colleagues who are persistent and determined in pursuing the matter. It should be highlighted that

maritime industry is not limited to shipping, but it also covers a range of activities. Given the full support of Dr Mohammad Saeedi for applying nanotechnology and establishing a good relationship between IRISL and INIC, hopefully we create an efficient core and center of nanotechnology in IRISL. Some of applicable areas of nanotechnology in maritime industry are as follows: offshore industry, water purification, different types of refineries, various types of raw material for ship building, ships' stores and spares, fuel, oil, control system, different types of absorbers, different types of telecommunication systems.



Hojatollah Farhoush: IRISL has begun its mission on the matter of self-efficacy and support for domestic production by using domestic marine paints and coatings, marine oils and chemical materials since 1993. Although IRISL is the user of the mentioned items on its vessels, however, by relying on its high technical knowledge, this

shipping company has always been leading for field test of domestic productions especially in marine oils. In this regard, with the cooperation of IRISL, cylinder oil product of an Iranian producer tested in one of the companies' vessel main engine successfully. That product received global authentic license from Wärtsilä.

Similarly, we have managed to connect foreign manufacturers with domestic producers in marine paints sector, the aim of this action was transferring technology and formulation. As a result, four domestic manufacturers have received global authentic licenses.

At the present time, IRISL is a leading company in nanotechnology area and is regarded as the first company in maritime industries that has announced its readiness to launching field tests of nano products.



Ali Asghar Najimi: nanotechnology has a history of 20-30 years and most countries have plans in this area. For example, the US has invested \$2 billion in nanotechnology sector since 2000. About 98 percent of this investment is dedicated to Apple Technology Company. Japan allocates \$1, 5 billion to nanotechnology sector annually. Moreover,

China and South Korea spend \$ one billion and \$700 million respectively. Iran Nanotechnology Initiative Council (INIC) was established in 2003. At that time, the number of experts was very limited, however, at the present time, more than 35 thousands experts and several thousands of faculty members are active in this area. 600 nano products are produced by 216 companies and more than 10,000 scientific papers have been written by Iranian scholars worldwide, and nano products are exported to 49 countries.

In 2015, Iranian nano technology companies exported their products in value of \$5 million which this figure raised to \$100 million in 2018. We aim to export one billion dollars of nano products in 1404.

As it was pointed out, nanotechnology has many applications in the maritime industry, Certainly, enforcement of 2020 Sulphur Cap is one of the main challenges for shipping industry, What measures have been taken by INIC in this regard?

Reza soltanalizadeh: nano companies which are active in fuel, have begun their studies since several years ago. They have concentrated on two main issues: reducing sulphur in fuel, water in diesel oil. Now, we have managed to reduce the content of sulphur in fuel to 1% and it will be limited to 0.5% until the end of September.





Hamid Delavari: Nanotechnology enjoys a long history, researches show that gold particles and colored glasses in churches are from nanoparticles.

Moreover, some researches which were carried out in museums of western countries indicate that Renaissance swords had been made of

nanocomposite.

The story of nanotechnology began in the 1950s and 1960s. At first, some countries had allocated investments for expanding and developing this technology. However, at the present time all countries have invested in this field.

Nowadays, nanotechnology has many applications. In the maritime industry, it is used for building commercial ships, passenger ships, tankers and etc... In a nutshell, the adaptation of nano technology in shipping industry has become widespread.



Mehdi Majid: nanotechnologies can create new industrial revolution in the world. In the shipping industry, the application of nanotechnologies is divided into two main areas of shipbuilding marine structures and maintenance and repairs. By using new nanotechnologies, the shipbuilding and marine structures areas will undergo massive

changes in the next few years.

The main concern of ship management companies is maintenance and repairs of vessels. Fortunately, nanotechnologies are applicable and can meet the needs of ship management companies. There is no shred of doubt that providing cost- effective and high- quality products will be welcome by shipping companies.



Mohammad Hossein TaleZari: At the present time, global 0.5% fuel sulphur content cap regulation is our first priority, the next priority is ballast water purification. It is important to highlight that Iranian experts have made remarkable advance in the area of producing low sulphur fuel oil.

In the field of ship Ballast Water Purification System, IRISL has provided knowledge-based companies with a good trade opportunity. However, since it is a time sensitive matter, a predetermined and precise planning is required.

Similarly, in the field of ship hull painting, IRISL has made a significant contribution to nano technology companies, in a way that its vessels have used for field tests.

Is there any economic justification for using nano products (filter, fuel or paint)?



Abdolreza Mohebbi: the competitive quality and cost for every product including nano products are key and necessary elements. When a vessel is going to be taken to the dry dock, many parameters such as time, cost, dock location, the scope of dry docking and etc... should be taken into consideration. The paint of dock is one of the costly and basic items in periodic repairs. We have not yet experienced using nano paints on IRISL vessels. However, we have applied new generation anti-biofouling paints on the hull of our vessels. These paints have used in thousands of ships in the world and has resulted in a decrease in fuel consumption.

It has recently been announced that 0.5% sulphur fuel is being supplied in port of Fujairah, do you think that such fuel will be produced in our country? In your opinion, if the domestic production of low sulphur fuel is cost effective for IRISL?



Abdolreza Mohebbi: At the present time, one of the best regular fuels used by ships is belonged to Iran. Currently, low sulphur fuel is produced through different ways. It is worth nothing that consumer market of low sulphur fuel is not limited to IRISL fleet and National Iranian Tanker Company (NITC). In case of success in producing fuel Compliance with 2020 Requirements through different ways including using nano, it will bring about considerable added value for the country.



Ali Asghar Najimi: for achieving this purpose (0.5% sulphur fuel), the elements like idea development, financing, licenses, industrial expansion, filter tester and finally market expansion and export are required. I strongly believe that IRISL has taken a big step in using new technologies especially nanotechnology.



■ Dr. Sergey Dobretsov, the president of the European Society for Marine Biotechnology



BIOTECHNOLOGY AND NANOTECHNOLOGY, KEYS TO MARINE INDUSTRY

Marine biotechnology, sometimes is referred to as “blue biotechnology”, exploits the diversity found in marine environments in terms of the form, structure, physiology and chemistry of marine organisms. On the other hand, nanotechnology is manipulation of matter on an atomic, molecular, and supramolecular scale which promises a new era for maritime industry. To discuss more on these issues, Marine Innovation magazine has conducted an exclusive interview with Dr. Sergey Dobretsov, the president of the European Society for Marine Biotechnology.



Could you please brief us about the potential applications of biotechnology and Nanotechnology in the marine environment?

Marine biotechnology or “blue biotechnology” exploits diversity of marine organisms for the benefit of mankind. While this is a relatively new field of science, first records about utilization of marine organisms in medicine or as a food source are dated more than 3000 years ago. Nowadays, the rapid growth of molecular, genetic and robotic technologies

is enabling scientists to explore and develop marine resources for diverse applications in the food, medical, pharmaceutical, environmental and energy industries.

Nanotechnology is referred to as the manipulation of materials at nanometer scale. At this scale, materials gain new physical and chemical properties that can be used in different maritime industrial applications. For example, with the help of nanotechnology we can make nanosensors and nanocapsuls, nanocoatings

for water cleaning, active packaging, surface protection and structural applications.

What are the major achievements of Nanotechnology in the marine industry? What are the ambitious goals you are looking in future?

In our recent study, we developed photocatalytic metal oxide nanocoatings to prevent biofouling. Biofouling is referred to the unwanted growth and accumulation of organisms on submerged in the marine environment man-made surfaces, such

as vessels, nets, pipes, and membranes. biofouling causes numerous technical and economic problems. Annually, countries spend billions of US dollars to control and deal with the problems of biofouling. Usually, biofouling is prevented by application of antifouling coatings that pollute the marine environment. We developed ZnO nanocoatings that are less toxic than traditional antifouling coatings and provide protection via production of reactive



oxygen species (ROS) though photocatalysis of seawater in the presence of sunlight. ROS quickly break down any attached fouling organisms and do not accumulate in the environment. More research is needed before industrial application of such nano-coatings. In particular, it is important to scale up production of photocatalytic nano-coatings and investigate their toxicity against non-target marine species.

Which countries have taken the most valuable measures for marine biotechnology?

The most of marine biotechnology companies are located in the European Union (EU) and the United States of America (USA). Europe, France and the UK have the leading role in marine biotechnology. There is no nationally coordinated strategy for marine biotechnology in the USA. In opposite, the EU developed Mare’s Blue Growth strategy and strategy for European Marine Biotechnology.

Currently, what are the main challenges that marine biotechnology is facing?

In my opinion, the main challenge in marine biotechnology is associated with limited translation of scientific results into industrial applications, which requires significant time and resources.

According to Dr. Antonio Trincone - the author of the book “Grand Challenges in Marine Biotechnology”, the grand challenge in marine biotechnology is to foster knowledge and to build our basic knowledge of marine environment. Specifically, we have to improve cultivation techniques of marine organisms, unlock their genetic potential, understand symbiotic relationships between some of them and understand their biology and chemistry.

Are research articles paying enough attention to marine biotechnology? And what steps have you taken in this regard?

Marine biotechnology is a



the main challenge in marine biotechnology is associated with limited translation of scientific results into industrial applications.

fast growing field of science. Now many countries, especially those who have long coastal lines, looking at the marine environment and its marine organisms as a source of new industrial products, food, renewable energy, pharmaceuticals and environmental health applications. Of course, there is always room for more research studies. As the president of the European Society for Marine Biotechnology (ESMB), I am trying to promote marine

biotechnology research and to build up closer research collaborations between marine biotechnologists. The ESMB also promotes effective training and education in the field of marine biotechnology. Regionally, at the Centre of Excellence in Marine Biotechnology at Sultan Qaboos University, Oman, we facilitate research, development and training in marine biotechnology and translation of scientific results into successful industrial applications.

NANOTECHNOLOGY APPLICATIONS IN SHIPPING INDUSTRY

Nanotechnology has greatly influenced the marine industry with regards to innovations in materials, which will make a big contribution to robustness of vessel equipment, delivering more fuel efficiency and bringing down operating costs. This technology covers all kinds of vessels ranging from yachts, cruise ships, and container vessels to aircraft carriers operated by the navy.

Marine Innovation magazine has conducted an exclusive interview with Mrs. Melina Lettau, sales manager of Marine NanoTech company.



Melina Lettau, sales manager of Marine NanoTech company

What is the role of Nanotechnology in marine industry?

The marine environment is one of the harshest environments for any structure to be exposed to. Many environmental influences (sun, salt, chemicals...) continually damage the surface materials of ships, yachts, tankers etc. Nanotechnology is one of the fastest growing services to influence the marine industry. Nanotechnology simply means to work on a very minute (nano) scale by manipulating the molecular state of materials and in turn protecting them from damage. By nano coating materials such as coatings for paintwork and glass, you protect them from the harsh environment and therefore prolong the life of the material, and also make it easier to maintain. In the future almost all surfaces exposed to marine conditions will be using some form of nanotechnology.

Could you please explain about your activities in this regard?

Marine NanoTech specialise in the high quality restoration, renewal and protection of

paint/gelcoat and other materials for the marine industry.

We have worked closely with our own laboratory to develop the best products available. With a detailed restore, renew and protect process using nanotechnology we are able to extend the lifetime of paint, gelcoat, steel, plastics and glass.

Our detailed renewal process includes a very gentle nano-polish (75 percent less abrasive than standard polishing). We then repeatedly add a specially formulated nano-filler, restoring the treated surface as closely as possible to its original 'molecular state', by filling and re-filling the smallest of gaps. The result delivers an outstanding high shine to the paintwork but also ensures there are no gaps for environmental influences to seep into. For example - a 99 percent protection against UV rays has now been created which means no discolouration.

Our CERAMIC ARMOR protective coating, also based on nanotechnology, is then added to the surface to seal and preserve the beforehand created renewed condition.

The surface is now guaranteed to be 'frozen in time' in this perfect condition for 2 years with an option to further extend the guarantee. Our process is precise, unique and tailor made to each client.

How do you see the future?

Continuous improvement is essential for our company and paramount for the industry. That is why we at Marine NanoTech are continually working with our laboratory developing new products and improving the current ones. Giving guidance, advice and education about what is important when working with nano-based coatings is just as important for suppliers and clients alike. This will help to ensure the quality of product and reputation of ceramic coatings in the industry. There are many companies who claim they are using nanotechnology and it simply isn't. Generic coatings can be bought online and applied but often the product is not of good quality and people buying them have no knowledge of how to apply it. This is why it is so important to work with a professional company with professional technicians.

AN OVERVIEW OF APPLICATIONS OF NANOTECHNOLOGY IN MARITIME INDUSTRY

In recent years, industrial countries have had a special view regarding the use of technologies in different industries. Considering evolutions and huge investments in maritime industry, new technologies have received particular attention.

Enjoying more than 2900 kilometer sea border, Iran is recognized as a developing country in maritime industries. While, some European countries have only one fifth of this sea border, however, they are considered as powerful countries in maritime industries.

Maritime industries include broad area of industries where each one can support and develop knowledge and technology in the country.

Maritime industries can be divided into the following categories; 1- Shipbuilding industry: including the building of different kinds of ships for instance, cargo ships, very large oil tankers, canal boats and submarines.



2- Offshore industries including: the building of floating and fixed maritime platforms and pipeline installation that is applicable in huge oil and gas projects.

3) Coastal and port industries including: building dock, breakerwater and marine structures near the coast (oil terminals)



Some of main challenges in maritime industry

Harsh environment and working conditions as well as domestic and international regulations in the maritime industry have always created big challenges for vessel builders and maritime equipment. In this regard, various solutions have used to overcome these challenges. Using different compounds for coping with sediment of marine compounds on vessel's hull, coping with corrosion on equipment, reducing the sulphur content of fuel and installing ballast water treatment systems on board ship are among these solutions. However, over time, the necessity of using compounds with less cost and higher efficiency for increasing competitiveness of products have attracted industries' attention.

The surface of vessel in maritime environment can be highly exposed to salt water, sunlight, abrasion, rain and wind, heat shocks, living sea creatures and other unpredicted factors. Every sector of vessel surface can be exposed to a specific condition. For this reason, for each sector, a particular technology must be selected which can meet the needs.

For instance, the sediment of marine compounds on vessel's hull will result in reducing the maneuverability and speed, increasing fuel consumption and decreasing general efficiency. This can also cause an increase in drag force and acoustic emission of surface and underwater vessels, and finally the costs will go up.

What is nano technology?

Nanotechnology as one of the key technologies for the 21st century has attracted much attention from many countries and big companies. Thanks to the effects of this technology on many technologies and existing products, experts believe that majors without using nanotechnology will not find an opportunity for growth in the next decades. In other words, technologies will not be thrived without utilizing nanotechnology. Nanotechnology is a new approach to all sciences and techniques and has extensive commercial applications in maritime industry. Therefore, recognizing the extensive needs of maritime industry can make a big contribution to developing nano product market.



The applications of nanotechnologies in the maritime industry

Nanotechnology is of great importance for all areas in maritime industries, some potential applications of this technology in maritime industry are as follows;

Utilizing nano materials and equipment in reducing sulphur in fuel

*Using nano technology-based systems in management of ships' Ballast Water

*Using corrosion-resistant and anti-biofouling nano coating

*Using anti-slip, UV and chemical resistant floor covering

Improving mechanical propertise of ship's engines parts, cutting tools and mold by hard nano coating

*Production of nano materials and nano composite for building hull and its components in order to increase strength and to reduce hull noise and vibration

*Production of new materials for enhancing ship's performance like new fuels, batteries with very high energy storage and fuel cells

* Using nano- based technology textiles for active personnel in maritime industry

*Using nonthermal plasma technology in order to Hydrophobe levels and increase color adhesion to hull

*Using nano material and smart glasses

* Using nano technology-based Water treatment

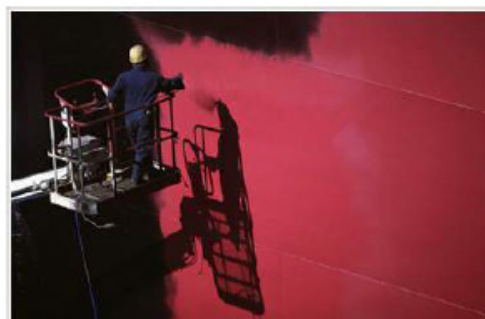
Biofouling



Fuel savings



Chemical resistance



Corrosion



Some of the applications of nanotechnology-based products in maritime industry

Reducing the sulphur content of ships' fuel oils

In October 2016, International Maritime Organization (IMO) announced that a new 0.5% global sulphur cap on fuel content will be enforced from 1 January 2020. The Marine Environment Protection Committee (MEPC) has addressed this issue since 2008. This matter indicates that shipping industry should be committed to its environmental commitments.

The nanotechnology researches with regard to fuel will last more than 15 years, this technology will make a big contribution to produce mineral fuels from petroleum mixtures. The process is very profitable, inexpensive and extremely efficient. One of the available solutions is using Nanocavitation and absorbent nanomaterial for reducing the sulphur content of ships.

Promising news is that process equipment for installation and producing nanofuel is cost effective process. Industrial unit of producing nanofuel can be launched in seacoast or in side a ship.

Using nanotechnologies solution for removal sulphur from fuel is considerably smarter than using purifier and it also has the potential for cost saving in investment and operational costs.

Using nanotechnology-based system for the control and management of ships' Ballast Water

Ballast water is kept in tanks and aims to improve the stability, propulsion and manoeuvrability of a vessel. When a vessel is empty or does not carry cargoes with appropriate weight or when sea condition is unfavorable, Ballast water can keep the vessel stable.

Ballast water is one of the main ways for transferring marine

pesky critters. These marine species will be transferred through different mechanisms. In recent years, following trade globalization, increasing travel speed, the high number of cargo ships and a growth in tourism industry, the possibility of accidental entrance of exotic species has increasingly grown. Transferring harmful and dangerous species and disease factors through ships' ballast water is regarded as the biggest threats to the marine environment and human healthy.

Therefore, according to a guideline, IMO has required all ships to install ballast water management systems (BWMS). In this guideline, different ways for equipping vessels with ballast water management systems have been introduced. From Nanotechnology-based systems, systems like electrochlorination and Nanocavitation have been mentioned.

Using biofouling resistant and corrosion resistant nanopaints

The hull of a vessel plays a key role in its efficiency. The improvement of quality and the smoothness of the vessel's surface make a big contribution to fuel consumption. A vessels' surface which is completely smooth, is ideal in terms of Hydrodynamic.

The sediment of biofouling on hull surface of ships or boats can cause some problems;

- * An increase in frictional resistance, due to an increase in surface roughness and the ship weight which would reduce the speed. To compensate lower speed, fuel consumption will be increased. An increase in fuel consumption will be resulted in an increase in emissions of harmful compounds.
 - * An increase in number of operations of ship repairs
 - * Damage to hull coating which increase corrosion
- Since Ship surface is exposed to different factors, using corrosion resistance protective coatings is necessary.





Hull, paints and coatings which are used in vessels and equipment should be resistant to pH of seawater, salts, corrosion and algal growth.



One of the usual ways for hull cleaning is taking the ship to dry dock and sandblasting which is associated with high cost and work stoppage. This matter not only damage to the hull, but it also will cause increasing ship resistance due to an increase in surface roughness.

Nanotechnology provides new paints which are extremely resistant to corrosion and environmental effects. Considering the life span of ships and durability of these paints on ship hull for more than 20 years, we can claim that these are everlasting paints.

It is worth noting that using nanotechnology in painting industry will prevent and stop algae sticking to ships' hulls. As a result, the ships' age will be increased.

Thanks to resistance, density and high adhesiveness, nanocoatings have found a special position in big industries. Nanocoating in maritime industries is an advanced solution for increasing reliability and lifespan of mechanical parts. Moreover, in comparison with other coatings, nanocoating will create less environmental problems and as a result, the efficiency will be increased. In the maritime industry, nanocoatings are used to protect marine structures and ship hull surfaces in a harsh condition. Considering the ever increasingly needs for high-temperature-resistant, corrosion-resistant and cavitation resistant coatings, the demand for using high performance coating has increased.



Nanotechnology provides new paints which are extremely resistant to corrosion and environment effects. Considering the life span of ships and durability of these paints on ship's hull for more than 20 years, we can claim these types of paints could be considered as "everlasting paints".

Producing nanomaterial and nanocomposite for building hull

Nanocomposite is divided into three categories including polymeric, metallic and ceramic. The main characteristics of composites are high rigidity, high resistance to corrosion and absorber of radar waves. This technology is used for building vessels and submarines.

Some of the nanomaterials which have some applications in maritime industry are as follow;

- Carbon nanotube
- Florennes
- Dendrimers



Nowadays, vibration absorbers are heavy and large materials . By offering new vibration absorbers, nanotechnology will create tremendous evolution. These materials have many applications in passenger ships, military vessels and submarines.

REDUCTION OF SULPHUR OXIDE DERIVATIVES IN COMBUSTION GAS

Ali Pourmand
Chief Engineer, Master of Ship Structural Engineering

In recent years, the shipping industry; being under the pressures of the poor condition of the global economy, the high costs of repairs and the operations of the fleet which has made the competitive condition of the market very difficult; has also faced the serious challenge of installing ballast water purification system and rapid changes in the direction of the Global Sulphur Cap 2020, to reduce the amount of sulphur in ship fuel oils. The necessity of enforcing the above mentioned regulation in 2020 and its results will leave many ship owners expose to bankruptcy. Currently, the use of low sulphur fuels, the use of natural gas, or the installation of Exhaust Gas Cleaning Systems (such as scrubbers) are considered as available solutions to reduce sulphur derivatives (SO_x) in the exhaust emissions.





The catalyst fines in the fuel at the desulphurization stage in refineries can increase the rate corrosion and abrasion wear on engine parts such as piston rings, injector nozzles, plunger in fuel pumps and cylinder liner.

The use of natural gas as an alternative fuel, in addition to the cost of changing available equipment, the installation, operation and reduction of carrying capacity of vessel, is facing a limited number of natural gas storage stations worldwide. But, according to the studies, if the price of heavy fuel oil is increased by 40% or more, compared to the current price; or its initial installation costs decrease to less than 10% of the price of the ship, then the use of the natural gas as an alternative fuel, will be the best option. On the other hand, if the price of the heavy fuel oil is considered as the benchmark for choosing the best solution, it seems that the installation of the scrubber system has its own benefits from the economical point of view. But, important factors, such as high installation costs, legal limitations for discharging water outlet from the open circuit of this system, increasing the cost of neutralizing and purifying the waste water of the scrubbing system, and the costs regarding the collection and transferring of the resulting waste, have raised doubts about choosing this option. As mentioned earlier, although the installation of a scrubbing system or the use of natural gas as an alternative fuel is economically feasible in some

cases, however, among the received reports of the ships used these two methods, there were limited number of reports indicating the proper functioning and the satisfaction of the ship owners. As a result, the use of low sulphur fuel oil, considered the best option to comply with the global regulations to limit the amount of sulphur, due to its short return on capital. Significant differences in the advantages of low sulfur fuel oil (including light and heavy fuels) regarding heavy fuel oil with sulphur content of more than 0.5%; big differences in viscosity, density, pour and flash point, caused severe technical problems in using low sulphur fuel oil in the ship machinery. Due to the importance of side-effects of low sulphur fuel oil on machinery, careful consideration should be given to the use low sulphur fuel oils. Before making any decisions about the use of low sulphur fuel oil as the main alternative fuel, the conditions and characteristics of the ship and its machinery should be carefully considered. This issue is of critical importance especially for using Low Sulphur Marine Gas Oil (LSMGO) which at low temperatures has strong tendency towards wax formation. The wax formation in fuel oils causes

problems in fuel purification and transfer systems, which is an important factor in inadequate combustion and engine damage and seizure. Therefore, necessary measures should be taken to control the temperature of the fuel storage tank. The density of low sulphur fuel oil is about 10 to 15 percent less than the density of heavy fuel oil with high sulphur content. Thus, it is necessary to consider the effect of this reduction in density on the ship balance. In the case of using low sulphur fuel oil, the fuel system does not need to be heated because of its Low Sulphur Marine Gas Oil (LSMGO), but due to the poor lubrication in these types of fuels, the possibility of engine seizure and damage of fuel pumps exists. As a result, in order to prevent the occurrence of these damages, additional equipment such as fuel coolers and chillers should be used to ensure that the minimum fuel viscosity is provided at the fuel injection point of the engine (fuel pumps) which is equal to 2 cSt at 40 ° C. Furthermore, the efficiency and performance of the fuel pumps, known as gears pump in viscosity of less than 5 cSt are reduced; which should either be replaced by additional cooling equipment or a gear pump be changed with screw pump.

In present ships, whose initial design is based on heavy fuel oil, steam is required. Then, there is a growing need of a boiler capacity for heating fuel consumption and the system for controlling and making use of a steam condenser according to the amount of the production and consumption of steam. Therefore, as mentioned before, the fuel system on vessels in which the main fuel source is LSMGO does not need to fuel heating equipment. So, there is no need of steam consumption to heat fuel in all storing, depositing and consuming bunkers. As a result, the ship's demand for steam production will be sharply reduced. Additionally, after altering the fuel to a low-sulphur fuel oil, complying with the above mentioned regulation, the ship will be faced the production of more than required amount of steam; then certain consideration should be taken to reduce the steam production or increase the capacity of the heat exchanger system controlling and condensing the surplus steam. One of the probable problems in boiler burners and incinerators in which the using fuel supplied with the use of steam in the form of atomization; is a possibility of evaporation and vaporization of the combustion chamber

resulting incomplete combustion. If the initial design of these types of burners provided for heavy fuel oil, then the use of low-sulphur fuel oil will produce too much soot. As a result, the ability of common flame sensors in a fire detection system (FDS), which is a type of cadmium sulfide cell, decreases in detecting flames of combustion of low-sulphur fuel oil. Similarly, flame sensors in the burner nozzle will also face the same problem that the ratio of air to fuel in the burner must be reset based on the burner manufacturer's guideline and or corrective actions on the burner should be applied.

The catalyst fines in the fuel at the desulphurization stage in refineries can increase the rate corrosion and abrasion wear on engine parts such as piston rings, injector nozzles, plunger in fuel pumps and cylinder liner. In some cases, for the separation of catalytic fines in the fuel, two fuel purification

units are applied in parallel process and fuel filters of 10 microns may be used to control and reduce the amount of catalytic fines of the fuel of less than 15 mg per kilo (15 mg / kg).

The sulphur in the fuel oil with the production of sulfuric acid causes corrosion of the cylinder liner (liners) and other engine parts. To control this situation, in addition to preventive measures, it is necessary to neutralize the acid produced by the oil in the system. If the Total Base Number of the oil (TBN) is lower than the required amount, corrosion wear will be occurred, because of the inability to neutralize the acid. However, if the Total Base Number of the oil (TBN) is greater than the required amount, then the alkaline additives in the oil (mainly CaCo₃) are created hard salt in different parts of the engine such as piston rings and the upper part of the piston. CaCo₃

made in the form of hard salt near the piston rings will cause abrasion and polishing of the cylinder surface, and, as a result, create the erosion and scuffing on the surfaces. The use of piston rings cleaner to dispose and purge the accumulated salt at the top of the piston is a good solution. Therefore, low sulphur fuel oils will increase the rate of chemical and mechanical corrosion in the components and engine surface, because of its poor lubrication, and hard salt formation corresponding Total Base Number (TBN). So, at the time of using low sulphur fuel oil, especially light low-sulphur fuel oil, corrective and controlling measures should be taken in cooperation with the manufacturer of the machinery. Accurate determination of Total Base Number (TBN) of the oil cylinder, resetting the amount of oil injected into the cylinder, adjusting the temperature of the engine surface cooling

water, analyzing, and regular and permanent oil testing in order to determine the amount of Total Base Number (TBN), and specifying of the quantity and type of metals in the oil, as well as regular field inspection of the different components, should take into consideration. As a result, the ship owners should consider different factors, such as the type and age of the ships, commuting area, the initial investment amount and the repairs costs, as well as the changing prices of the fuel oil and the accessibility to the appropriate fuel, to find the optimal solution to comply with the regulation.

References:

- KR classification society technical information, 2019.
- DNV GL Global sulphur cap 2020, www.dnvgl.com.



AUTONOMOUS SHIPPING; MORE EFFICIENT USE OF FUEL

Autonomous shipping enjoys the potential to notably reduce shipping costs, solve anticipated crew shortages, increase safety, improve working conditions and provide better integration into the transport system. Developments in autonomous shipping, such as those that allow ships to deal with weather and currents more efficiently, can lead to fuel savings and fewer emissions, says Päivi Haikkola, the leader of the One Sea – Autonomous Maritime Ecosystem.

In order to discuss more on this issue, Marine Innovation magazine has conducted an exclusive interview with Päivi Haikkola.



Päivi Haikkola, the leader of the One Sea –Autonomous Maritime Ecosystem

It has been argued that autonomous ships operate in an ecosystem, where decision-making is based on big data, smart algorithms, artificial intelligence and ultimate optimization, would you please explain about it?

Many of the solutions relating to autonomous and remote-controlled maritime traffic rely on the abovementioned technologies. These technologies are useful also for traditional ships. For example, situational awareness solutions can easily be used in traditional ships for object detection and classification at sea. Situational awareness systems use many different sensor types (radar, lidar, infrared, camera etc.) and combine this data through sensor fusion, thus giving the seafarers a much better view of what they are seeing out at sea. The system has then been taught to recognize what they encounter to give possible warnings to the humans. Vessel performance and condition can be monitored, planned and enhanced using Big Data and machine learning. Machine Learning can also be used for fleet control and optimization.

What are the main advantages of autonomous shipping for the industry? How does it make a big contribution to decarbonization?

The best way to reduce the carbon emissions on the current



ships is to use less fuel. One of the main advantages of using these new autonomy related technologies on board is a decrease in fuel consumption. When the computer algorithms calculate routes, taking into account additional data, such as real time weather data, the ship can travel at optimum speeds on any given route, thus saving fuel, which benefits the environment as well as saves money for the ones paying the fuel bill. For shorter routes, propulsion solutions such as electrical propulsion can reduce the carbon emissions, as long as the electricity is made carbon free. Electric propulsion is very advantageous for autonomy related solutions, as it is much easier to autonomize than conventional diesel engines. These technologies can also increase the safety of the seafarers, as in the example of the situational awareness system. The safety benefits are the reason why these technologies are also interesting to passenger vessels, who will certainly not reduce their crew.

The technologies are expected to decrease the amount of accidents caused by human fatigue and other human factors. Benefits increase when the whole maritime transport system is connected and optimized. Maritime transport system comprises also of ports and connections to other transport modes.

Do you think that we will witness a new area in ship design in the near future?

I believe we will not necessarily need a new area in ship design, but the current ship designers and seafarers need to learn to better communicate with programmers and automation designers. Automation and IT will, however, become more important in the future on all newbuilds, and at least a rudimentary understanding of those subjects will be necessary for ship designers. Better communication through all the ship design disciplines will benefit conventional as well as new smart ships.

ALL HANDS ON DECK



■ Magda Kopczynska, the director for Waterborne Transport in Directorate-General for Mobility and Transport within the European Commission

Efficient marine transport with minimal health and ecological damage is a general definition for green shipping. The European Commission has adopted a series of measures to support green shipping. Marine Innovation magazine has managed to carry out an exclusive interview with Magda Kopczynska, the director for Waterborne Transport in Directorate-General for Mobility and Transport within the European Commission.



What do you think about the role of green shipping in energy efficiency and decarbonizing? And how about hybrid and electric solutions?

Maritime transport is widely recognized as the most environmentally sustainable and energy efficient way of moving large quantities of cargo. However, increased pressure on environmental resources has already required corrective actions to contribute to the “greening” of shipping.

The need for cleaner shipping has thus come into focus in relation to climate change (namely greenhouse gas (GHG) emissions) and air quality, determined by air pollutants that are particularly harmful at regional level and notably close to coastal areas and port cities (for example sulphur, particulate matter and nitrogen-oxides). This is also true for other types of ship-source pollution such as waste, marine litter etc. Meeting the objectives of the Paris Agreement to limit the temperature rise implies a contribution from all sectors of the economy, including transport and notably shipping. For a sector as global as shipping, it is important to pursue these efforts at the international

level and the adoption by the IMO of its initial strategy for the reduction of GHG emissions is a key step of the sector’s contribution towards this objective.

However, the strategy now needs to rapidly materialize and deliver tangible emissions reductions. Achieving the long-term climate goals will require simultaneous efforts to enhance the energy efficiency of the current fleet (through technical and operational measures), ensure that the new fleet meets higher environmental standards and stimulate the development and uptake of carbon neutral technologies, alternative fuels and propulsion, including hybrid or electric propulsion where appropriate.

In your opinion, what measures should be taken to achieve a green shipping?

Given the international nature of maritime transport, it is important that solutions are as much as possible taken at the international level to allow their global application. Following the last meeting of the Marine Environment Protection Committee, the International Maritime Organization (IMO) has

identified three work streams for further development in the short-term, namely improving energy efficiency, reducing methane slip and emissions of Volatile Organic Compounds, and encouraging the uptake of alternative low-carbon or zero-carbon fuels. The European Commission has also already adopted a series of measures to support green shipping. these include the development and adoption of regulatory instruments to transpose the relevant international standards (e.g. the European Sulphur Directive) or establishment of EU specific framework (e.g. on the deployment of alternative fuels infrastructure). In addition, the first dataset collected under the EU regulation on the monitoring, reporting and verification of CO₂ emissions from maritime transport will be soon published, followed by the Commission’s report towards the end of this year. Our policy is accompanied by appropriate enforcement and consultations with all parties affected, including through dedicated expert groups such as the European Sustainable Shipping Forum (ESSF). Our aim is also to back policy with adequate funding. In the current financing period



The European Commission has also already adopted a series of measures to support green shipping.

of the EU (2014-2020), the maritime portfolio of Connecting Europe Facility (CEF) amounted to €1bn in 2016, the Green Shipping Guarantee programme was established with the European Investment Bank to support fleet renewal and the retrofitting of ships with sustainable technologies (such as LNG, ballast water, energy efficiency, etc.). With a capacity of €750m of guarantees, it is expected to generate €3bn of investments in the sector. In addition, roughly €50m have been made available annually for research and innovation in the waterborne sector as part of Horizon 2020.

What changes do you think that should be made to ship structural design?

It seems clear that “green shipping” can relate to a variety of situations and that today, we do not necessarily have a ‘one size fits all’ answer. A lot of the potential solutions (and their

effectiveness), will depend on the ship type, the typical trade lines and operations, the market conditions, etc. For example, while current technology of hybrid or electric marine operations may not be suitable for covering long distances in deep-sea shipping, it may be an attractive solution for short sea shipping operations, such as ferries etc.

In the same vein, while slow steaming is a very attractive option to reduce fuel consumption and hence ship emissions, its optimal application may depend on the type of trade a particular ship is engaged in, its time-sensitivity, operating conditions and numerous other factors.

In reality, we expect that greening maritime transport will imply the implementation of a range of measures, ranging from technical measures to operational ones.

More specifically and in aiming for early action

at international level, we are looking into further improvement of the existing IMO energy efficiency framework, namely Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Management Plan (SEEMP) regulations.

How do you see the outlook of green shipping?

I would say that the outlook for green shipping is very positive. Greening the fleet is not an option; as all the other industrial sectors, maritime transport needs to make its contribution to the meeting of the GHG objectives, the reduction of air pollution, waste, its contribution to the circular economy etc. This task should not be underestimated. Achieving the long-term climate goals will require significant efforts in the development and uptake of innovative technologies and low-carbon and zero-carbon fuels, as well as the adoption of more sustainable operational

models and consumption patterns. In order to be successful, this also requires all actors of the maritime cluster (operators, ports, charterers, technology providers, etc.) to share a common understanding and ambition.

However, the call for a cleaner and more sustainable shipping sector should not be seen as a threat but rather as an opportunity. The deployment of new technologies also means that the shipping sector does not become only cleaner but also smarter. At the European level, the Commission hopes to accompany and facilitate this transition. The experience which we have gained in Europe in the past 5 years on the question of LNG has shown us that managing a smooth transition is possible and that the long term efforts are fruitful.

But, once again, the key here is the cooperation of all actors, so today’s message should really be: “all hands on deck”!



GREEN SHIPS / ECHO SHIPS

Mohammadreza Ghalambor
Senior expert for new building projects



The world's shipbuilding and shipping industry is working to develop environmentally friendly shipbuilding technologies with the cooperation of various related organizations. Many marine industry experts believe that the trend towards the construction of green shipping and eco-friendly vessels has come more attractive after the crisis in the shipping and shipbuilding industries in 2008. Aside from the recession in the shipping market, related global environmental regulations are strengthening. The environmental regulations of the International Maritime Organization (IMO) are gradually expanding. Currently, eco-friendly vessels are green vessels that meet the IMO conventions. These vessels contribute to improving the present environmental condition in one way or another. In other words, a green ship means using new technologies such as advanced hull and propeller systems, exhaust gas scrubber systems, waste recovery system, exhaust gas recirculation system etc. apart from this, use of right grade of fuel for a particular engine also reduces carbon emission and fuel consumption. Since marine industries are the largest sources of greenhouse gas emissions in marine environments, many shipyards around the world have started inculcating special methods and equipment in their ships,

which not only helps to minimize the CO₂ emission but also increases the ships efficiency.

Throughout the last century, the maritime industry has displayed a laudable ability to introduce clean technology and embrace green policies. The industry has become a leader in green technology, which justifies why it is the most carbon-efficient means of moving products in a global economy. In the age of climate change and the Paris Agreement, marine industry players raise the bar of innovation even higher, by implementing regional and international regulations on ship energy efficiency, such as the EU MRV Regulation, the Energy Efficiency Design Index, the Ship Energy Efficiency Management Plan and the emerging global MRV instrument of the IMO. In addition, fuel accounts for 25%-50% of total costs in shipping, the single largest cost to the sector. There are, therefore, clear regulatory and economic incentives to improve energy efficiency in shipping and invest in green technologies.

Green Ship requirements

The main objective of the green ships is to reduce greenhouse gas emissions, with a proposed reduction of 30% for carbon dioxide and 90% for nitrogen and sulfur derivatives (NO_x and SO_x). Many individual projects have come close these targets by achieving individual reductions of up to 25 % for CO₂, up to 98 % for SO_x and up to 80% for NO_x.

In some cases, these green ship technologies have already become standard products, especially with respect to machinery equipment and

onboard systems.



There are several new technologies which if used together would result in the ultimate green ship of the future. They are as follows:

- **Engine improvements**

Many green ship projects focus on optimizing the engine efficiency by constantly adjusting to factors like engine load and operating conditions in order to reduce emissions.

Auto-tuned engines and optimized low speed marine engines replace infrequent, manual adjustments with ongoing electronic ones. They potentially reduce fuel consumption by up to 3%. This kind of innovation in GSP has also adapted Selective Catalytic Reduction (SCR) systems to marine engines. The SCR prototypes achieved an 80 % reduction of NO_x emissions over the same engine without SCR.

- **LNG fuel for main and auxiliary engines**

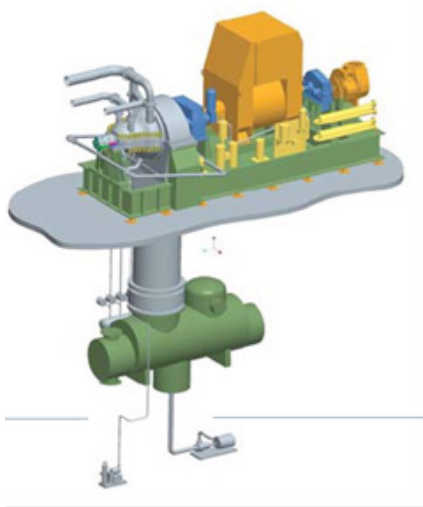
It is said that LNG fuel is the future of the shipping industry. LNG fuel helps in reduction of air pollution from ships, and a combination of LNG fuel with diesel oil will lead to efficient engine performance, resulting in fuel saving.

No Ballast System

Ballast water convention by IMO focuses on reducing the transit of sediments and micro organisms of one territory to another through the ballast of ships. in order to prevent this condition, plans of making a “No Ballast Ships” is under progress.

Waste Heat recovery

This system is already in use for quite some time now, but making it more efficient can reduce the fuel consumption of the ship drastically up to 14% of the total consumption. the waste heat from the exhaust gases can be utilized to heat and generate steam which in turn can be used for heating cargo area, accommodation, fuel oil etc.



Exhaust Gas Cleaning Systems (EGCS)

The international Marine Organization (IMO) is imposing increasingly stringent emissions regulations to meet its environmental commitments. the next round of IMO sulphur reductions will come into effect on January 1, 2020, when the global sulphur cap will be lowered from 3.5 to 0.5%. the implications of this move will be felt widely. ship owners have three key options to meet the new requirements:

- Install exhaust gas cleaning systems/ Scrubbers
 - Switch to low sulphur fuels
 - Switch to dual fuel engines or liquid natural gas (LNG) vessels
- EGCS, or scrubbers are a cost effective way to meet SOx emission requirements. As salt water is used to clean the exhaust gases, a corrosive environment is created which requires the application of nickle alloy materials.

Improved Pump and Cooling Water System

An optimized cooling water system of pipes, coolers and pumps can result in decreased resistance to the flow. this will lead to savings of up to 20% of electric power of the ship and fuel consumption up to 1.5%.

Exhaust Gas Recirculation (EGR)

A way to reduce the nitrogen oxide emissions of a diesel engine is the use of exhaust gas recirculation, EGR. here, a part of the exhaust gases is rerouted into the combustion chamber. this leads to a lower peak combustion temperature which in turn reduces the formation of NOx.

Sail and Kite Propulsion System

Sail and Kite propulsion system when is used along with the conventional propulsion system can reduce the fuel as well as NOx, SOx and CO2 emissions by 35%.

Fuel and Solar Cell Propulsion

The fuel cell propulsion utilizes power from a combination of fuel cells, solar cells and battery systems. this helps in reduction of GHG emission to a great extent.

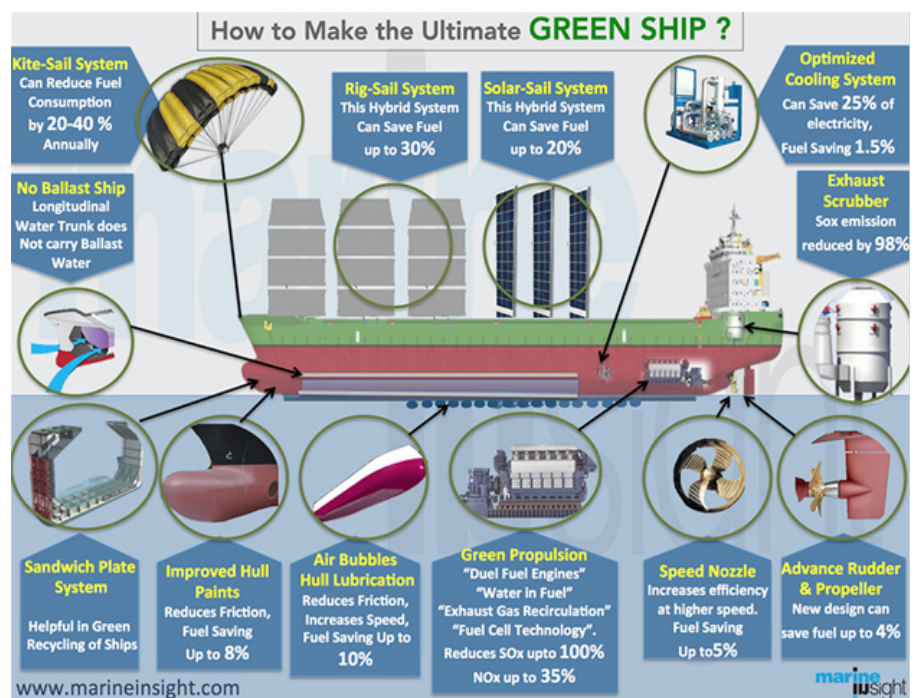
Sandwich Plate System (SPS)

It is a process of composting two metals plates by bonding it with polyurethane elastomer core. this avoids usage of steel which requires additional stiffening hence makes the structure light weight and less prone to corrosion. this technology can definitely play a good role in green ship recycling process as SPS feature includes superior in service performance and reduced corrosion through life maintenance.

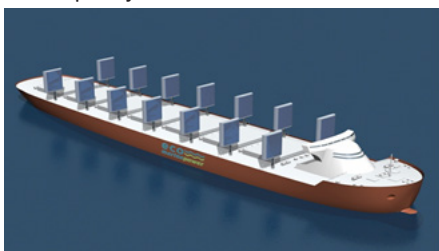
Echo Ships:

The main objective of ECO ships is to minimize fossil fuel consumption and optimize the use of renewable energies such as the solar and wind. In other words the Eco-ships are the low emission green ships concept design with rigid sails and solar power.

Initiatives by IMO and other worldwide agencies on enhancing environmental regulations have spurred interest in new technologies and new products. In Japan, work on new technology development has proceeded apace, and major companies have already placed orders for dual-fuel engines and emissions treatment systems. further, as interest in energy conservation remains high, Japan’s shipyards have garnered a number of orders for eco-ships, a testament to the high levels of technology and quality offered by Japanese shipyards.



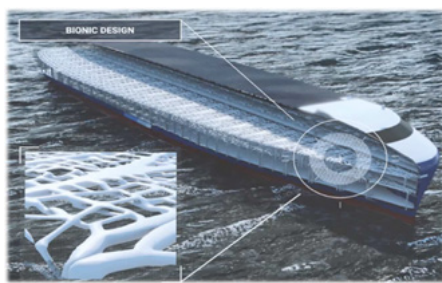
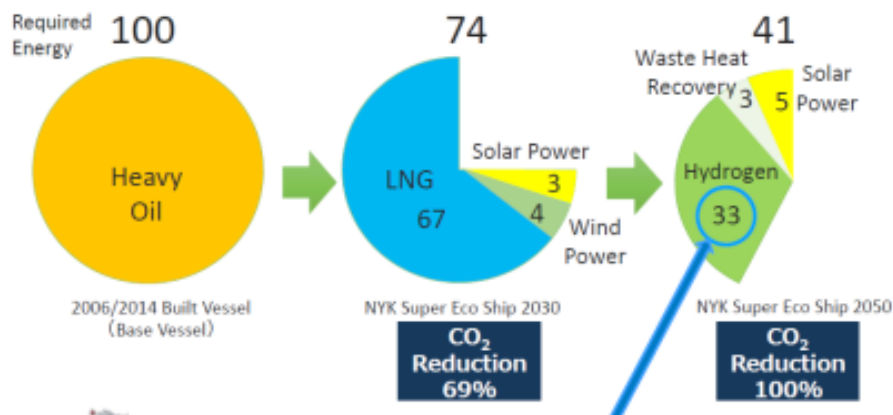
The concept is part of company's Staying Ahead 2022 with digitalization and green management plan and incorporated the latest green and digital technologies. The design fits well the industry decarbonization efforts aimed at halving greenhouse gas emissions by 2050. More recently, a project was started in 2010 in Fukuoka, Japan, aimed at bringing rigid sails back onto ships. Initially this project involved only the technology start-up company Eco Marine Power (EMP), and its main focus was on developing a new type of rigid sail. This new type of patented rigid sail has become known as the sail energy, and the system that combines these with solar power is designated as Aquarius Marine Renewable Energy (MRE). These technologies led to a project to design a ship using both sail and solar power, now known as the Aquarius Eco Ship Project.



The Aquarius Eco Ship is a low emission & wind assisted or sail assisted propulsion solution which has been designed to be highly flexible and configurable so that the concept can be applied to most ship sizes and types.

Applications for the system include bulkers, oil tankers, general cargo ships, survey ships, passenger ferries, cruise ships, ro-ro ships, car carriers & even unmanned surface vessels.

In addition to Aquarius MRE, a future Aquarius Eco Ship would be fitted with other fuel saving measures such as an advanced electrical propulsion system, low power LED lighting, air lubrication, an optimized hull design and waste heat recovery technologies. Fuel cell technology could also be incorporated into the design. This combination of technologies could



lead to fuel savings of 40% or more and also dramatically reduce the emission of noxious gases such as Sulphur Oxides (SOx), Nitrogen Oxides (NOx) and particulate matter (PM). In addition the use of renewable energy and energy saving measures would reduce the vessels carbon (CO2) footprint.

NYK is one of the leading companies in the field of green and environmentally friendly ships in Japan. NYK Group has given the maritime world a taste of things to come as it unveils a new concept of an emission-free ship dubbed the NYK Super Eco Ship 2050.

Overview of NYK super echo ship 2050: 67% reduction in energy derived from fossil fuels.

They believe that the power needed to operate the ship has been cut by 70 percent by remodeling the hull to decrease water friction, reducing the weight of the hull, introducing fuel cells for electric propulsion, and relying on other highly efficient propulsion devices. Instead of fossil fuels, the ship would be powered by LNG, solar energy and hydrogen produced from renewable energy sources, all of which would lead to a reduction of CO2 by 100 percent and thus result in a zero-emission vessel.

•Lightweight Hull

Recently, the use of lightweight materials has become popular in the ship's construction. The weight of the hull is reduced through a dynamic, mathematical design combined with topology optimization.

•Flapping Foils:

Using the flapping foils instead of conventional propeller to deliver greater efficiency than screw-type propellers.

•Hydrogen Fuel Battery

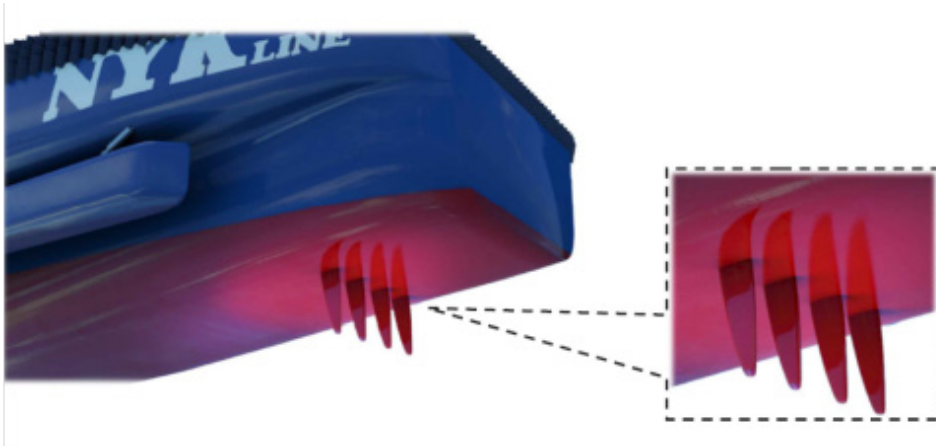
Fuel cell is a sustainable, emerging technology with negligible pollution. The hydrogen is produced by renewable energy sources.

•Solar Power

The storage of liquefied hydrogen on board the vessel will be expensive and require significant space, so fully utilizing power produced on board is essential.

- Energy conversion efficiency: 45%
- About 9,000 square meters of solar panels
- Covers 15% of total energy demand

•Air-lubrication System



Air bubbles are delivered to the vessel bottom to reduce frictional resistance between the vessel hull and seawater.



The trend towards embracing more environmentally friendly technologies and practices is now firmly on the agenda. Terms like eco ships and green shipping are probably over-use. But at least when you mention alternative power and propulsion options these days you're not considered part of some fringe group. The challenge now is to deal with environmental issues based on facts and science. Because over the longer term, we don't believe it will benefit the industry or the environment, for technologies to be implemented despite the legitimate concerns of ship owners and shipping companies, simply because of eco-politics. If that happens, then there is a risk that investment will flow towards solutions and technologies that are not effective, while other promising solutions and technologies might be ignored.

One way to avoid this situation could be for shipping companies to take a more active role in the new product development process. This could include becoming joint owners of intellectual property or investing directly in start-up ventures. There are tentative steps being taken in that direction and some companies like NYK Line in Japan, have actively been driving research for many

years. But there is plenty of scope for greater collaboration between technology developers and shipping companies. It would also be a good way to tap into the skills of those working at sea and involve them more actively in R&D projects.

To finish with an optimistic note, we believe that with some further infusion of new ideas and technologies, there will be every reason to think the future for shipping will be bright. We just need to be smart about how we get there. Although technology will be driving us forward – let's not forget about the human element.

References:

- Taehee Lee, Hyunjeong Nam, 2017, A Study on Green Shipping in Major Countries, The Asian Journal of Shipping and Logistics
- Anne Katrine Bjerregaard ,GSF Group, Green ships of the future, Published by Danish Maritime, www.danishmaritime.org
- NYK group Nov. 15 2018, super Echo ship, World Maritime News
- KIM, S. (2015) "Korea's shipbuilding industry goes into eco-friendly ship research". Available at: <http://www.greenplatform.re.kr>
- Raunek, 2019 ,Green Ship Design for Ship Building, Bright Hub Engineering
- Naval Architecture & Ship Design for Marine Engineers / By Raunek / Marine Engineering
- Infographic from MarinInsight.com





VALFAJR SHIPPING COMPANY

Pioneer at passenger movement, freight transport and related services to the offshore industry in the Persian Gulf and Oman Sea

- **Passenger services by sea and freight transport to inland island and states in Persian Gulf and Oman sea area**
- **Transportation of perishable cargo such as food, fruit and vegetables with trailers and refrigerated containers**
- **Providing combined transport and transit services as complementary services to customers**
- **Ship management of feeder vessels**
- **Providing of various off shore services to oil rigs, platforms and terminal and other related projects at Persian Gulf area by use of AHTS DP1/DP2 and ASD tug boats**



www.valfajr.ir
info@valfajr.ir



WE ARE GETTING CLOSE TO ZERO-EMISSION SHIPS

The shipping industry is increasingly convinced that wind power is a renewable energy source and it potentially offering double-digit fuel savings. Marine Innovation magazine has spoken to Gavin Allwright, the Secretary of the International Windship Association (IWSA). It is a not-for-profit association with the primary objective to facilitate and promote the uptake of wind propulsion solutions in commercial shipping.



Gavin Allwright, the Secretary of the International Windship Association (IWSA)

What are the benefits and limitations of wind propulsion system in modern commercial shipping?

The percentage saving that you can get from vessels depends on the type of vessel, operational profile and etc. There are two groupings of wind propulsion systems, the first one is wind-assist system, which can be either retrofitted onto an existing ship, and which assists the primary fossil fuel propulsion system. This type of system can save between 5-20 percent of fuel and potentially up to 30 percent.

For primary wind vessels, vessels are designed to use wind as the main propulsion system, along with auxiliary engines that are used when weather conditions are less favorable. These type of wind vessels can bring very high percentage savings, we usually say 30 percent and above, in comparison with a motorship of the same size and operation, however there are design that can deliver fifty, sixty, seventy, even up to eighty percent savings from the wind propulsion component.

For instance, do you know Chantiers de l'Atlantique? It is

very large cruise vessel building company based in France, it has designed cruise vessel for 400 passengers, she can be operated at 17 knots, just by using wind and can save 60 to 70 percent in fuel. So, it is very substantial amount.

As mentioned, these savings are when you compare ship with no wind against a ship with wind on exactly the same operational profile - at the same time, at the same speed, carrying the same cargoes.

A big advantage is a zero-emissions technology that is ready now and increasingly

available. With these wind propulsion systems you can future proof your investment. Another advantage of wind propulsion is helping with ship stability, depending on the system, we have many different systems which are possible for different ships. Because of weather routing, new materials and automation, almost all of systems we see for large vessels are fully computer-based control, linking in with energy management systems and optimized using big data. Actually, much of wind propulsion technology we are seeing emerging into the market has been either tried and tested on vessels in the past or has been under development for quite a long time and thus many of the technological issues have been solved. The big challenge is making them commercially viable. When we set up our association in 2014, the fuel prices were very high and the future uptake of the technology was looking set, however we then experienced the lengthy slump in fuel prices. However other drivers have kept the development of these solutions going from regional low sulphur fuel regulations and restrictions to the adoption of the worldwide 0.5% cap coming into force on 01 January 2020 to other policy drivers such as the initial GHG strategy at the international Maritime Organization (IMO), of at least 50% reduction in GHG's by 2050, based on a 2008 baseline. However, as with any technology, it is challenging to get finance, it takes time to test, verify savings and then bring solutions to market. For some rig systems, one of the challenges is the navigation issue, with clear line of site being required, thus for larger rigs this can pose a problem, however developments in

other segments of shipping are assisting, as cameras and sensors are recognized as acceptable methods in autonomous shipping, so they will be possible to use for wind vessels, where needed.

What do you think about the role of technologies such as blockchain in this regard?

As mentioned before, emerging technologies work together with wind propulsion systems helping to get the best out of the systems. Weather routing software helps to plan, operate and adjust levels of savings and speeds. Sophisticated databases and operational profiles enable the planning of optimal primary or wind-assist routes, real time satellite weather data can help adjust those routes and finally the onboard weather monitoring station allows for wind rig adjustments for localized wind conditions. There is also another aspect, with modern sensors and ship connectivity, the wind rigs themselves can be monitored from long-distance, operational changes can be recommended, faults can be diagnosed and dealt with by the technology experts who are supplying the equipment.

How can Nanotechnology contribute to development wind propulsion system?

Interestingly, the materials which are used for wind propulsion systems in the leisure, yachting and racing worlds, for example, have utilized modern techniques from carbon fibre, alloys etc. With the commercialization of those systems, we need to make the systems cheaper, more durable and robust, so there are many areas that the right application of new techniques and materials can assist. As the price of those systems fall and mass production is possible,



As mentioned before, emerging technologies work together with wind propulsion systems helping to get the best out of the systems.

there will be substantial market opportunities.

Could you please explain about wind propulsion system's role in decarbonizing shipping?

The technologies are ready for market or entering the pre-market stages, with increased sea trial. The industry increasingly is understanding that these can be incorporated into existing operating systems. As a whole, if you're aiming for a carbon neutral fleet of vessels then combining three elements—a third would be delivered through design and machinery optimization and operational adjustments, a third through a substantial, primary renewable wind propulsion system and the remaining third delivered from a secondary renewable alternative fuels such as electric batteries, hydrogen, ammonia, waste-energy biofuel etc. On a wind-assist vessel option without design and other optimisations, with wind propulsion systems delivering say 20% of the propulsive force, then the rest would need to be delivered by the alternative fuel. To run a blue ocean vessel on 100% alternative fuels is currently an expensive and technically challenging option, however with 20% less storage

or installed power required, that starts to make it more attractive and wind propulsion can be seen to help facilitate these alternative fuel options in both scenarios. With alternative fuel systems, we are getting close to zero-emission ships.

As the Secretary of the International Windship Association (IWSA), please explain about your activities, and what is your prediction about the future?

We are active in 5 different areas. First area is communication. One of the biggest issues is perception. This has shifted from 'what is the new innovation and why should we think about that' towards 'we understand this is an important option, but how do we get that onto our vessels. We spend a lot time on website, conference appearances, education programs, social media, explaining the various technologies and spreading the latest information. Our members and me as the secretary lecture hold seminars in maritime universities, including WMU in Malmo, we also assist with undergraduate and post graduate thesis and engage with students

whenever we can. We have a number of universities in our association either as project members, associates or registered supporters, these include University of Tokyo, TU Delft, UCL, University of South Pacific and so on. The second area of our activity is advocacy work. We send up-dated information to IMO delegates, EU departments and to policy makers at the UN and national levels. We engage with transport studies and projects and ongoing dialogues with NGO's active in the fields of maritime transport, logistics and GHG.

We are also active in the area of market transformation, so we engage with shipping companies, ship builders, engineering companies etc. we are in the process of developing wind propulsion clusters or hubs around the world, these clusters bring together all of the key stakeholders in the region and collectively develop projects, share best practice and collaborate on market development. Our first hub was launched just over a year ago, IWSA – Europe Atlantic, based in Nantes and we are currently laying the foundations for three more, IWSA – Europe North Sea & Baltic, IWSA – North America & IWSA – Oceania. Our fourth area of activity is in the technical field, while our members all work with their choice of classification society to certify their technologies, it is in the areas of general regulation, verification and codifying assessments of wind propulsion systems that the association interests are. We will be increasingly active in this field with a number of joint industry projects under development. Finally, we would like to work not only for helping members to access and secure finance for their projects, but also for the incubation of new technologies and the funding of research areas. Carbon



credits, government subsidies and other alternative sources of funding are of great interest, however we have only a small secretariat so this is an area that we are spending time identifying prospective partners and supporters to develop that further. Well, prediction is a very difficult game to play and any forecast is going to be wrong, so I usually let others make the predictions and we as an association and our members provide the toolbox to help construct that future. When it comes to wind propulsion market forecasts, I usually refer to the 2017 EU study on the 'Analysis of Market Potentials and Market Barriers for Wind Propulsion Technologies for Ships.' the study concluded that if we have wind propulsion systems coming into the market in 2020, then the market potential for (wind-assist solutions) bulk carriers, tankers and container vessels is estimated to add up to around 3,700-10,700 installed systems until 2030....' This prediction was made prior to any worldwide low sulphur fuel regulation being agreed and was made during a period where the shipping industry

resolutely stated that there would never be a numerical target placed on GHG emissions in the sector. Both of those things have come to pass, and while the industry is focused heavily on compliance with the impending sulphur regulations and non-compliant fuel ban, it is the GHG challenge that will define the industry in this century, so perhaps it is on the conservative side as predictions go. Maersk has thrown down the gauntlet with an undertaking to be carbon neutral by 2050, and they are currently testing wind-assist on one of their tankers. While the industry doesn't know yet the pathway to carbon neutrality, there is no more kicking the can down the road - we know most of the technology stepping stones that are required and many of those are becoming available and costs are falling. Harnessing the wind for ship propulsion has been done before, we understand it and now we have the automated, increasingly optimized rigs to do it again for the 21st century, and this is one solution that can get us a significant way down that decarbonization road.



we are in the process of developing wind propulsion clusters or hubs around the world, these clusters bring together all of the key stakeholders in the region and collectively develop projects, share best practice and collaborate on market development.

SSLIL established in 1967 and presently it is one of the companies in IRISL Group. The core activity of the company is terminal operation & logistics, as well as providing cargo support and container inland services. The company manages and operates a terminal network country-wide with direct interest in 4 operating ports and terminal facilities.

Some of the services rendered by SSLIL:

1. Loading and discharging all types of vessels including container vessels.
2. Warehousing of goods by providing suitable storage facilities in southern ports.
3. Providing logistic services according to customers' requirements.
4. Stripping and stuffing of containers.
5. Container Repair & Clean services according to respective standards (IICL).
6. Providing all necessary facilities at logistic sites for change of transportation mode.
7. Multimodal transportation by privately-owned freight wagons.



IRISL COMPLEX – NO 63 –TAJARLOO SQUARE - EAST TAJARLOO ST – LAVIZAN – TEHRAN – IRAN
P.O.Code : 1678695489
TEL : (+98)21-22941388 , (+98)21-22954851
FAX: (+98)21-72415717
Email: dir.office@sslil.net

APPROPRIATE TRAINING, EFFECTIVE IN IMPROVING SITUATION AWARENESS

Marine Innovation magazine has conducted an exclusive interview with Dr Kayvan Pazouki, lecturer and degree program director for MSc in marine engineering at Newcastle University.



Dr Kayvan Pazouki, lecturer and degree program director for MSc in marine engineering at Newcastle University

How will Artificial Intelligence and new technologies contribute to developing autonomous shipping?

Technological development is now apparent across shipping sector due to the rapid development of sensor technology, IT, automation and robotics. Ships now generate a large volume of data from different sources and in different format (Zaman, et al., 2017). Monitoring, recording and analysis of these data discovers correlations to determine hidden patterns and trends. This analysis will have a significant impact on vessel performance monitoring and provide performance prediction, real-time transparency, and decision-making support to the ship operator. It will also increase the capability of performance monitoring, reducing human error and increase interdependencies of components. The industry is now considering a digital twin concept to produce a digital presentation of a ship based on continuous data collection. This allows understanding how ship will perform without needing to test in the real world. All are



the ingredients of moving towards the development of autonomous shipping. The ultimate goal is to incorporate full automation in the shipping industry to provide high levels of safety and cost effective operations (Strauch, 2017). Currently IMO is working on a scoping exercise for the regulatory framework for safe, secure and environmentally sound Maritime Autonomous Surface Ships (MASS)

operations (IMO, 2018). This illustrates that the action to increase the level of automation in ships from the current state to the fully autonomous ship has already started. Artificial intelligence has contributed in the optimal operation, fault diagnostic, forecasting, sensor validation, inferential measurement, and control in many industries including shipping industry. Artificial intelligence will be one

of the key contributors to make the transition from current automation status to autonomous operation happen. This can be done using AI for pattern recognition, inferential monitoring, optimised operation and decision-making.

Do you think autonomous ship operation will fully eliminate the possibility of human errors?

Even with the best intentions in designing systems and associated automation, studies have shown a dichotomy in the level of interaction between humans and machines for safe and cost effective operations. Many claimed that there would be an increase in performance if human activities are substituted by machines, while others mentioned that automation would be excellent in



compensating for human limitations and our world would become much safer, due to the reduction in so-called human errors (Besnard & Hollnagel, 2014; Woods, et al., 2010; Broek, et al., 2017). However, in reality, over the past 30 years or so, there have been failures in adaptations of humans to machines. For example, studies showed that failures happened due to high level of reliance, complacency and bias towards automation. In the case of failures, operators either failed to detect (situation awareness) or were unable to solve the automation problem (out of the loop) or were unable to act (loss of skill) because they rarely conduct tasks themselves (Parasuraman

& Manzey, 2010; Endsley & Kiris, 1995; Kaber & Endsley, 1997). In line with impact of human-machine interaction, my colleague and I performed a small scale experiment in the recognition of a developing emergency situation due to failure of automation. The result showed a positive relationship between the level of trust on automation and situation awareness. The study also showed the effectiveness of appropriate training on improving situation awareness (Pazouki et al., 2018). Having said that, when it comes to full autonomous operation, meaning no human interaction with machine on board the ship, the human error will

be shifted to where the interaction with human exist. **In your opinion, how will seafarers be impacted by smart ships?** IMO has defined four degrees of autonomy for the purpose of the scoping exercise. The first two degrees require seafarers to still be a key element in safe and secure ship operations, while in the third degree, the ship's operations will be remotely controlled by humans from another location with no need for seafarers on board. In the fourth degree of autonomy, maritime operations will be independent of human involvement. In the transition period from the first degree of autonomy to the fourth degree, human-machine

interaction on board the ship is inevitable. Therefore, until third degree of autonomy, seafarers are key element, but conventional qualifications and requirements for seafarers may change.

What are the key advantages and disadvantages of autonomous shipping?

The key advantages will be cost effective and safe operations with minimum to no human error/s. However, this is provided if the system is flawless and fault tolerant. We are at the beginning of this transition period, shipping industry will benefit from the wealth of experience, and knowledge from other industry such as aviation to make it happen.





Khazar Sea Shipping Lines

Leader in Non-petroleum Exports

Liner Services

Bandar Anzali, Astara, Nowshahr, Feridon Kenar, Amir Abad Ports to/ from:

- Ports of Russian Federation (Astarakhan and Makhachkala)
- Ports of the Republic of Kazakhstan (Aktau)
- Ports of the Republic of Azerbaijan (Baku)
- Ports of the Republic of Turkmenistan (Turkmenbashi)
- Ports of Volga River
- Ports of Azov Sea
- Ports of Black Sea/ Russia, Ukraine, Georgia, Bulgaria, Romania and Turkey

Head Office

**Mostafa Khomeini St. Ghazian,
Anzali Free Zone, Iran
P.O.BOX: 4315671145
Tel: +98 (13) 44 42 38 01-3
Fax: +98 (13) 44 42 36 26**

- Maritime transportation including shipment of ironware, grain, wood, industrial commodities, cement, ironstone, clinker, coke, general cargo, project equipment, container and automobile
- Providing regular shipping Lines to Import/ export goods and from Northern ports of the country to foreign ports of the Caspian Sea
- Providing competitive freight shipping rates
- Providing the best and easiest conditions for maritime transportation as well as issuing standard Bill Of Lading
- Offering free consultancy to owners to guarantee a reliable, fast and cheap transportation in the Caspian Sea
- Tax Exemption in freight rates of imported products by 10%
- Receiving freight rates of export cargoes by Rial
- Providing 20-40' standard dry containers in all Iran's ports and foreign ports of the Caspian Sea
- Providing container shipping by Door-to-Door and Full LINER
- Shipping of 20-40' dry containers through C.O.C and S.O.C by the owned fleet
- Providing cargo transit from ports of Far East to the Persian Gulf and CIS Countries and vice versa
- Shipment of cargo and oil products within the Caspian Sea
- Providing trans-regional cargo and oil products shipping as well as swap ship agency services





CRUISE INDUSTRY TO STEADILY RISE IN 2019

Cruise Lines International Association (CLIA) emphasizes that the cruise industry is more conscientious than ever and it is going to minimize environmental footprints. It is important to highlight that the growth of cruise industry has continued an upward trend in recent years. In this regard, Marine Innovation magazine has spoken to Sarah Kennedy, public relations manager at CLIA.



the cruise industry is projected to grow throughout 2019; with over 30 million travelers are expected to cruise.

globe by providing 1,108,676 jobs equaling \$45.6 billion in wages and salaries and \$134 billion total output worldwide in 2017. Based on the projections, the cruise industry will bring about further job opportunities in this year.

In your opinion, how can we provide more interesting sea voyages? What plans do you have in this regard?

Our survey indicates that travelers are going to seek more restorative cruises, adventure as well as personalized travel experiences. Moreover, through sea voyage, they want to escape from fast-paced lives and seek ways to check out from daily responsibilities more than ever before. Travelers are interested in seeing the world in a conscious, mindful way. It is worth nothing that wearable technology has been adopted from cruise lines for providing highly personalized travel experience while on and off the ship. In the light of providing a more interesting sea voyage, CLIA has considered wellness

options onboard including; restorative spa experiences, onboard oxygen bars, healthy menu choices, and the latest in fitness innovations. While the cruise industry continues to grow, the industry is only as healthy as the oceans we sail and destinations we visit. We are taking action to preserve, protect and strengthen our environment and destination communities.

What is your prediction about the cruise industry?

As it was pointed out, the cruise industry is projected to grow throughout 2019; with over 30 million travelers are expected to cruise. It is also poised for continued solid growth in the upcoming years. CLIA has pledged to reduce the rate of carbon emissions across the industry fleet by 40 percent by 2030. The cruise industry stands ready work with all travel and tourism stakeholders to ensure world destinations grow tourism sustainably and preserve their unique heritage and way of life.



Sarah Kennedy,
public relations
manager at CLIA

Generally speaking, how do you evaluate cruise industry in recent years?

The cruise industry continued to grow around the world with an almost 7 percent increase from 2017 to 2018, totaling 28.5 million passengers. However, cruise passenger numbers are predicted to pass 30 million in 2019.

The cruise industry makes a big contribution to communities around the

Chabahar Port in Iran on the Road to Growing Development:

THIS PORT WON'T BE IMPACTED BY SANCTIONS

By: Vahid Basereh



Certainly, the future of the ports in Gulf of Oman and the Persian Gulf ports is dependent upon Chabahar seaport in southeastern Iran. The initial plan for construction of this port which is located at the mouth of the Indian Ocean and next to the Oman Sea dates back to the early 1970s. At that time, due to rising oil prices and, consequently, incredible revenue growth, it was decided to develop ports in the south of the country, one of which was Chabahar Port. After Iranian revolution in 1979, development programs were practically

stopped for a period of time. In 1980, the name of Chabahar and its port, being out of the strategic and political Strait of Hormuz, once again became renowned. At this time, the Iranian government decided to use the fast-installing berths to prepare the Chabahar port for mooring of the ocean-going vessels, so that the Iran's only oceanic port would be born. Subsequently, the Chabahar Port was developed by applying little changes and installing new equipment, but with a much stronger hinterland it was the Shahid Rajaei port in the Persian

Gulf, which became the Iran's main port. However, in all the country's offshore developmental programs, experts emphasized the importance and the geo-strategic position of Chabahar, and urged the necessity of developing of Chabahar port as a national priority. These recommendations were included in the notified guidelines of the senior Iranian officials to the governing authorities, so that the government could invest much more in Chabahar port over the last seven years and increase the constructional

activities speed, which resulted in finishing of the first phase of this port in 2018; which was inaugurated by the President as the highest executive head of the country to demonstrate the strategic significance of the Chabahar port for the Iranian government more visible. But why is Chabahar Port so important for the Iranian government and nation? There is another question that can be raised: Is Chabahar Port Development Project also important for the countries like India and Afghanistan? And more significantly, what is the impact of this port's

construction on the region and even on the world? In the following text, we will try to answer these questions.

Landlocked countries and one belt - one road

CIS countries in northern Iran such as Turkmenistan, Kyrgyzstan, Kazakhstan, Tajikistan are enclosed by land. Afghanistan, located in northern Iran, also doesn't have access to open sea. Chabahar Port has been termed the "Golden Gate" to these landlocked countries to the ocean. This means that this port is a transport gateway to import and export the goods for any length of time which offer low cost for these countries. Generally, regardless of the Iran population of more than 80 million, Chabahar Port has a big share in market about 400 million, indicating its strategic importance in the region. At the same time, India, emerging as the major global economic player, needs the resources of these countries and consider them a good market for its own products. Some political-economic rivalries with Pakistan and China have led Afghanistan and India to consider Chabahar Port as a connecting corridor for strengthening their relationship. The significance of this port will become even more apparent when China plans to build one belt- one road with a major project to take control of the transportation of this part of the world.

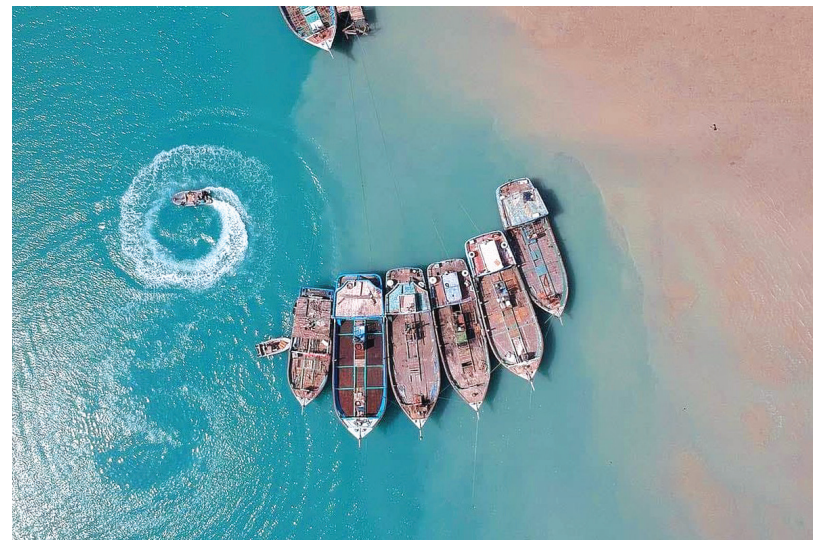
The situation in Afghanistan is very delicate. This country has begun efforts to establish peace in the country after a decade of war and devastation, but it faced difficulties breaking into export market or imports various types of goods. So that Afghanistan

can easily overcome obstacles by taking the advantage of Chabahar port, which shows a bright future for the country to overcome its security and social problems by relying on its economical development and after 40 years, it can become a normal economical and political country in the world. Chabahar Port also paves the way for India to advance its flourishing economy comparing to the other rivals. Through Chabahar Port, India will not only boost its access to the CIS countries' market but also reach the Russian market through the North-South corridor. Also, if railway projects complete in Iran and connect to Chabahar port, accessing to the European market through the northwest of Iran and Turkey will be possible for India. This port's significance for India is obvious in a way that the government of India takes over the operation of a part of first Phase of Chabahar Port and it will gradually install 80 million dollars equipment as India's investment plan.

But China can also benefit from this port. The Chinese investment in Gwadar, near Chabahar Port, is much more, which will take advantage of the opportunity for the transshipment between the two ports to find a new route to the hinterland major market of Chabahar port. Certainly, Chabahar port development will be more beneficial for Afghanistan and India, as well as Central Asian countries, which will result in considerable reduction in shipment costs and time.

About Chabahar Port

Through investment of one billion dollars of Iranian government, Chabahar Port



is now in the first phase of its 16 berths. This port is 16 meters deep at quayside. The distance to the new under development airport is 40 kilometers, although the plan for creating a new and larger airport is on the agenda. The available marine border of this port is 541 kilometers. Its equipped passenger terminal also has a capacity of 600 passengers simultaneously. The capacity of the container terminal in the first phase is 740 thousand TEU. The dock area is currently 16,000 square meters, and now it has a total capacity of 15 million tons per year. After all, the port development plan has 5 phases; the second phase is being under construction. Achieving the final capacity of 83 million tons per year can be achieved at the end of the fifth year and installing final phase is the ultimate goal for the port's constructors. Grain silos with a capacity of 100 thousand tons, a 25 MW power plant, highly mechanized minerals terminal, the establishment of a railway network within the port are among the most important projects which are already well underway in this port.

It is planned to install more than 2,100 meters container

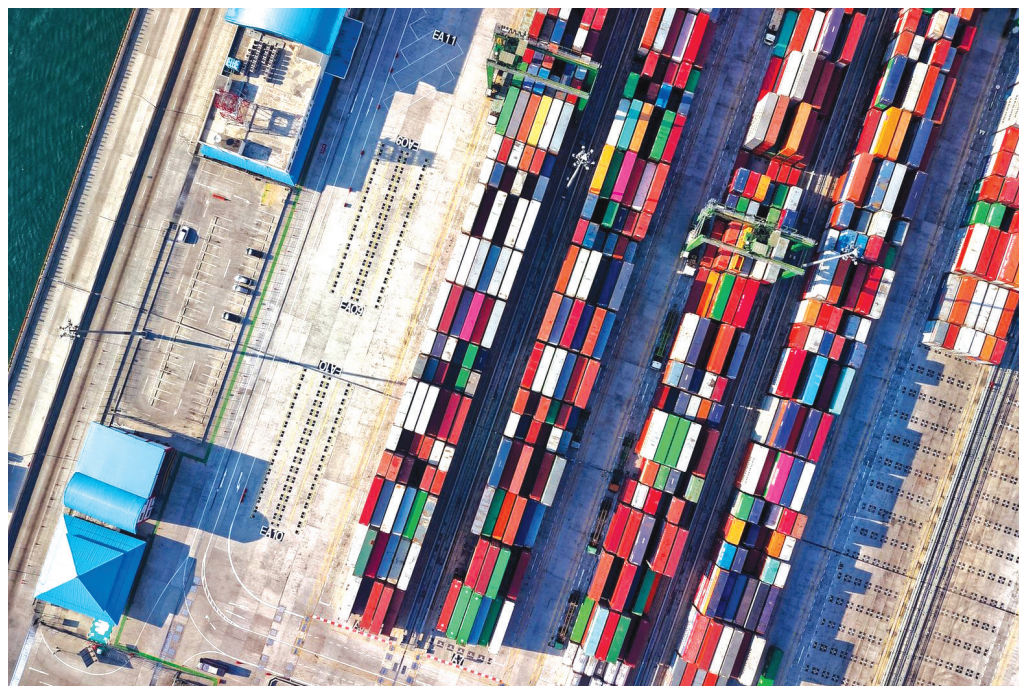
berth in the second and third phase in this port. In Phase 5, the construction of a 1,600-meter multipurpose berth will be completed which will make Chabahar Port a great significant port. Among other ongoing projects in the development of the Chabahar port, is a 700-kilometer railway route which can connect this port to the Afghanistan border. The railway line will be connected to the northeastern borders of Iran, in order to make it possible for Chabahar port to reach directly to the borders of Central Asia. Also, through a complementary rail line in north of Iran; the rail link starts from the eastern part of the Chabahar port will be connected to Caspian Sea ports to transport the goods to the Caspian Sea countries. But this is not the end, as Mohammad Rawast, the managing director of the Iranian Ports and Maritime Organization, announced the construction of a highway that will begin from Chabahar to transitional destinations, to make Chabahar's logistics chain even more complete.

DEVELOPING COUNTRIES GET THE LION'S SHARE OF GOODS LOADED AND UNLOADED GLOBALLY

The world's seaborne trade is gathering momentum, however, some key factors which are affecting the market, will make it difficult to provide any accurate projection about seaborne trade growth. In order to delve into this issue, Marine Innovation magazine has managed to conduct an exclusive interview with Mrs. Hassiba Benamara. She is a maritime transport and international trade specialist at UNCTAD and has over 20 years professional experience in transport and trade logistics.



Hassiba Benamara,
maritime transport and
international trade
specialist at UNCTAD



How do you evaluate global seaborne trade growth in recent years? Over recent years, global seaborne trade continued to grow, albeit at a moderate pace relative to the decade preceding the 2008-2009 global financial crisis. This did not, however, take away from the strategic role of shipping as over 80% of world merchandise trade by volume

continues to be carried by sea. Socio-economic factors, namely GDP growth, merchandise trade, industrial production, population growth, as well as consumption and urbanization continue to shape global seaborne trade patterns. Driven by these various demand factors, global seaborne trade increased at an average annual growth rate of

2.9% between 2007 and 2017, down from 4.9% a decade earlier. According to UNCTAD data, world seaborne trade expanded at an estimated 4% in 2017. Volumes loaded at ports worldwide reached 10.7 billion metric tons. Improved global macroeconomic conditions, a pick-up in containerized trade, especially on non-mainline East-West

trade routes as well as a firm import demand for dry bulk commodities in particular in China, have sustained much of the growth. Led by Asia in particular, China, developing countries have, over the years, emerged as important players in maritime transport and trade. Developing countries are now handling the lion's share of goods loaded and unloaded globally.

What are the major challenges of seaborne trade?

Uncertainty arising from a fragile macroeconomic situation is weighing down on maritime trade prospects. There are also doubts arising from the changing trade to GDP relationship to the extent that this change may well be reflective of cyclical factors but not only. It has been argued that structural elements such as a shift in globalization trends and supply chain distribution patterns may also be at work. Other downside

risks relate to geopolitical risks and the rebalancing of China's economy; the main engine driving maritime trade volumes since mid-2000s. Geopolitical tensions and heightened trade policy risks and protectionist sentiment are compounding the uncertainty. Trade tensions between the United States and some of its main trading partners, notably China is a particular concern.

There are also some factors, which depending on how they unfold, could constrain maritime trade. Worth noting are the fast-moving digitalization wave; the heightened global sustainability imperative; and, the stepping up of global climate action and energy transition efforts. In connection with environmental sustainability, an issue of immediate concern is the IMO's global 0.5% fuel sulphur content cap regulation to be enforced starting 1

January 2020. The new requirement entails important implications for the maritime transport industry, shippers and tanker trade flows and routes.

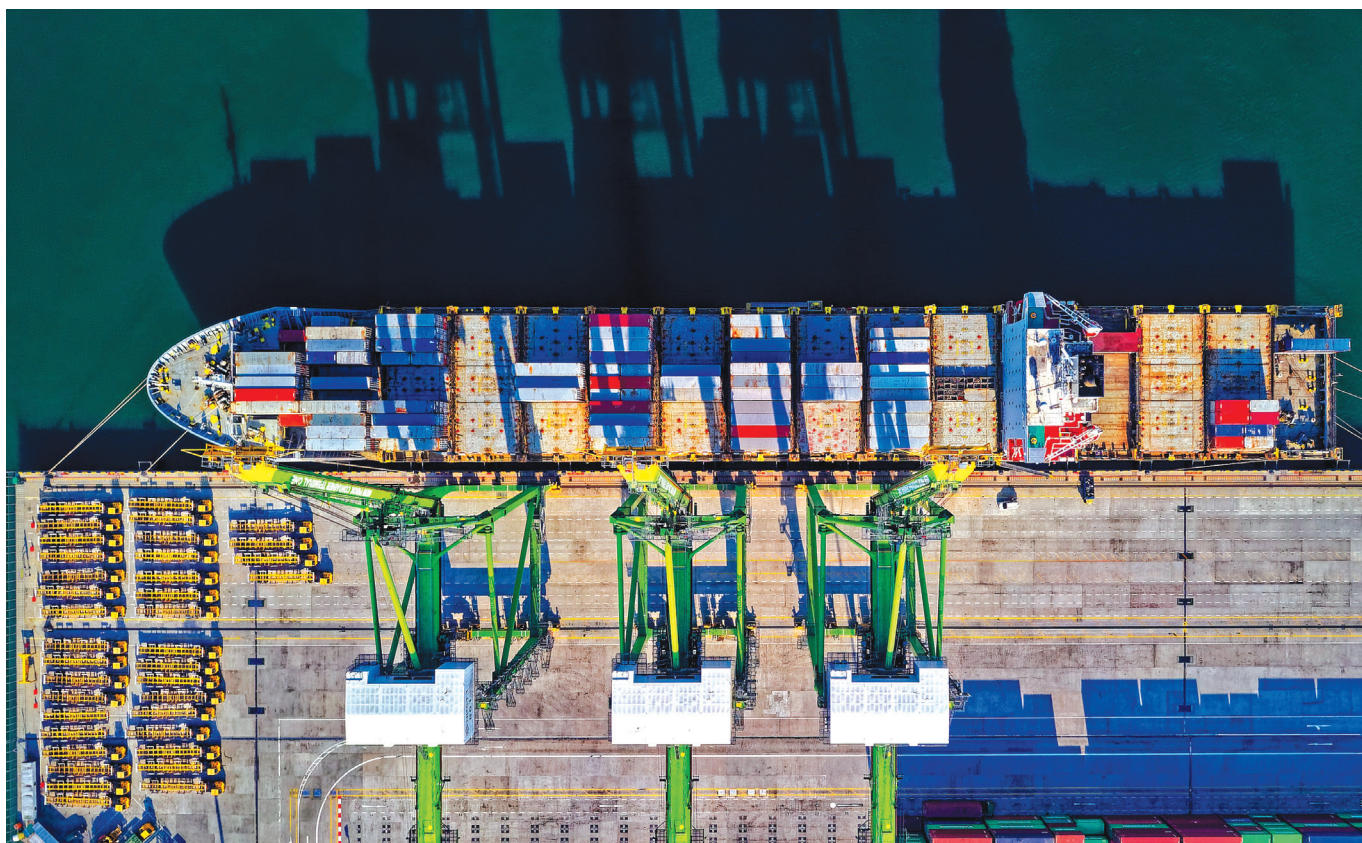
What is your prediction for main sectors of shipping industry including container, bulk and tanker?

With uncertainty being overriding, predicting the future of shipping and maritime trade is no easy task. Bearing this in mind, UNCTAD projects continued growth in global seaborne trade. A CAGR of 3.8% is projected for the period between 2018 and 2023.

Dry bulk commodities such as coals and iron ore, are projected to grow at a CAGR of 4.9%, while containerized cargo is expected to expand by 6%. A positive global macroeconomic situation, China's firm import demand for dry bulk commodities, rapid growth in containerised

trade, especially on intra-regional and outside the main East-West trade lanes, are expected to underpin these projections.

Wet bulk commodities trade is projected to grow at a relatively slower pace. Crude oil is set to grow by a CAGR of 1.7% while, together, refined petroleum products and gas are set to rise by 2.6%. Factors supporting the projected growth include, for example, the trade liberalization efforts at regional and bilateral level; the move of low-cost manufacturing activities from China to other neighbouring Asian countries; and, the major infrastructural development projects such as initiatives under China's Belt and Road Initiative. On the downside however, the varied geopolitical, economic and trade policy risks that are currently at play continue to fuel uncertainty and to potentially undermine the projected outlook.



THE IMPORTANCE OF TRAINING BY USING BRIDGE SIMULATION IN RESPECT OF NEW TECHNOLOGY TO MITIGATE ACCIDENT AND INCIDENT

Capt. Farshad Haeri / Research manager, maritime training institute

Human factors which contribute to 80 percent of marine casualties and incidents, are defined as deliberate acts or omission that affect the proper functioning of a particular system, or the successful performance of a particular task. The causes of human error in a ship's operation are numerous: fatigue, stress, poor qualifications, negligence, language, and cultural differences on board ships etc. Understanding human factors therefore requires a study and analysis of the equipment design, the interaction of the human operator with the equipment, and the procedures followed by crew and management.

Naturally, accident investigation indicates that high percentage of marine accidents are occurred by human factors. So, the effect of unfamiliarity of officer with navigational equipment particularly new technology as well as overreliance on Modern Navigation Aids on marine casualties and incidents are undeniable. Best examples for overreliance on Modern Navigation Aids are G.P.S and AIS as included in many accident investigation reports. Unfamiliarity with new generation of Electronic Chart Display and Information System (ECDIS) or Bridge integrated system (IBS) is one of main worries for owners. The article of preventing marine accidents caused by technology-induced human error" written by Faculty of Maritime Studies at University of Rijeka (2017) highlights that fast

technology development has strongly influenced maritime transport. Study of maritime researches shows the importance of training to reduce the accident/incident. In order to reduce the risk of accidents, handling of vessel's systems and increase efficiency in marine traffic, automated systems such as Integrated Bridge System, Integrated Navigation System, Electronic Chart Display Integrated System, ECDIS, have been introduced. At first glance the new high precision technology makes a big contribution to reduce accident/incident. But sometimes it can be contrary .several recent maritime accidents suggest that modern technology sometimes can make it difficult for mariners to navigate safely. Despite the efforts of a global maritime community, maritime accidents caused by human error still occur. In

order to reduce their number, it is vital to understand which human and organizational factors determine how the work on board a ship is carried out. Analysis of the accident reports confirms that ineffective relationship between human and technology remains one of the factors that contribute to the development of human error. Inadequately designed, baffling and insufficiently understood technology created error pathways that lead to accidents. On the other hand, perception of technology as fully reliable resulted in an inadequate crew members' performance. To decrease the likelihood of an occurrence of human error related to technology, several actions are necessary which one of the most effective ones using bridge simulator during training and assessment. A simulator is defined as, "A device, designed to satisfy

objectives which mimics part of real situation in order to allow an operator to practice and/or demonstrate competence in an operation in a controlled environment" The history of maritime simulation applied to teaching future sailors is primarily focused on that simulators filled a vacuum left by the severe reduction in opportunities for on board training as a primary resource. Proper simulation training provides an accessible introduction to background theories through the realistic operations of the simulator and at the same time provides a means to introduce students to applications to current crises. Work with ship handling, cargo handling, engine room, vessel traffic service, oil spill and communication simulators demonstrably reduces the likelihood of human error - operational failures and miscommunications

commonly cause major accidents and expensive breakdowns with severe economic, environmental, and health consequences. To perform high-quality training, especially for imparting management skills, an integrated simulator center that works with values computed physically and mathematically in real time is necessary. Different scenarios involving various malfunctions can be illustrated through such a system, even, and importantly, those unlikely to occur – and when students observe the use of simulation applied to real events they are clearly, in our experience, will be better able to understand the importance of this latter stipulation. Without simulation aided training even good operators are not sufficiently trained. The use of simulation technology for training purposes has been a feature of several industries for many years. The aircraft industry is an outstanding example of the use of simulation. By using such training and achieved results the maritime shipping industry will gain benefit from their experience in that field. Van der Rijken (2008) has stated that simulators are developed to serve the professional maritime world in studies and training with complex realistic simulation environments. Moreover, simulators are an extension of model testing enabling the performance of simulations based on ultimate hydrodynamic data and geographical database derived directly from the model tests. The direct implementation of the hydrodynamic data is possible because the simulator technology



used is based on software developed according to real life locations. The resulting mathematical maneuvering model for instance, (vessel, tug or any other floating object) are six degrees-of-freedom (6 DOF) models responding realistically to environmental conditions (wind, waves and current) and hydrodynamic interactions. In addition, other real-life phenomena such as back suction, squat and trim are depth/draft dependent modeled. Nowadays with exponential growth of technology in maritime field, under various pretexts such as refreshment course, the officer and master are upgraded by update simulation. Update simulation may be defined as integrated bridge with latest technology. Actual course conduction, frequent practice, various exercises and Professional deal can pin some professional reactions in candidate's subconscious mind which will be useful in her/his maneuvering by abilities. During the process

of accident investigation with the extracted information from VDR such as Radar, ECDIS, Voices, Spd of vsl and ..., the simulator helps to redesign the situation which lead to lesson to be learnt and making scenarios in the future courses. The role and importance of using simulator in maritime training/assessment noted in International Convention on Standards of Training, Certification and Watch keeping for Seafarers (STCW), below is the list which STCW Convention noted on simulator usage and requirement:

- Regulation I/12 use of simulators
- Section A-I/12 Standards governing the use of simulators
- Part 1-Performance standards
- Part 2-Other provisions

The following advantages can be addressed using simulator in maritime training:

- 1- Simulator implementation in master and officer assessment.
- 2- Improve master and officer

maneuvering/navigational confidence.

- 3- Helps master and officer to react effectively in real emergency situations.
- 4- Familiarize master and officer with maneuverability of owned vessel and frequent called ports.
- 5- Provide useful introduction to upcoming technology even before they are made practical on board vessel.

- Maritime technology challenges 2030, new technologies and opportunities/european council for maritime applied r&d

- **The use of integrated maritime simulation for education in real time// marko erkovic, rick harsch, valter suban, peter vidmar, david nemec, oliver muellenhoff, leonardo delgado**
- **The importance of using ship bridge simulation training to enhance the competency of masters and watch-officers//al-kabie mazin da wood salman world maritime university**

One Sea and the European Space Agency collaborate on maritime digitalisation



A Memorandum of Intent (MoI) between One Sea and the European Space Agency (ESA) aims to bring common objectives to encourage the development of space-based applications to analyse, enable and implement maritime digitalisation and autonomy using latest generation connectivity.

One Sea coordinator DIMECC (Digital, Internet, Materials & Engineering Co-Creation) gathers together key stakeholders from the maritime and ICT industries to accelerate the delivery of digitalised solutions to market. ESA's participation aligns with the space agency's Advanced Research in Telecommunication Systems (ARTES) Business Applications programme, which aims at supporting European players in delivering commercial products and services that benefit user communities across a number of vertical domains.

The agreement foresees using resources, expertise and facilities belonging to one of the signatories to achieve common goals. The MoI makes explicit reference to the future use of DIMECC's Jaakonmeri test area for autonomous vessels - the first dedicated test zone worldwide for autonomous ship technology, located off western Finland. Finnish regulators have authorised One Sea to oversee future trials in the area.

"This is an important statement of intent, through which One Sea and the ESA acknowledge the significance that ongoing digitalisation and autonomy have for the maritime industries," stated Jukka Merenluoto, One Sea Lead. "Expertise from different disciplines is necessary to transform today's connectivity capabilities for tomorrow's needs, and this MoI represents a unique opportunity to develop applications and services that leverage assets on the ground and in space."

"It is with great satisfaction that we start the cooperation with DIMECC and the other actors participating in the One Sea Alliance", commented Rita Rinaldo, head of the ESA Institutional Projects Section. "We expect that the current initiative, thanks to the engagement of the partners, will foster the emergence of innovative space-based downstream solutions addressing the key challenges of the future maritime and shipping sector."

Digitalization and the future of energy



An industry study that goes beyond the hype — to find out how to create value by combining digital technology, people and business strategy

Digitalization. The term is everywhere. But what does it really mean? How will it impact the energy sector? And where can it add most value for society and individual organizations? At DNV GL, we see digital technology and digitalization as key enablers of the transition to a low-carbon energy system. Their potential transformative effects are massive. To realize that potential, the sector must start treating digital transformation like any other vital business process. That means defining goals and strategies that create long-term value and help organizations to take the lead in a rapidly changing energy landscape.

Doing that takes real insight and understanding. However, digital technology is a vast and rapidly evolving area. To determine what it means for the energy sector specifically, DNV GL surveyed nearly 2000 professionals from across the global energy value chain. The results and analysis of that research will help individual organizations:

- Formulate the right questions to start a successful digital transformation
- Understand their digitalization options
- Benchmark their progress against other leaders in the industry

Technology and data

Automation, virtual reality, blockchain: Our research looks at what digital technologies are available, and which are already having the biggest impact across a range of segments. Data is, of course, king in the digital world. But how, where and why should it be managed and shared?

People and digital skills

Digitalization is not just about technology and big data. Our research reveals that the biggest challenge is often changing the culture and people's perceptions. It also pinpoints the

main cultural barriers and skills gaps that could hinder a successful digital transformation both for individual organizations and the energy industry as a whole.

The strategy and business case

In all the hype, it can be easy to forget that digitalization is a means not an end. Before starting on their digital transformation, organizations must be clear on why they are digitalizing and how it supports their long-term goals. What are the possible business and investment strategies for digitalization? What are other organizations doing? And where is it having the most impact?

Beyond the hype

The global analysis of our survey – as well as in-depth interviews with professionals at the forefront of the digital transformation in energy – can be found in our free report ‘Digitalization & the future of energy: Beyond the hype – how to create value by combining digital technology, people and business strategy’.

We will also be releasing focused analyses of what digitalization means for the various segments within the energy industry.

DNV GL supports 2020 sulphur compliance with online Ship Implementation Plan



As the days count down to the entry into force of the 2020 0.5% sulphur cap, preparation is key. DNV GL offers a free web-based application of the Ship Implementation Plan (SIP) that ship owners and managers can use to prepare vessel-specific SIPs and maintain an overview of their fleet. While not mandatory, the SIP is an IMO guidance which all ships are encouraged to prepare and implement to be ready for 1 January 2020.

Sample vessel in DNV GL's web-based Ship Implementation Plan application

“As we approach 2020, good preparation will be essential to ensure a smooth transition into using compliant low-sulphur fuels,” says Christos Chryssakis, Business Development Manager at DNV GL – Maritime. “This includes technical actions, such as hardware upgrades, tank cleaning, and a fuel changeover plan, but also commercial preparations like updating charter party clauses and agreements between owners and charterers on how

to best prepare each vessel to minimize operational disruptions. It is important to build flexibility into the plans, to make sure ships are prepared for using different types of compliant fuels, depending on their availability.”

DNV GL's web-based SIP application is a user-friendly way to prepare such plans. It is easy to update and offers operators an overview of their whole fleet. One of the benefits of the app is that it enables several users to work on a single vessel – allowing coordination between onshore and onboard personnel. The SIP application is free of charge and available in the market place of Veracity, DNV GL's digital platform and industry ecosystem. More than 300 shipping companies are already using the SIP app with over 1,700 vessels registered and actively preparing their Ship Implementation Plans. DNV GL also supports shipping companies in the development of SIPs by offering risk assessment workshops, by reviewing their SIPs, and offering remote verification of tank cleaning.

The SIP is not a mandatory requirement, but port state control (PSC) may consider the preparatory actions described in the SIP when verifying compliance. It should cover risk assessment and a mitigation plan on the impact of new fuels, fuel oil system modifications and tank cleaning, fuel oil capacity and segregation capability, procurement of compliant fuel, a fuel oil changeover plan (conventional residual fuel oils to 0.50% sulphur compliant fuel oil), and documentation and reporting. DNV GL also recommends supplementing the plan by documenting any actions taken to ensure compliance. This can help to track progress and can be used to prove compliance in the event of a PSC inspection.



Ship operators join CargoSmart in initiative to boost shipping's digitalisation



CargoSmart and the ship operators will work together to develop the GSBN, with the purpose of accelerating the digital transformation of the shipping industry.

Shipment management software solutions provider, CargoSmart, has announced the execution of Global Shipping Business Network (GSBN) Services Agreements with maritime industry operators CMA CGM, Cosco Shipping Lines, Cosco Shipping Ports, Hapag-Lloyd, Hutchison Ports, OOCL, Port of Qingdao, PSA International and Shanghai International Port Group.

Under the agreement, each member will provide resources to support preparatory work required to establish the GSBN, a not-for-profit joint venture to accelerate the digital transformation of the shipping industry.

The preparatory work includes obtaining all necessary regulatory, competition and antitrust approvals required for the establishment of the GSBN. CargoSmart will provide software solutions and services to the GSBN once it is formed.

Once established, the GSBN intends to provide a platform for all shipping supply chain participants to work collaboratively to accelerate technology innovation and develop solutions through trusted and secure data exchange platforms. The signatories believe that the GSBN can unlock underlying value and create exciting new opportunities for all shipping supply chain participants in a more open and transparent way. While the current signatories are shipping lines and terminal operators, it is envisaged that other participants in the shipping industry may wish to join the GSBN or otherwise benefit from the innovative solutions it develops.

“In line with our Customer Centric and Digital First approach, the CMA CGM Group is committed to facilitate increased transparency and to spur innovation with the entire supply chain ecosystem. The GSBN blockchain consortium provides us a concrete opportunity to bring greater value for our customers and the supply chain as a whole,” said Rajesh Krishnamurthy, executive vice president – IT & Transformations, CMA CGM

Group.

“We are focused on offering our customers the best choices for their supply chain needs. Once it is established, the GSBN will work, with its JV structure and strong carrier and terminal participation, to increase efficiency in cross-network operation for the benefit of the various stakeholders in our industry,” said Martin Gnass, managing director IT Technology at Hapag-Lloyd. The signatories of the GSBN Services Agreements plan to complete the establishment of the GSBN in early 2020. The signatories are open to feedback from the shipping community to enable the GSBN to offer solutions based on market need. In the interim, CargoSmart will run pilot applications that test the viability of the GSBN and the potential for the GSBN to offer unprecedented value to all supply chain participants. For example, initial preparatory efforts to explore and test the feasibility and value of using blockchain technologies are underway and showing promise.

“CargoSmart is pleased to support the strong industry commitment, represented by the GSBN Services Agreements, to build a solid foundation for the digitization of the shipping industry and the development of innovative solutions based on distributed ledger technology,” said Steve Siu, chief executive officer of CargoSmart.

China Unveils World's 1st Smart Oil Tanker



China has launched the world's first intelligent very large crude carrier (VLCC) at the country's shipbuilding major, Dalian Shipbuilding Industry (DSIC).

The 308,000 dwt vessel was named and delivered to its owner, China Merchants Energy Shipping (CMES), in a ceremony at the shipyard on June 22.

Featuring a length of 333 meters and a width of 60 meters, the new tanker's main feature is an installed “intelligent” system. Namely, the ship has assisted autopilot navigation, intelligent liquid cargo management, and integrated energy efficiency management, among other functions.

The vessel has already finished its sea trial, as well as other tests, including intelligent equipment and system testing. According to the shipbuilder, the new tanker does not only mark a milestone in the development of the world's large-scale ocean-going intelligent ships, but also represents a new chapter in the tanker shipping sector.

France and India to develop space-based continuous ship tracking



A constellation of satellites jointly operated by France and India to track and monitor ships in the Indian Ocean is under development, the French National Space Agency (CNES) and the Indian Space Research Organisation (ISRO) have confirmed. Carrying telecommunications (AIS) and radar and optical remote-sensing instruments, the first space-based system will cover a wide belt around the globe, providing continuous ship tracking. The system will also be able to detect oil slicks and trace their origin.

The constellation further boosts France and India's partnership, which has previously delivered several jointly operated satellites for food security, water resource management, and climate research.

India's Prime Minister Narendra Modi and France's president Emmanuel Macron have also discussed training in France for the flight surgeons who will be responsible for India's future astronauts, the active contribution of French-Indian space programmes to tackling climate change and India's involvement in the Space Climate Observatory (SCO) for which the founding declaration was signed at this year's Paris Air Show in the presence of President Macron.

CNOC president Jean-Yves Le Gall commented: "CNES's and ISRO's teams are both very proud to see, in the presence of president Macron and prime minister Modi, this new step forward in our cooperation in space. Our technologies today occupy an unprecedented place in the world economy and it is through large-scale international partnership projects like these that we will promote and develop our excellence."

BDI continues upward momentum

Dry bulk owners' earnings have been rising, supported by strong capesize and panamax markets, which have reached the highest level in six years. However, the segment is expected to show signs of slowdown due to the escalating tensions between China and the US.

The increase in rates could spur interest among owners to lock

in gains by chartering their capes and panamaxes for longer periods of time, said one broker.

THE Baltic Dry Index is continuing its upward momentum, buoyed by higher freight rates for capesize and panamax bulk carriers.

The index rose to 2,267 points on Wednesday, climbing to its highest levels in the past six years and was up by 25.1% compared with the beginning of the month.

The strengthening of capesize shipments was not surprising due to increased iron ore cargoes to China from Brazil and Australia, but the boom was also propelled by coal shipments from Indonesia and Australia to China.

"Especially on the Brazil to China route we have seen a big improvement with \$4 per tonne added to the freight," Norwegian brokerage Fearnleys noted.

"For this route we see significant activity with less and less early tonnage available. This tightness indicates that we are looking at further improvement in the week to come, however it mostly depends on the schedule and activity of one major freight consumer."

The average capesize weighted time charter on the Baltic Exchange was at \$32,182 per day at the close on Wednesday, up from \$28,431 last week.

The increase in rates could spur interest among owners to lock in gains by chartering their capes and panamaxes for longer periods of time, said one broker.

Looking forward, the Singapore-based broker added: "I think the general upward trend will carry on until the next few weeks. Tonnage tightness remains a big issue and this will put pressure on rates."

"However, I am cautiously optimistic in the short term as the macro environment looks bleak and is sure to have an impact on spot rates."

Trade tensions between the world's two largest economies has already started to take a toll on the dry bulk market.

Chinese steel futures have slumped more than 3% — the steepest drop in nine months — on the back of heightened worries about a prolonged weakness in demand, according to Arctic Securities.

Steel mills in China are also grappling with a plunge in the currency after China weakened its yuan which has eroded the purchasing power of steel makers, underscoring jitters over seaborne demand for raw materials.

Although, China's energy demand could be partly cushioned by policy support for domestic consumption, Bank of America Merrill Lynch warned that industrial metals like copper or nickel are also set to suffer from a slowdown in Chinese investment and exports. This might further hurt dry bulk shipping demand. Moreover, Chinese coal imports are already up 7% year on year as at end-July while the Asian giant plans not to exceed 2018 totals. Evercore ISI analyst Jonathan Chappell said that there is a risk that a large pullback from this trade could result in end-of-year weakness in spot rates, just like the large decline in late 2018.

Still, it is not all gloom and doom. Another broker pointed out that panamaxes would benefit from the increased grain flows from the east coast of South America in the coming months which would hugely support spot rates.

IRISL YOUR GLOBAL PARTNER

GROUP



ISLAMIC REPUBLIC OF IRAN
SHIPPING LINES



No.523, Asseman Tower,
Shahid Lavasani (Farmanieh) Junction,
Pasdaran Ave. Tehran - Iran.
P.O.Box: 19395/1311
Tel: +98 21 23841 (180) Lines
Fax: +98 21 238451
WWW.IRISL.NET

SEVEN OCEAN MARITIME TRANSPORT CO. LTD.



11L, NO.206, Sec.2,
NANKING EAST ROAD,
TAIPEI TAIWAN

Tel : 886-2-25037179 Fax: 886-2-25082610
E-MAIL : tlx@mail.7ocean.com.tw

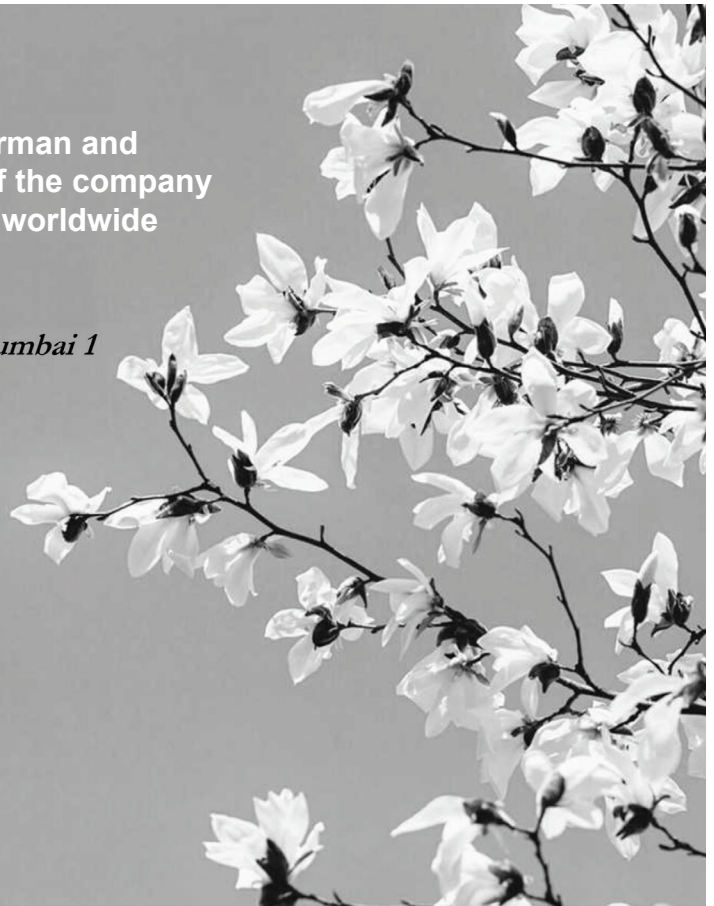
The Name You Can Count On

SEVEN OCEAN established in 1977 to act as a professional shipping agency to provide various shipping service in Taiwan.



Wish to congratulate Group Vice Chairman and MD for his Dynamic and great leadership of the company for passing more than half a century of worldwide transportation

--A Greeting from Mumbai 1



KR ready to implement Industry 4.0



PRESS RELEASE
11 July 2019

Industry 4.0 is driving a paradigm shift across the maritime industry. To address these significant changes, KR has been conducting various R&D (research and development) projects to enhance the application of advanced information and ICT across the maritime and ship classification industries. In this regard, KR has restructured its internal organization to maximize internal operational efficiencies and to focus more on R&D activities last year. The core improvement is to establish a new R&D Division. The new division brings together all KR's R&D activities in one area, to ensure that R&D across the organization is more strategic, coordinated and efficient. The new division will focus on developing shipping 4.0 related technologies and future technologies.

To mention some achievements of KR's industry 4.0 related projects are:

Remote Survey

KR has launched a new remote survey service for any of the society's vessels engaged in international - ocean going - voyages. KR Remote Survey can be conducted anywhere in the world – without requiring a surveyor's attendance on board. KR offers its eligible clients several types of KR Remote Survey using this method; a Continuous Machinery

Survey (CMS), a 3-month extension to a propeller shaft and stern tube shaft survey, a 3-month extension for boiler survey (only for exceptional circumstances), a minor damage survey (if approved by the flag administration), and an outstanding COC (Condition of Class) survey (which confirms repair deficiencies and/or corrective actions).

Electronic certificates

On 17 December 2018, KR rolled out IMO-compliant electronic class and statutory certificates across its classed fleet. The new paperless certificates cut administrative tasks for customers, saving time and costs and reducing instances of human error and fraud. The move to e-certificates is in direct response to industry and customers calls to speed up and modernize administrative tasks. KR started to issue class and statutory e-certificates with flag administration acceptance at the first annual, intermediate or renewal survey after 17 December 2018. E-certificates are issued for all new vessels delivered after this date.

Cyber Security

The risk of maritime cyber-attacks has increased globally as the latest information and communication technologies are widely applied throughout the maritime industry. In February 2019, KR delivered the first certificate of cyber security compliance to Songa

Shipmanagement following an intensive six month long cyber security certification audit. KR does not just certify companies and vessels, we are expanding our related technical services to include cyber security type approval, and the certification of ship IT service providers.

3D-based drawing approval

There have been growing demands from shipyards for KR to provide 3D model-based drawing approval, because 3D modeling is increasingly being used in a ship's initial structural design phase. To meet demand, KR has developed CAE interface with heterogeneous CAD, to provide consistent 3D modelling throughout the ship design process, and provides a 3D model-based ship management system. The project focuses on the development of a 3D CAD/CAE interface between the shipbuilding 3D CAD and KR's SeaTrust-HullScan software, the ship design support solution that analyzes and appraises a vessel's hull structure. It provides a 3D view of the entire ship, illustrating the management function and its history so that the drawing approval process can be more easily and efficiently accessed. Jeongkie Lee, CEO and Chairman of KR, said that KR continues to transform itself to become a digitalized classification society so that

the society can deliver values and solutions to the industry in the era of Industry 4.0.

About Korean Register

The Korean Register is an internationally recognized classification society established in 1960 with the purpose of promoting safety of life, property and the protection of the marine environment. KR currently classes an international fleet of 3,050 vessels totalling 68 million GT. It is headquartered in Busan, South Korea and operates a network of 68 offices around the world. It is authorized to perform statutory and certification services in 80 countries.

For further information, please contact:

Mr. Insoo Lee, +82 70 8799 8064, email: islee@krs.co.kr
website: www.krs.co.kr



FREIGHT FORWARDING & LOGISTICS COMPANY

SHIPPING AGENCY



YOUR BUSINESS. MOVING WITH US.



Best wishes to IRISL Vice Chairman and Managing Director, Board of Directors and staff members on The Happy Occasion of IRISL's foundation anniversary

T.P.G. Logistics can offer the following solutions:

- CUSTOMS CLEARANCE IMPORT / EXPORT
- FISCAL REPRESENTATION
- WAREHOUSING
- TRANSIT DOCUMENTS
- TRUCK & RAILWAY TRANSPORT
- DISTRIBUTION

T.P.G. Agency activities:

- ACTING AS AGENTS FOR TRAMP AND CRUISE VESSELS
- ACTING AS AGENTS FOR PROJECT CARGO VESSELS
- DOING AGENCY FOR PRIVATE YACHT OWNERS
- CHARTERING AT PORT OF KOPER RIJEKA & BAR

Present in Port of Koper-Slovenia, Port of Rijeka-Croatia, Port of Bar-Montenegro and Belgrade-Serbia (Danube solutions).

T.P.G. Logistika d.o.o. & T.P.G. Agent d.o.o.
Vojkovo nabrežje 30/a
6000 Koper, Slovenia
Tel: +386 5 66 38 900
Fax: +386 5 66 38 908
Email: info@tpg.si / agency@tpg.si



www.tpg.si

Trust, Personal care and Global presence.



A & A Techno

We are delighted to have the opportunity to express our sincere felicitations to His Excellency Mr. Modarres Khiabani, IRISL's Vice Chairman & Managing Director on his well-deserved appointment.



A&A TECHNO ENGINEERING & SERVICES PTE LTD

sales@aatechno.com

T62727155-65- , F62726900-65-

Genuine Ship Machinery & Parts (JAP, KOR , EUR)

*Best Compliments
From
C & C Marine Combine.
Mumbai.*

*C&C Marine Combine
25 Bank Street, 1st Floor,
Fort, Mumbai 400023
India
Tel: +91-22-22660017*



Multi-Modal Transportation



- Providing multi-modal transportation and Door to Door services for containerized shipments with competitive rates by railway and road
- **Inland transit service to CIS countries, Iraq and Afghanistan and other countries**
- Outbound transit service cargos with coordination of shipping lines from any origin in the world to all customs point in Iran as well as CIS countries and other countries by issuing one through Bill of Lading only.
- **Providing forwarder services, customs services, agency services, Bill of Lading and Way Bill issuance**
- Transporting different kind of edible liquids such as vegetables oil and etc. by tank-wagons completely hygienically and standardized
- **Professional transporting of fuel, chemicals and industrial oils by tank-wagons domestically and internationally**
- Transporting different kind of containerized shipments and general cargos by short- edged wagons domestically and internationally
- **Providing loading and discharging services in origins and destinations**
- Providing specialized facilities, warehousing, stuffing and lashing of cargo in available logistic centers
- **Having logistic warehouses**
- Engagement in wagon repair services in Tezerj (BandarAbbas)
- **Owning 731 tank-wagons for carrying fuel and edible oil and etc.**

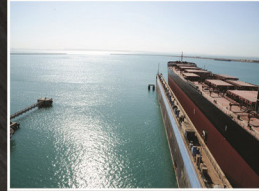
Fifth floor, No 237, North Iranshahr St., Karimkhan St. Postal Code: 1584783111
 Phone: +982188140660 Fax: +982188303953 Info@m-mtc.com



Persia Hormoz Shipyard

Committed to International Standards

PROVIDING SHIP REPAIR AND DRY-DOCKING SERVICES WITH COMPETITIVE PRICES IN PERSIAN GULF REGION



Shipyard Facilities:

- Floating Dock: 240x42m with 28000 MT Lifting Capacity, Suitable for Vessels of 80000DWT
- Repair Berth: 2x180m, 2x172m and 1x340m with 40t Crane
- Synchrolift: 170x30m with 11000MT Lifting Capacity, Suitable For Vessels of 30000DWT
- Dry Berth: 3x200m Equipped With 2x40t Cranes
Specialized Work Shops
6x648m²

PERSIA HORMOZ SHIPYARD VOYAGE REPAIR DEPARTMENT DEDICATED TO SERVE YOUR VESSELS THROUGH OUT NORTHERN COASTS AND PORTS OF PERSIAN GULF



Address: Persia Hormoz Shipyard, ISOICO Complex, 37km West of Bandar Abbas, Iran

Tel: +98-76-32571187 , +98-76-32571194

Fax: +98-76-32571204

Email: info@persiahormoz.com Website: www.persiahormoz.com



Shara Dynamic Marine

Our entire organization joins in wishing IRISL Group all the best to be managed under the leadership of his Excellency
Mr. Modarres Khiabani



BS MARINE SUPPLY SDN BHD

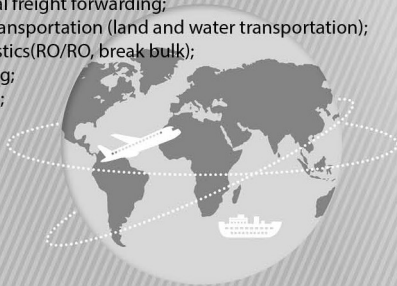
Best wishes to IRISL Vice Chairman and Managing Director, Board of Directors and staff members on The Happy Occasion of IRISL's foundation anniversary



RongShang Logistics

We are your best choice in China!

Main business:
CIS business ;
Ship Agency;
International freight forwarding;
Domestic transportation (land and water transportation);
Project logistics(RO/RO, break bulk);
Warehousing;
Distribution;



contact way " www.rslg-china.com ATTN: Ms. Rainie
TEL: 008621 60676520 / EMAIL: marketing@rslg-china.com"

RongShang Logistics
wishes IRISL Group all the best to be managed under the leadership of his Excellency Mr. Modarres Khiabani



Guangzhou Kunchi Shipping Agency Co.,Ltd wish to congratulate IRISL Group Managing Director for passing more than half a century worldwide transportation





HOOPAD DARYA
Shipping Agency

***Are you looking for a leading shipping agency that renders various types of shipping services in all Iranian southern ports?
You are in the right path:***

Hoopad Darya Shipping Agency Company (IRISL Group Agent)

(ISO 9001, ISO 14001, OHSAS 18001)

- Providing full agency, husbandry and protective agency services in all Iranian southern ports. HOOPAD DARYA SHIPPING AGENCY Company, take's care of your interests, wherever in the Iranian southern ports
- Providing commercial operation services In Tehran, Mashhad & Iranian Southern ports.
- Providing Container operation services in Tehran and all Iranian southern ports.
- Replenishment of Bunkers & Fresh Water to the ships in all Iranian southern ports.
- Providing all types of crewing services including sign on/off, repatriation, medical services/ assistance.

ADDRESS

Hoopad Darya Shipping Agency Company, No: 101, beside Shabnam Alley, Ghaem Magham Street , Tehran , Iran.

Tel: (+98) 21 84208

Fax: (+98) 21 88845067

Email:

md.office@hdsac.net

market.mgr@hdsac.net

ex.office@hdsac.net

cs.office@hdsac.net

publicrelation@hdsac.net

web site: www.hdsac.net



PAYAM DARYA

How to Advertise in Payam Darya :

- *Name of your company*
- *Full address including zip code*
- *Contact person*
- *Email address*
- *Direct line*

**Kindly send the above
information to Mr. Sadeghi :**

- *Email : al_m_sadeghi@yahoo.com*
- *Email: m_sadeghi@irisl.net*
- *Mob: +98 912 100 17 69*
- *Fax: +98 8803 40 13*



***“ A man who stops advertising to save money
is like a man who stops a clock to save time”***

Henry Ford

www.irisl.net



GLOBAL MARINE & INDUSTRY PTE LTD

Blk 42, Toh Guan Road East, #01-72, Enterprise Hub, Singapore 608583

Tel: 65 - 68998713 Fax: 65 - 68998731

Email: info@globalmi.com.sg

Business & GST Reg. No: 200618668Z

Website: www.globalmi.com.sg

GLOBAL MARINE INDUSTRY (SHANGHAI) CO. LTD

Room A2215, Tomson Center, No. 188 Zhangyang Road Shanghai, 200120, China

Tel: 86 - 21 - 6850 3986 / 6850 7086 Fax: 86 - 21 - 5168 5769

Email: info@globalmi.net.cn

Global Marine & Industry Pte Ltd is a locally established company with a competent team of highly skilled professional engineers, technicians and craftsmen in marine aircon and respective field. Our managers are experienced and qualified people who have been in this trade for various years. Furthermore, we have a Representative Office in Shanghai to compliment our sourcing of spare parts for Owner's needs and are capable of carrying out aircon repair activities at various Ports in China.

Our nature of business:

Aircon Jobs

- 1) Supply & Installation for Various Brand of Air Conditioner Compressors, Air Conditioner Spare Parts & Package / Split Units
- 2) Complete overhauling of Various Compressors
- 3) Fabricate & Installation of Air Ducting
- 4) Modification, Conversion & Troubleshooting for Air Conditioner / HVAC / Cold rooms etc

Motor & Alternator Rewinding

- 1) AC & DC Motor
- 2) Rewinding / Servicing / Overhauling & Supply

Electrical & Automation

- 1) Generator / Alternator Troubleshooting / Repair
- 2) Alarm System Troubleshooting / Repair
- 3) Control Panel / Main Switch Board Fabrication
- 4) Cable Laying
- 5) Infrared Thermograph Scanning For Switchboard

Fabrication & Machining Works:

- 1) Crane Sheave, Fan Impeller, Shaft
- 2) Radiator, Heat Exchanger
- 3) Gears, Reducers, Seawater Pipes etc

Products In Stock

- A) Various Fully Recondition & New Aircon Compressor in Stock.
- B) Various Aircon Spare Parts.
- C) Evaporator Coil & Condenser
- D) Marine Package Unit / Split Unit



We extend our sincere felicitations to His Excellency

Mr. Modarres Khiabani and wish him all success in his new tenure which augurs well for IRISL GROUP and the Shipping Community. His dynamic leadership and extensive experience will immensely benefit IRISLGroup and take it to the pinnacle of glorious achievements in the future.

Best Wishes

Capt. Naresh Vaswami

(Founder and Managing Director)
and his dedicated team at Deep Sea Group



DEEP SEA GROUP

401, Morya Landmark II, Opp. Infiniti Mall, Off. New Link Road, Andheri (W), Mumbai - 53, INDIA.

Tel.: (91-22) 4079 0191 / 6691 6469 / 6695 9332

Email.: mail@deepseaindia.com Web.: www.deepseaindia.com

RPSL-MUM-110

RIIA

ISO 9001:2015

2006 MLC Compliant