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Performance, Outcomes and Results

The Maritime Education and Training (MET) Network with NGO Status at IMO

GlobalMET NEWSLETTER

A group of SAMTRA Cadets and Training Officers in Antarctica during a voyage on Training Vessel SA Agulhas SAMTRA is a prominent maritime training institute in South Africa and a member of GlobalMET

Inside this Issue

Editor: **Sriram Rajagopal**, Hong Kong

GLOBALMET MARITIME EDUCATION & TRAINING

To promote, develop and support in the spirit of cooperation, the common interests of its members in all matters concerning the development and quality of maritime education and training.

www.globalmet.org

Editorial

Capt. Sriram Rajagopal

Dear Readers,

Welcome to the February 2022 edition of the GlobalMET newsletter.

As you must have noticed, we have decided to collate material and publish issues every month. This is an improvement from our earlier pattern of publishing newsletters less frequently (typically 2-4 issues per year). This naturally has increased our workload tremendously, but we hope it is all for a good cause and that you, our members find the end result useful.

We have already begun to receive feedback from members regarding the new format, and the kind of articles you would like. We thank you for this feedback. You will notice that based on your comments, we have already made some improvements from this very issue itself. We hope you like the selection of articles.

Please feel free to continue to send us your comments, feedback and suggestions on the emails listed in this issue, and we will try our level best to accommodate them.

Most importantly, please encourage the faculty in your institutions to write and send us articles for publication. Details on the article length and style are given elsewhere in this issue. Our editorial team will go out of its way to help you fine tune your article and make it ready for publication.

IMO update – Assembly A.32

The 32nd session of IMO's Assembly was held from 6th to 15th December 2021. Your organization GlobalMET attended the sessions. Capt. Vinayak Mohla presents us with a summary of the main proceedings. Members will especially find the Revised Procedures for Port State Control Res. A.1155 (32) and the revised Survey Guidelines for Ships under the Harmonized System of Survey and Certification (HSSC) Res. A.1156 (32) of particular interest. Three earlier issued resolutions have been revoked – members may want to circulate these with their faculty as well, in order to remove these from your course material and documents.

Upcoming IMO meetings

As promised, we carry the list of IMO meetings for 2022 in this issue as well. This will be a regular feature in each issue, to help our members keep a tab on recent and upcoming IMO proceedings. February will be one of the most important months in 2022 for maritime training institutes at the IMO, as it is around this time that the Sub-Committee on Human Element, Training and Watchkeeping (HTW) will meet for five days. Similar to past years, GlobalMET will attend the HTW sessions this year too, present members' points of view and will contribute to the HTW's work.

Members who would like to contribute to the work being done by GlobalMET at the IMO are requested to send a short mail to Capt. Vinayak Mohla and myself. We will keep all members updated with a detailed report on the deliberations that take place at HTW 8 in the March and April newsletters.

For the information of members, four HTW meetings have taken place in the last five years. These were in February 2017 (HTW 4), July 2018 (HTW 5), May 2019 (HTW 6) and last year in February 2021 (HTW 7). Members wanting to see details of the work done by GlobalMET at them can view this on our website http://globalmet.org, under the "Our work at the IMO" sub-menu.

New books and publications – INTERTANKO Guide to safe navigation (including ECDIS)

INTERTANKO has published the 2nd edition to its Guide to Safe Navigation (including ECDIS). We summarize this book's salient features and contents, including a summary of what is new in this edition. Members who conduct ECDIS and navigation related courses may wish to obtain a copy of this publication for their libraries and faculty.

If you want more articles on new maritime publications, and impartial book reviews to be published in this newsletter, please let us know/send us a request.

Article – Lessons from the flooding of *Emma Maersk* in 2013

In February 2013, the nearly 400 meter long container ship *Emma Maersk* experienced flooding of its shaft tunnel and subsequently, its engine room. The entire main engine, upto cylinder head level got submerged in water. The incident occurred late at night, and was noticed just as the ship had entered the Suez Canal for its Southbound transit. Its transit had to be aborted, and the ship had to be brought alongside in an emergency with multiple tugs assisting in the emergency. In this article, based on the official findings of the Danish Maritime Accident Investigation Board, Mr. Chilukuri Maheshwar examines the event from an engineering and training perspective. He focusses on eight such items and derives 11 lessons that have relevance for us as maritime education and training trainers. The article is expected to be of special interest to both Deck and Engine personnel.

New books and publications – Bridge Procedures Guide (6th edition)

The International Chamber of Shipping (ICS) has just published the 6th edition of its popular book Bridge Procedures Guide. Often taken as a compilation of current industry practices, this new edition includes sections on the role of human element in navigation, ECDIS safety settings, CATZOC and many more topics.

Members who conduct navigation related courses may wish to obtain a copy of this publication for their libraries and faculty.

Article - Knowledge, quality and experience of maritime teachers

In this article, Dr. Angelica Baylon presents us with a conceptual framework on how maritime sector can best benefit from the knowledge, quality, and experience of its teachers. She does this by linking the inputs and processes involved with the outputs or outcomes. 6Ms and the mnemonic "COMPETENCIES" are used to describe qualities and processes that help make a maritime teacher a 'master' of his or her trade, namely that of teaching. In doing so, she presents some practical examples from our industry and provides institutions with suggestions on how to bring out the best in their teachers. Dr. Baylon has been involved in academics and teaching for more than two decades, and I am sure the views presented in this article will implore readers to contemplate them.

We hope you will enjoy this selection of articles. Please do give us your feedback at rajagopals@angloeastern.com

Happy Reading.

Capt. Sriram Rajagopal
Editor, GlobalMET Newsletter
Head of Outreach Activities (GlobalMET)

Upcoming IMO Meetings - 2022

The Editorial Team, GlobalMET Newsletter. *Source: IMO.*

Members please note: There are no IMO meetings currently scheduled for the month of August 2022. HTW 8 will be held from 7 to 11 February and GlobalMET will represent its members in it. Members wishing to participate in and contribute to the review of model courses – please send an email to Capt. Sriram Rajagopal and Capt. Vinayak Mohla on the addresses on the back cover. They will be most happy to include you in the team.

Forthcoming meetings

January	
8th session/17 – 21 January	Sub-Committee on Ship Design and Construction (SDC)
February	
8th session/07 – 11 February	Sub-Committee on Human Element, Training and Watchkeeping (HTW)
8th session/28 February – 04 March	Sub-Committee on Ship Systems and Equipment (SSE)
March	
11th session/14 –18 March	Intersessional Working Group on Reduction of GHG Emissions from Ships (remote meeting)
109th session/21 – 25 March	Legal Committee (LEG)
April	
9th session/04 – 08 April	Sub-Committee on Pollution Prevention and Response (PPR)
105th session/20 – 29 April	Maritime Safety Committee (MSC)
May	
46th session/09 – 13 May	Facilitation Committee (FAL)
12th session/16 – 20 May	Intersessional Working Group on Reduction of GHG Emissions from Ships (TBC)
June	
78th session/06 – 10 June	Marine Environment Protection Committee (MEPC)
9th session/21 – 30 June	Sub-Committee on Navigation, Communication and Search and Rescue (NCSR)
July	
127th session/11 – 15 July	IMO Council
8th session/25 – 29 July	Sub-Committee on Implementation of IMO Instruments (III)
September	
8th session/19 – 23 September	Sub-Committee on Carriage of Cargoes and Containers (CCC)
October	
LC 44/LP 17th session/03 – 07 October	Consultative Meeting of Contracting Parties (London Convention 1972) and Meetings of Contracting Parties (London Protocol 1996)
72nd session/17 – 21 October	Technical Cooperation Committee (TC)
November	
106th session/02 – 11 November	Maritime Safety Committee (MSC)
128th session/28 November – 02 December	IMO Council
December	
79th session/12 – 16 December	Marine Environment Protection Committee (MEPC)

IMO Update: Assembly - A32 (Dec 2021)

Capt. Vinayak Mohla, GlobalMET delegate to A32

The 32nd session of IMO's Assembly was held remotely from 06th to 15th Dec 2021.

GlobalMET, represented by Capt. Vinayak Mohla and Capt. Sriram Rajagopal attended the meeting.

The following sums up important aspects of the proceedings that may be of interest to members:

Election of members of council

The following 40 IMO member states were elected to the Council for the 2022–2023 biennium:

Category A (States with the most significant stakes in international shipping services): China, Greece, Italy, Japan, Norway, Panama, Republic of Korea, Russian Federation, United Kingdom, United States of America.
No changes from the last biennium.

Category B (States with the biggest share of international seaborne trade): Australia, Brazil, Canada, France, Germany, India, the Netherlands, Spain, Sweden, and the United Arab Emirates.
Sweden replaces Argentina.

Category C (States which have special interests in maritime transport or navigation and ensure representation in all key geographical regions of the world): Bahamas, Belgium, Chile, Cyprus, Denmark, Egypt, Indonesia, Jamaica, Kenya, Malaysia, Malta, Mexico, Morocco, the Philippines, Qatar, Saudi Arabia, Singapore, Thailand, Turkey, and Vanuatu.
Qatar, Saudi Arabia, and Vanuatu replace Kuwait, Peru, and South Africa.

Important resolutions and circulars

The following lists the most relevant resolutions adopted by the Assembly

Resolution A.1149(32)

Revised Strategic Plan for the Organization for the six-year period 2018 to 2023.
The Assembly updated the plan for the 2022–2023 biennium, adding a new strategic direction on the human element.

Resolution A.1155 (32)

Procedures for Port State Control, 2021.
The new resolution updates procedures to take account of amendments to IMO instruments that have entered into force since the adoption of the previous resolution A 1138(31). The amendments are mainly related to Appendix 7 (Guidelines for control of operational requirements) which are intended to assist PSCO's to exercise professional judgement to determine whether the operational proficiency of the crew is of a sufficient level to allow the ship to sail without danger to the ship or persons on board, or harm to the marine environment. This resolution revokes resolutions A 1138(31) and MEPC 321(74).

This resolution is expected to be of interest to members who teach Port State Control related courses at their training centres.

Resolution A.1156(32)

Survey Guidelines under the Harmonized System of Survey and Certification (HSSC), 2021.
The revised guidelines include requirements related to:

- Operational readiness, maintenance and inspections for lifeboats and rescue boats, launching appliances and release gear, means of escape for passenger ships and helicopter facilities
- Harmonization of survey periods of cargo ships not subject to the ESP Code
- Intact Stability
- Electronic record books under MARPOL
- Helicopter facility foam firefighting appliances

This resolution revokes resolution A 1140(31).

Resolution A.1157(32)

2021 Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code).
This resolution revokes resolution A 1141(31).

Resolution A.1158(32)

Guidelines for Vessel Traffic Services.
This resolution revokes resolution A 857(20).

Resolution A.1159(32)

Prevention and suppression of piracy, armed robbery against ships and illicit maritime activity in the Gulf of Guinea.

Resolution A.1160(32)

Comprehensive action to address seafarers' challenges during the COVID-19 pandemic.
The resolution consolidates issues related to crew changes, access to medical care, "key worker" designations to facilitate shore leave and unhindered movement across borders, and prioritization of vaccinations.

Resolution A.1161(32)

Entry into force and implementation of the 2012 Cape Town agreement.
This resolution addresses safety of fishing vessels and encourages member states, which have not yet done so, to becomes parties to the Cape Town Agreement by 11th Oct 2022.

Non-Governmental Organizations

Consultative status was granted to the following organizations:

1. Ballastwater Equipment Manufacturers' Association (BEMA);
2. Global TestNet;
3. The International Windship Association (ISWA); and
4. The Grain and Feed Trade Association (GAFTA).

Resolutions revoked

The following lists the resolutions that were revoked by the Assembly.

Members might find it useful to remove mentions of these circulars from their courses and replace them with more current IMO circulars:

Resolution A 658(16)
Use and fitting of retro-reflective materials on life-saving appliances

Resolution A 739(18)
Guidelines for the authorization of organizations acting on behalf of the Administration

Resolution A789(19)
Specifications on the survey and certification functions of recognized organizations acting on behalf of the Administration

About the author

Capt. Vinayak Mohla started his sea career in 1992 as a deck cadet and gradually rose to the rank of a Master. He stepped ashore in 2008 and is presently working with Anglo-Eastern Ship Management as "Head- Cadet Recruitment & Competency Management". He has been the Review Group co-ordinator for several IMO model courses (2017-2022) and chaired the Drafting Group 1 at IMO, London in 2018 (HTW 5).

Feedback request

Do you have any comments regarding the articles in this newsletter, the GlobalMET website or GlobalMET's activities?

If yes, then we eagerly solicit your feedback.

Please send your comments and suggestions to Capt. Sriram Rajagopal (Head of Global Outreach Activities, GlobalMET) and the Secretariat at the following three email addresses, and we will get back to you.

Email: rajagopals@angloeastern.com and sriram.rajagopal@globalmet.org
Email: Secretariat@globalmet.org

Please do mention the name of the member.

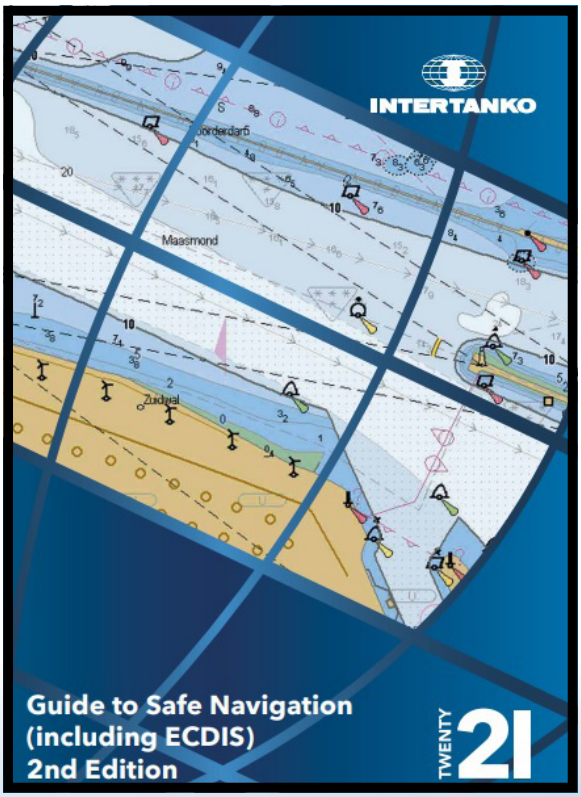
"Art is an ocean and I am a dream sailor."

—Biju Karakkonam

New edition published: INTERTANKO Guide to safe navigation (including ECDIS)

The Editorial Team, GlobalMET Newsletter

Ever since ECDIS was made mandatory on merchant ships, a number of books and guidelines have been published by the industry, individual authors and shipping companies. In November 2021, INTERTANKO published the second edition of its book "Guide to safe navigation (including ECDIS)". This replaces its earlier first edition which had been published in 2017.



The chapters contain guidelines on the following topics:

- Zone of Confidence (ZOC) and Passage Planning
- Under Keel Clearance (UKC)
- Area Settings in ECDIS
- Frequency of Position Verification in ECDIS
- Safety Contour in ECDIS
- Temporary and Preliminary Notices
- Techniques to detect jamming and spoofing
- Effective training
- Alert management

Many would consider this book to be part of what has been often been referred to as 'industry best practices'.

It would certainly be useful for members who teach ECDIS and navigation related courses.

Lessons from the flooding of *Emma Maersk* – February 2013

Chilukuri Maheshwar

1. Introduction

On 1 February 2013, the nearly 400 meter long container ship *Emma Maersk* experienced a case of severe flooding in her shaft tunnel and engine room. As a result, about 14,000 cubic meters of sea water entered the ship, flooded her engine room to a level equivalent to her draft of 15.1 meters, and submerged the main engine up to the cylinder head. This article describes the event, its root causes as identified by the official investigation report, and the failure of structural as well as functional barriers that should have prevented the incident. While the events and photos are taken from the official report published by the Danish Maritime Accident Investigation Board (DMAIB), the author has added his own comments, based on his experience of working on board ships as well as lessons garnered from teaching at MET institutions, so that the lessons learnt can be used by all maritime institutions and perhaps generate further responses among readers.

Figure 1: Emma Maersk.
(Source: DMAIB, 2013)

Name of vessel	EMMA MÆRSK
Type	Container ship
Flag	Denmark (DIS)
IMO number	9321483
Year built	2005, Odense Staalskibsværft A/S/203
Class	American Bureau of Shipping
LOA	397.71 m
Breadth	56.40 m
Gross tonnage	170,794
Deadweight	156,907 t
Maximum draft	16.02 m
Engine rating	80,080 kW at 102 RPM
Service speed	24.50 knots
Hull design	Double hull

Table 1: Ship particulars
(Source: DMAIB, 2013)

2. The Incident

On the evening of 1 February 2013, the containership *Emma Maersk* (IMO 9321483), loaded with about 14,000 containers, was about to pass southbound through the Suez Canal. While in the convoy, a severe ingress of seawater occurred into the shaft tunnel, the flooding continued and extended to the engine room. Within two hours, about 14,000 cubic meters of seawater had entered the engine room flooding it up to a level equivalent to the outside draft of 15.1 meters. The main engine got submerged up to the cylinder head level.

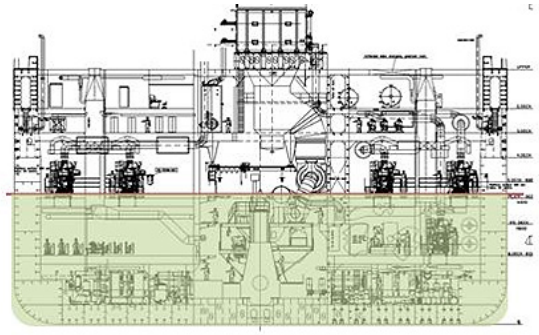


Figure 3: Transverse Section of Emma Maersk showing the level of flooding in the engine room. *(Source: DMAIB, 2013)*

Figure 4: Longitudinal Section of Emma Maersk.
(Source: DMAIB, 2013)

How the ship was saved:

The ship was taken off the convoy and was steered on its own power to the Suez Canal Container Terminal to be finally moored with the help of five tugs. During the mooring operations, the ship lost propulsion power and subsequently, even the electrical power was lost. While coming alongside, the shipside suffered minor indentations.

3. Various Contributory Factors

3.1 Failure of forward stern thruster

Emma Maersk has two bow thrusters and two stern thrusters Make: Rolls Royce Marine AS, 4-bladed tunnel thruster type TT2400 AUXD CP, operating at 257 RPM, each creating a thrust of about 250 KN, regulated by a hydraulically controlled pitch propeller system. The blades were made of Ni Al Bronze. Each stern thruster was built into an eight-meter long transverse tunnel with a diameter of 2.4 meters. The water ingress into the shaft tunnel occurred at the flange neck of the forward stern thruster shaft sealing. The entire flange neck was basically torn off the transverse tunnel at the welded connection between the flange neck and tunnel and moved forward creating a gap. One of the propeller blades that had been fitted as a replacement for a broken blade on the aft stern thruster in October 2012 was of a different design than that of the original propeller blades. **A mistake made during the pattern production process showed a lower blade foot area (prior to 2006/07) leading to excessive material removal. This deviation was not captured by the manufacturer's internal quality system.**

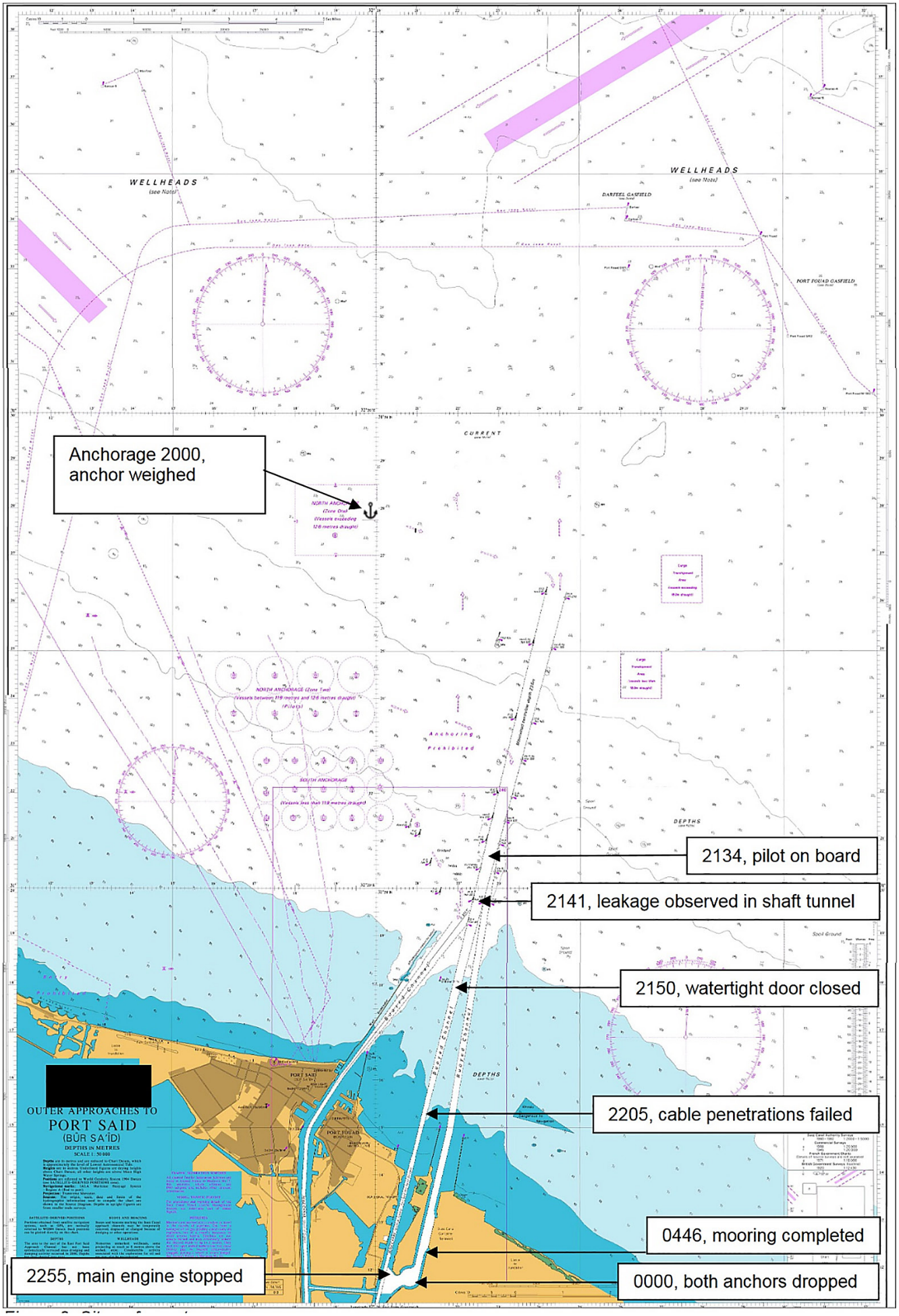


Figure 2: Chart showing the sequence of events. *(Source: DMAIB, 2013)*

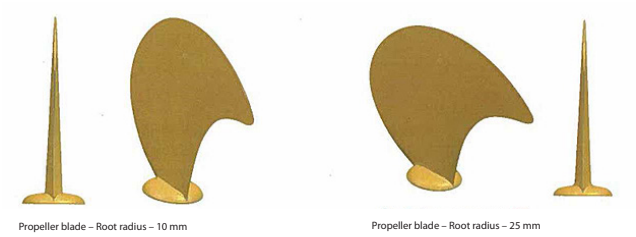


Figure 5: Transition between blade and blade base
(Source: DMAIB, 2013)

The weight of the new propeller blade that was mounted on the aft stern thruster in 2012 was 4.5 kg lesser than that of the original blades. This resulted in an imbalance creating a centrifugal alternating load on the structure of 4.9 kN at the operating speed of 257 RPM (4.28 Hz) corresponding to 3% of the forces from loss of one blade. The dynamic balancing of the original four blades was according to ISO Class II, but after the replacement of one propeller blade by a blade of the new design, the dynamic balancing of the propeller exceeded ISO Class II. **High dynamic loadings and an unfavorable design related to a sharp notch that is associated with high local stress concentrations. The propeller blades broke off at their bases due to fatigue failure.**

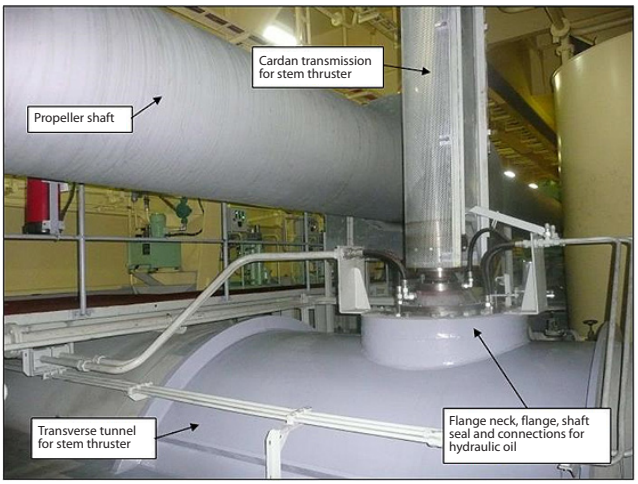


Figure 6: Arrangement of Stern Thruster Power Transmission.
(Source: DMAIB, 2013)

3.2 Failure of watertight integrity between engine room and tunnel

The bulkhead between the engine room and the shaft tunnel, situated at Frame No. 166, was designed, constructed, approved and relied on as a watertight bulkhead. This bulkhead had not been constructed to meet the ship's damage stability conditions, but rather to limit the needed capacity of the CO_2 fire extinguishing plant. It was not compulsory according to SOLAS regulations.

The construction of this watertight bulkhead was designed to limit the size of fixed fire-extinguishing plant for total flooding of CO_2. In the port side of the watertight bulkhead between the engine room and the shaft tunnel, there was a watertight sliding door. The watertight door could be operated locally from both sides, in the engine control room and the ship control center.

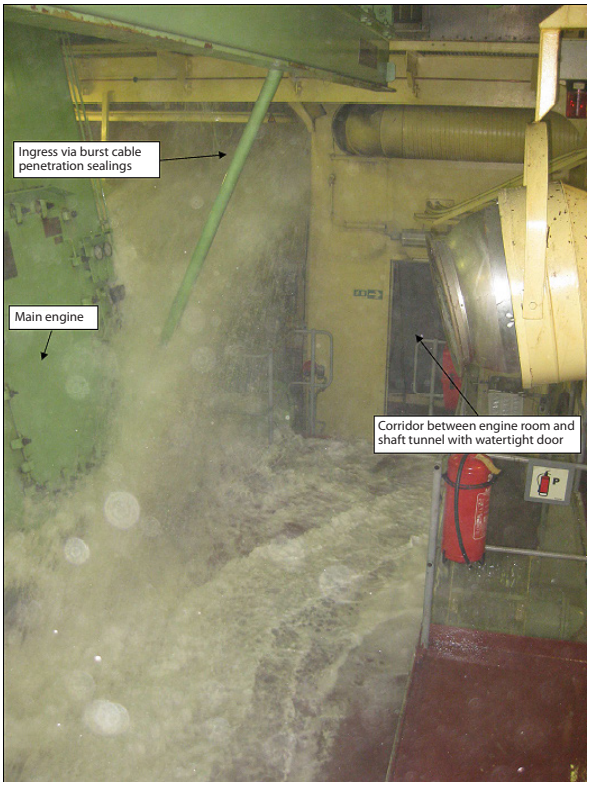


Figure 7: Ingress of Water into Engine Room. *(Source: DMAIB, 2013)*

3.3 Failure of cable penetrations leading from tunnel and engine room

The cable penetration system named "GK Packing System" used in *Emma Maersk* with stay plates of plastic was designed to withstand fire and gas. Cable penetrations with metal stay plates were tested to a water pressure of 5.5 bar and a gas pressure of 0.3 bar, while plastic stay plates were limited to one bar and 0.3 bar, respectively. The four high-voltage cable penetrations located above the propeller shaft in the watertight bulkhead at Frame 166 were all fitted with stay plates of plastic. instead of stainless steel plates because they were easier to install and were less costly.

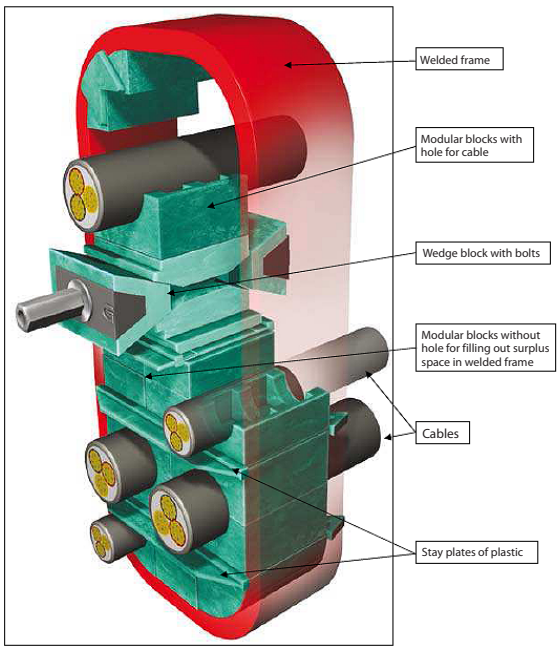


Figure 8: A "GK packing" marine cable penetration system
(Source: GK marine)

When the four high voltage cable penetration sealings collapsed, the ship's draught was about 16 meters. The high voltage cable penetrations in the watertight bulkhead were situated about seven meters above the ship's baseline. Thus, the cable penetrations collapsed at a hydrostatic water pressure corresponding to the maximum water column of approximately nine meters equal to approximately 0.9 bar.

3.4 Improperly designed bilge piping system

The valves in the bilge system for the engine room and the shaft tunnel were to be operated manually on site at each bilge well. **When the shaft tunnel was completely flooded and the watertight door was closed, it was not possible to enter the shaft tunnel and close the bilge suction valves. Nor could the bilge suction line in the shaft tunnel be isolated, which caused the entire bilge line to be pressurized.**

3.5 Improperly designed Emergency Bilge Suction System

In the event of a water ingress of this magnitude, the bilge pump capacity and the functioning of the system as a whole are essential to either contain the situation or to gain the necessary time for limiting the consequences – abandoning the ship or getting the ship alongside. The ship was equipped with means for discharging water in accordance with Class rules.

There was a mismatch between the expected discharge capacity and the actual discharge capacity of the emergency bilge suction line caused by the reduced inflow area of the inlet to the large seawater pump (emergency bilge suction) and by the discharge water being pumped through the central cooling system. This in turn created a back pressure reducing the capacity. The emergency bilge suction pipe has a 600 mm internal diameter. It was situated just below the pump 50 mm above the tank top and had no strainer. The area made up by this elevation (50 mm) multiplied by the pipe circumference is only one third of the internal area of the inlet pipe. Therefore, **the flow to the pump was reduced to an unknown proportion of what would be the case with an inlet area under the suction pipe equally large as the pipe itself.**

3.6 Failure to isolate the seawater pump from the other cooling water pumps.

The pump was running in parallel operation with the other seawater pump that was serving as a cooling water pump, and the discharge from both pumps had to pass via the central cooler giving a pressure head of 3.0 bar. **The backpressure from the coolers contributed to a diminished capacity of the pump.**

3.7 Poor maintenance of emergency bilge suction valve

The emergency bilge suction valve provides direct suction from the engine room tank top. The opening of the suction valve was supposed to be carried out manually by a large handwheel just above the floor plate. The suction valve was situated just above the tank top, and its spindle was connected to the handwheel by an extension fitted to the valve spindle by a cardanic connection, the bushing of which was locked to the rod with steel pins. **When operating the handwheel, a steel pin broke and the handwheel could not be used.** The engineer had to crawl under the floor plates and used a wrench to open the valve while standing on the tank top in water to the knees.

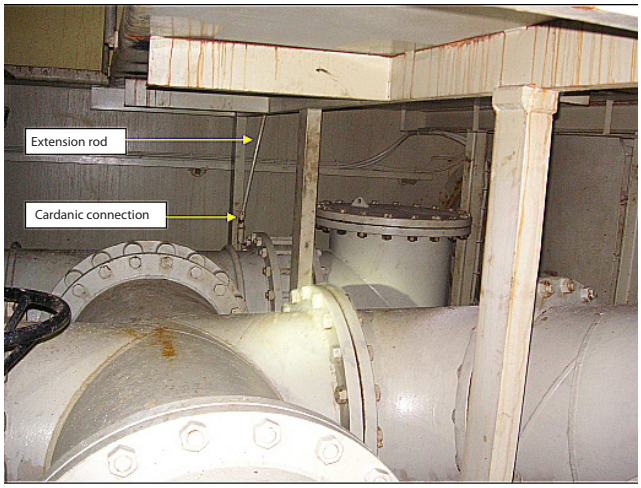


Figure 9: Extension rod and a cardanic connection.
(Source: DMAIB, 2013)

3.8 Ventilation duct valves in the watertight bulkhead

The watertight door was closed locally by the second engineer, but the two hydraulically operated valves in the ventilation ducts situated just above the watertight door could not be operated locally and had to be operated from the ship control center.

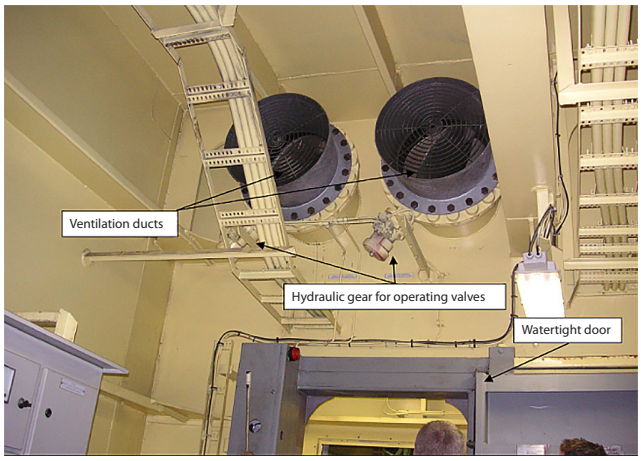


Figure 10: Ventilation duct valves in the watertight bulkhead.
(Source: DMAIB, 2013)

In terms of fire-fighting or fire precautions, it may make sense to operate the valves from the ship control center from where all other firefighting systems are controlled. However, as an element in the bulkhead's watertight integrity, it is inexpedient that the valves in the ventilation ducts cannot be operated on site like the watertight door. In this particular emergency, it did not pose any significant risk.

The long distance from the watertight door to the deck office, may have complicated rapid and rational actions in the complex circumstances of an emergency.

4. Lessons learnt and recommendations

1. For any rotating system, replacing one broken blade is insufficient. The entire set of blades has to be replaced.
2. Dynamic balancing after replacing components of a rotating system is important.
3. Lack of standardization in design and manufacturing techniques among components can lead to undesirable consequences.

4. If hydraulic valves are required to be fitted to ventilation pipes passing through a bulkhead separating two watertight compartments, they should be provided with local operational controls.
5. Cable penetration wherever used should be tested to withstand the required hydrostatic pressure equivalent to the outside water level.
6. Provision should be made to isolate the tunnel bilge system from outside the tunnel without having to enter the tunnel.
7. Inlet area and the height beneath the emergency bilge suction inlet pipe should be designed to allow sufficient water flow in case of emergencies. **This would need to be checked by the shipstaff.**
8. When using the emergency bilge suction, coolers should be bypassed to reduce back pressure. **Shipstaff would have to be trained for this.**
9. The emergency bilge suction valve should be operated regularly under controlled conditions and regular greasing and maintenance should be carried out. **This highlights the importance of regular trying out of Emergency Bilge Suction.** Most companies have a drill planner that is used on board ships, so that different types of drills get exercised throughout the year. **It would be worthwhile to incorporate an engine room flooding drill along with other emergency drills.**
10. It is better to keep the machinery submerged in sea water until complete repair systems are in place. Exposure to air will, after being in contact with seawater, accelerate corrosion.
11. It is important for a ship's crew to be adequately trained for such situations where leadership and presence of mind are put to test.

5. Conclusions

The accident and its consequences were the result of a breakdown of structural barriers i.e., the hull of the ship and the watertight bulkhead and weaknesses in the functional barriers – i.e., the bilge system and the emergency bilge system.

Despite the breakdowns and weaknesses, the shipboard organization commendably managed to contain the emergency situation and bring the ship alongside. The events of the accident did not result in more severe consequences due to the behavior of the crew who managed to adapt to the situation and prioritize the recovery effort to meet the unfolding events. Furthermore, the outcome was favored by the ship's position close to the Suez Canal Container Terminal.

It is beneficial that all new big sized container vessels have engine rooms located in the mid ship. Following this concept was providentially good for *Emma Maersk* as its engine room was not in the aft of the ship as is the case with many tankers and smaller ships. If the additional weight of 14000 cubic meters of seawater had been added at the aft of the ship in the engine room and the ship had been light, the ship would have developed a trim which could have lifted the bow above the waterline, In this situation the ship could have broken into two parts at midship very much like the *Titanic* did.

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- TradeWinds, 2013. Emma leaves Suez, TradeWinds, 18 Mar.

About the author

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New publication and review - Bridge Procedures Guide (6th edn.)

The GlobalMET editorial team

A new edition of the Bridge Procedures Guide (BPG) has just been published by the International Chamber of Shipping (ICS). This Sixth edition of BPG was officially launched in January 2022. Procedures given within it are often taken as industry guidance for best practices of bridge navigation and procedures.

Members involved in bridge navigation related courses might find it useful to obtain this latest edition for their libraries and their faculty. The print version is available from the ICS bookshop, and e-books are available from Witherbys, Weilbach and NAVTOR

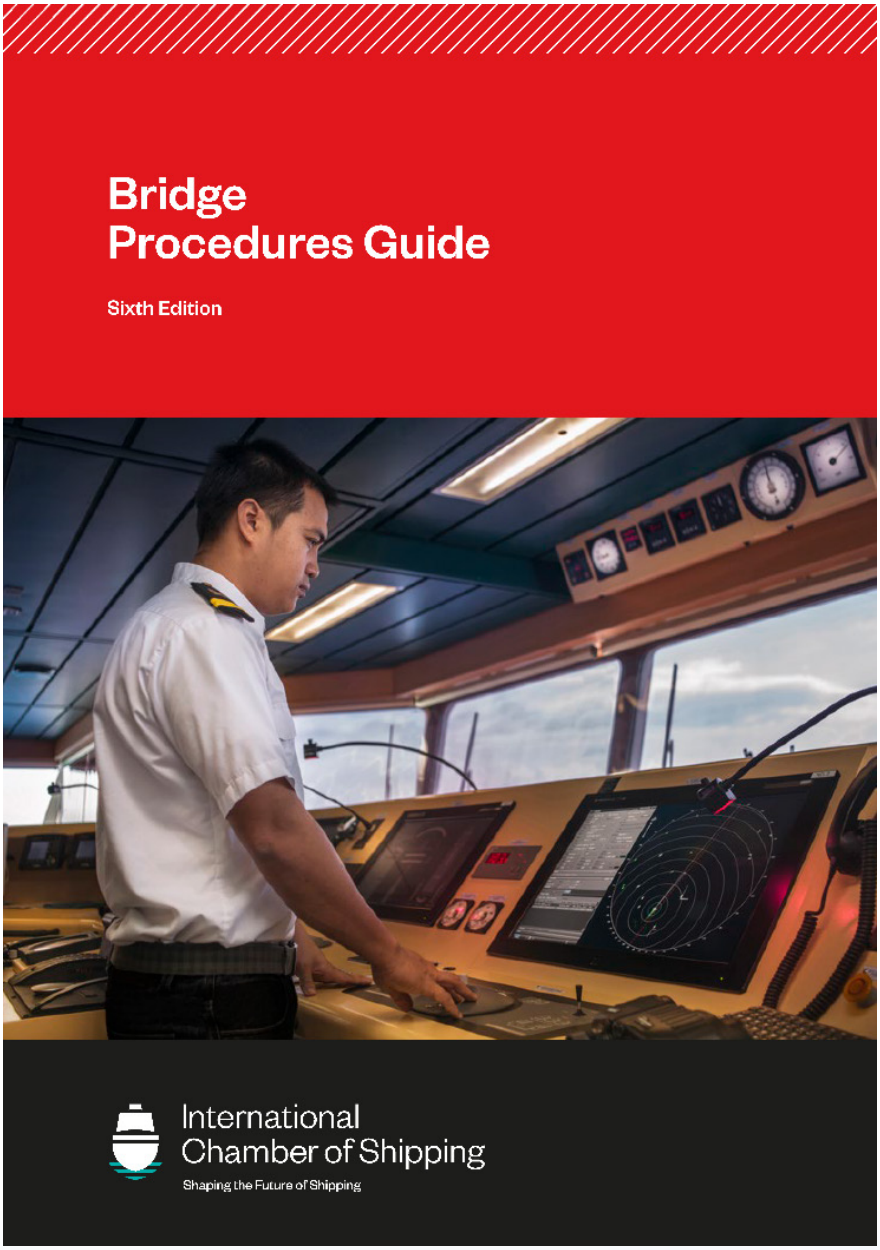
The sixth edition of BPG includes the following:

- Guidance on non-navigational procedures
- Additional visuals
- New sections on 11 topics (see below)

New sections have been added on the following topics:

- The role of human element in navigation
- Safety settings for ECDIS
- Category zone of confidence (CATZOC) for ECDIS
- Weather routing
- Communication with the engine control room (ECR)
- Cargo operations
- Risk assessments and permits to work (PTW)
- Ship stability
- Ballast water management
- Errors associated with Global Navigation Satellite System (GNSS), a term that today consists primarily of GPS, with a few ships fitted with GLONASS and Beidou receivers
- Characteristics of radar

The *Bridge Procedures Guide* complements the guidance in the other ICS publication Engine Room Procedures Guide.



A Conceptual Framework for Benefitting from the Knowledge, Quality, and Experience of Maritime Teachers

Angelica M. Baylon

1. Introduction

The need to maintain high standards in maritime education and training (MET) has been stressed at various forums. In this article, we develop a conceptual framework on how this can be done by focusing on three key elements of an excellent maritime teacher: knowledge, quality, and experience. Naturally, the question is interesting and requires an exciting answer. Indeed, there can be more than one '*correct*' answer, depending on the individual's perspectives and current role in the maritime world.

1.1 Aims and methods

In this article, based on my own and my colleagues' personal observations, experiences, and documentary analysis from various earlier publications from this sector, a conceptual framework is presented on how the sector can best benefit from the knowledge, quality, and experience of teachers. My own work at the Maritime Academy of the Asia Pacific (MAAP), which I have been associated with since 1999, initially as its executive dean, and now as one of its directors; as well as interactions with various maritime teachers, have contributed to the thoughts expressed in this article. MAAP has been training seafarers in the Philippines since 1999. Additionally, it has been active in GlobalMET and various maritime activities. It's President, VAdm Eduardo Ma. R Santos, AFP (Ret) is the regional representative of the International Association of Maritime Universities (IAMU), Vice-chair of GlobalMET, and President of the Philippine branches of Nautical Institute and the Institute of Marine Engineering and Science Technology (IMarEST). Many of the ideas described here have been influenced by interactions with him and with many non-MAAP entities that I have come into contact with, due to these activities. I am thankful to all of them.

2. Results

Based on the above, we present a conceptual framework (figure 1). It relates the "*Inputs*" to the "*Process*" and the resulting "Outcomes. The former is shown to contain "*6Ms*". The 24 key ingredients that make the process are highlighted in the "Process", resulting in a high-quality outcome or end product, namely a high-quality teacher. The mnemonic "*COMPETENCIES*" is used for the convenience of representation of these key ingredients. We describe each of the above in the following sections, with practical MET-related examples. We also describe their applicability to the current COVID-19 related pandemic restrictions that have compelled MET providers to migrate to online platforms.

3. Discussion

3.1 Inputs – the 6 Ms

Most training establishments have requirements to ensure that their faculty have the required knowledge, quality, and experience. While international STCW (Standards for Training, Certification, and Watchkeeping) and national requirements help specify these, they tend to be non-specific and allow the employer, namely the MET provider, to establish their own criteria. An easy way to remember the six aspects of making a good teacher is the '*6Ms*', namely Manpower, Machinery, Money, Materials, Manuals, and Management.

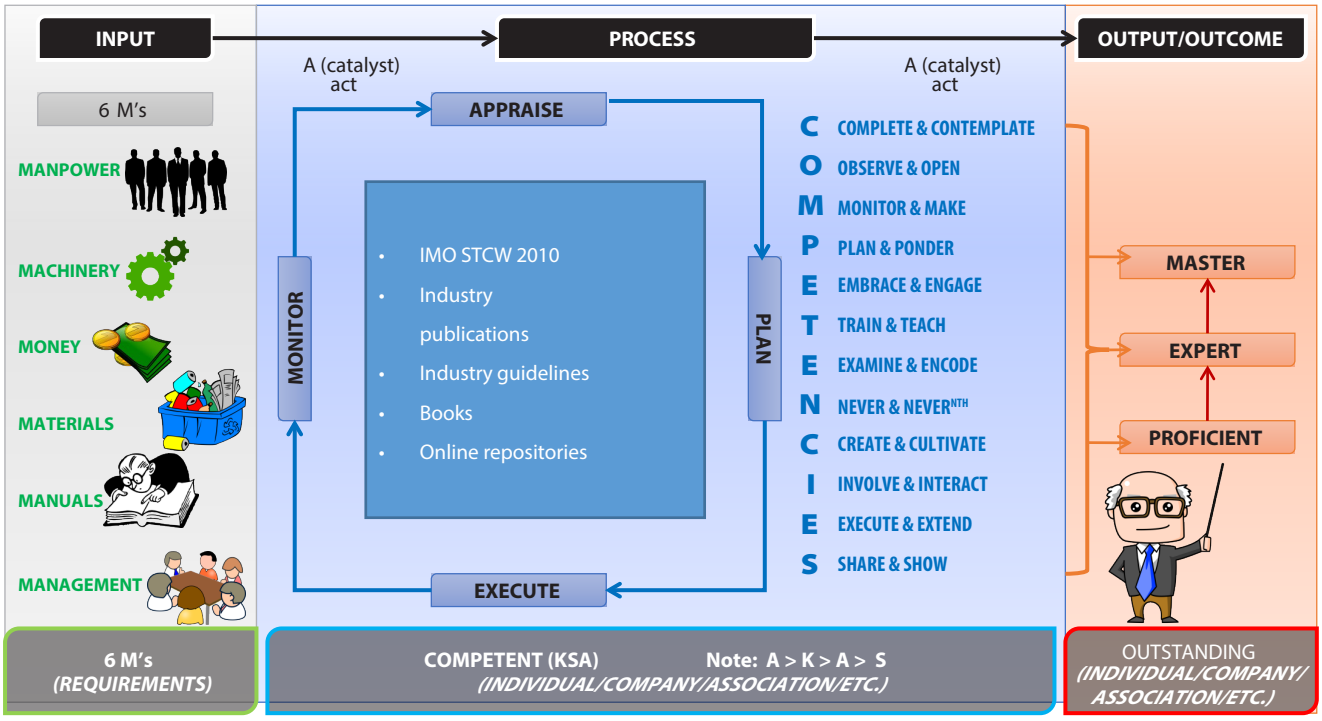


Figure 1: A conceptual framework that describes how the industry can use the knowledge, quality and experience of teachers for its and its students benefit. *Source: the author.*

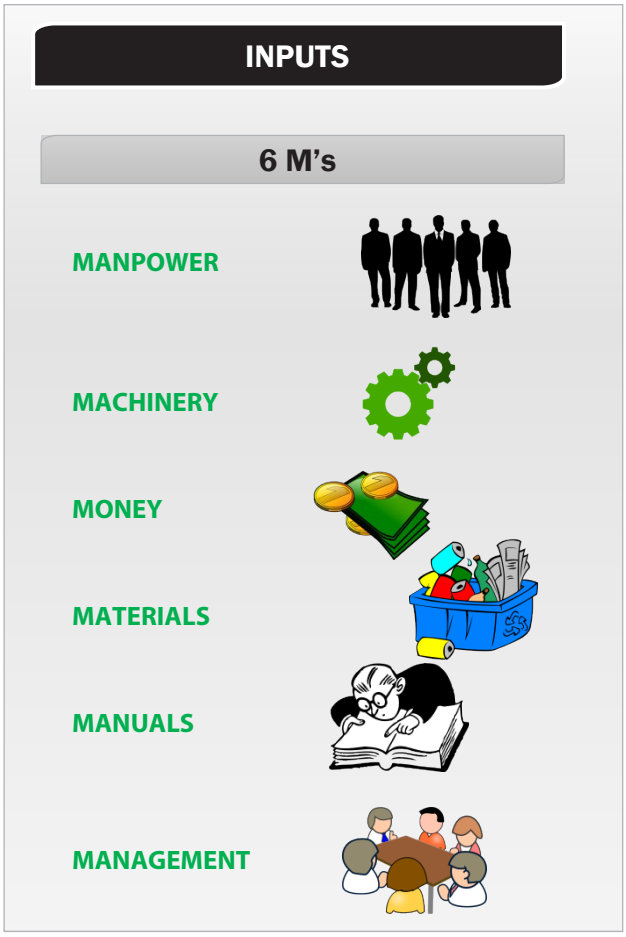


Figure 2: The 6Ms that make up the Inputs.
Source: the author.

Manpower naturally refers to people. **Machinery**, in this case, refers to equipment and infrastructure required, from simulators to mock-ups of ships, lifeboats to working models of oily water separators and hatch cover controls, as well as infrastructure in terms of classrooms (for brick and mortar teaching) and dependable, easy to use online software (for conducting online education). **Money** is naturally needed to pay for things and services required. Materials like supplies or other items can be critical for helping a teacher teach well. This would include providing teachers with free laptops and the internet in today's world. **Manuals** related to the administrative aspects for the quality assurance procedures and policies. **Management** is perhaps one of the most critical aspects. It relates to the leadership, the people who make up the top management, and people at each management level who can provide or deny support to their teachers, and thus indirectly, to their learners. These six elements need to be provided for us to help the teacher become a competent, proficient, expert, or master (pun unintended).

3.2 The Process

As per IMO Resolution A.893 (21), all seafarers learn that in passage planning, they must **Appraise**, **Plan, Execute** and **Monitor** to navigate safely between two points. The same model can help us steer a course towards becoming competent maritime teachers. The teacher's task here is to help navigate the students' learning. Hence, to ensure that the knowledge, quality, and experiences of maritime teachers are *'fit for purpose,'* all concerned persons must use the various support systems available (6Ms) to:

- **Appraise:** Teachers must know themselves, their strengths and weaknesses, along with any gaps in their qualifications, knowledge, and experiences that need to be addressed to be better teachers for their students;

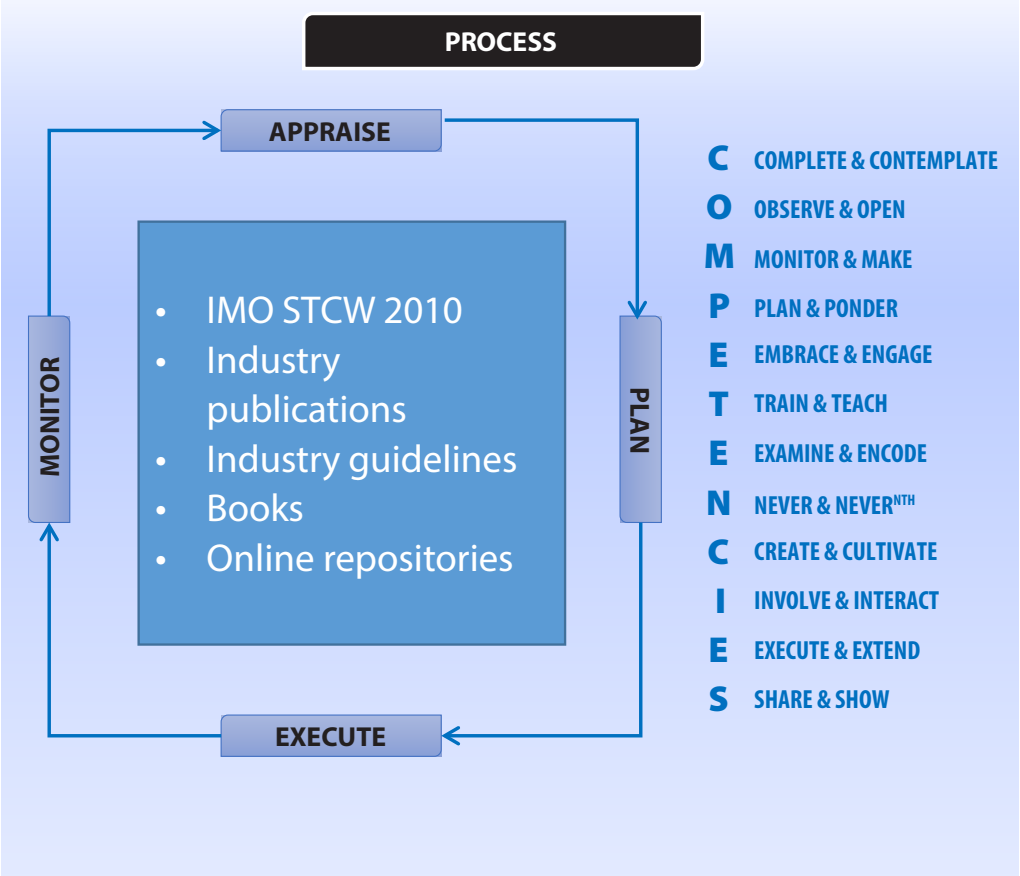


Figure 3: The Process and C-O-M-P-E-T-E-N-C-I-E-S. *Source: the author.*

- **Plan:** Teachers must create their outcomes-based learning (often abbreviated as OBL) and development plans to serve as a guide in the delivery of the course;
- **Execute:** Teachers must carry out the project, which is the most challenging but part of the teachers' responsibilities. Teachers must deliver the course as planned to produce the needed outcomes;
- **Monitor:** Teachers need to check the plan if accomplished and reflect on what went well and what didn't. They must find ways and means to build their competencies to move forward to being proficient, an expert, or a master for personal satisfaction, for the benefit of their students and the organizations that they serve.

Many experiences and quality learnings (or new knowledge and skills) may be needed even for experienced teachers to elevate their competencies. For example, if we expect teachers to use a certain software, we should first teach them how to use it. How else can we expect a teacher to teach, say a particular loadicator or ECDIS software to their students? A seat-of-the-pants, 'figure it out on one's own' approach is clearly unprofessional here. Just because we have done things a certain way in the past does not make it the right way.

Similarly, let us suppose that we want deck officers to teach a bulk carrier safety course. In that case, we should give them sufficient time and material to prepare for their classes, and arrange a ship visit to a bulk carrier so that they too can update their own knowledge of practical realities on board.

To be good teachers, teachers need to be good learners. As learners, the rules given are generally followed. Once trained or taught, the teachers develop the required competencies characterized by active decision-making when choosing the course of action.

3.2.1 C-O-M-P-E-T-E-N-C-I-E-S

Action words or verbs are applied for easy recall, represented by each letter in the word **COMPETENCIES**. It is opined that actions are needed to build up one's competencies.

C- **C**omplete and **C**ontemplate on maritime studies, sea experience, training courses. The Certificate of Competency or COC is normally the minimum requirement, however *'C'* here might also include any related higher level of maritime studies applicable. These are needed to build up one's qualifications by completing and gathering various certificates and degrees. For example, an ECDIS trainer would need to complete an IMO 1.27 ECDIS course and type-specific training on the ECDIS models that he or she is expected to teach seafarers. However, after completion, one needs to contemplate applying the knowledge gained. **Competency** is the capability to use or apply a set of related **knowledge**, **skills**, and **abilities** required to do the tasks in any given situation successfully;

O- **O**bserve and **O**pen one's horizon by asking mentors or assessors for feedbacks. These mentors may serve as inspirations and role models. There are online-resources (GlobalMET, NI, IMAREST, IAMU, etc.), free manuals, journals, video tutorials, books, etc. which maritime teachers can take advantage of;

M- **M**onitor and **M**ake way for new developments in technology to move forward with the latest trends;

P- **P**lan and **P**onder with the use of new tools and other techniques to be effective in mentoring or teaching recent trends;

E- **E**mbrace and **E**ngage in all new things, drills and training to hone proficiencies;

T- **T**rain and **T**each, by mentoring, one will get to be more skilful and knowledgeable;

E- **E**xamine and **E**ncode goals and learning activities in a journal. It is in documenting that teachers won't forget what they have learned, and the same is helpful in performance review, reflecting, and for future planning for professional development and in passing them to future generations;

N- **N**ever, **N**ever^{nth} give up. Always learn from the experience and do better the next time;

C- **C**reate and **C**ultivate new knowledge through Continuing Professional Development **(CPD)** a scheme currently offered by GlobalMET, NI, IMAREST, and IAMU;

I- **I**nvolve and **I**nteract with various like-minded people, experts, and role models by being an active member of international professional associations like GlobalMET, NI, IMAREST and IAMU to be mentored and be updated with global thinking and issues and be recognized, which will add value to being maritime teachers ;

E- **E**xecute and **E**xtend suitable learning activities always because practice makes perfect;

S- **S**hare and **S**how knowledge for a domino effect and get satisfaction from doing so.

Competency can be defined as a set of combined Knowledge, Skills, Abilities, and Attitude, often abbreviated by educators as '*KSA*' that enables a person to act effectively in a job or situation for organizational success. If we rank KSA on their degree of importance using a simple algebraic equation, which should rank first?

Just for fun, let us use the alphabet letters A to Z and designate a value to each letter (If A =1, B=2, C= 3, D=4 ….with Z = 26). Add all the designated value for each letter for **knowledge** (11+14+15+23+12+5+4+7+5), **skills** (19+11+9+12+12+19), **abilities** (1+2+9+12+9+20+9+5+19) and **attitude** (1+20+20+9+20+21+4+5) and see which gets a total of 100%. Indeed, Math is an exact science, though admittedly, not everything can be translated into numbers!

We posit that **knowledge**, both practical and theoretical, would amount to 96 % in all probability. **Skills** would amount to 82% - this would include conceptual, technical, and core competency skills, namely personal, interpersonal, and business skills. **Abilities** would amount to 86% and would be necessary to help the teacher go forward. The teacher's **Attitude** (100%) will guarantee a 100% positive result in going forward, with the teachers serving as a catalyst through their actions in making their students or their organizations (company, schools, associations) top or outstanding, with deliverable outcomes.

It is the teachers' **Attitude** to act and apply their **knowledge**, **skills**, and **abilities** (**competency**) for the common good that defines the outcome. Continuous learning through education (CPD training) is, in my opinion, a *must* for teachers regardless of age (young and old), rank (OS to Captain/Master), nationality, and experience (at sea and in teaching). There is NO limit to

the degree of **knowledge**, **quality**, **and experiences** that can be achieved as teachers. The peer learning that takes place in these CPD workshops, as teachers discuss their own experiences, problems, solutions, workarounds, and views with other teachers, gives these workshops excellent value. It is then dependent on the teachers' own Attitude to move forward using the enhanced skills and knowledge thus collected.

3.3 The Outputs or Outcomes

It can be surmised that being competent is not a static level of achievement. It is only when we elevate our competencies that we become good maritime educators, teachers, and trainers. There is thus a need to go *beyond* simply being competent.

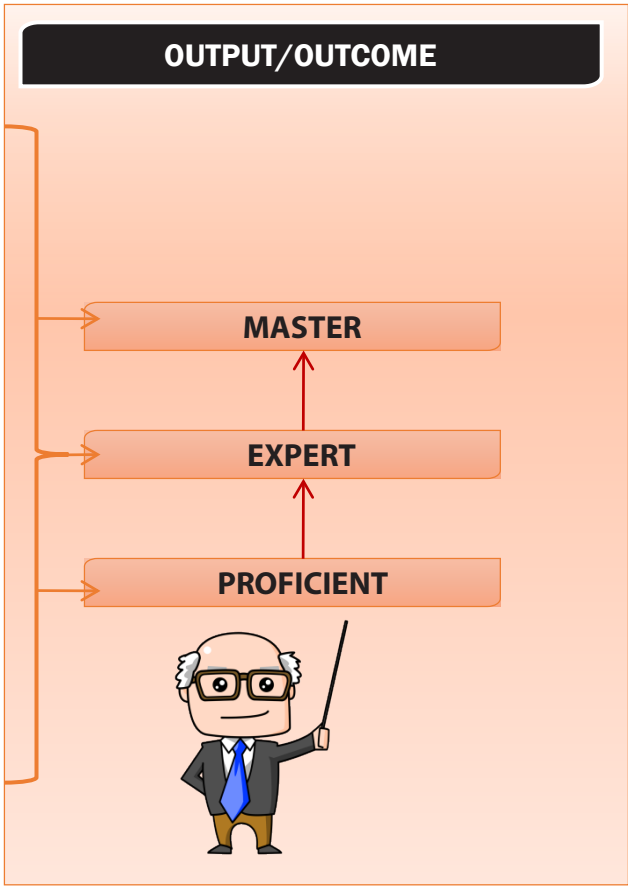


Figure 4: The end result (Output/Outcome). *Source: the author.*

It must be noted that IMO has identified just minimum competencies and listed them in the STCW code. To be promoted or elevated to the next level, one must display greater proficiency above and beyond the minimum competency requirements, be they STCW competencies or management leadership behaviour competencies. As technology advances, for example, competencies required today may not be the same as needed tomorrow, particularly in this pandemic wherein teachers, whether they like it or not, have been transformed into maritime digital teachers to deliver their courses using digital online platforms. Naturally, here it is a two-way street, as MET institutions help their teachers master the skills required to use these platforms, and teachers, in turn, adapt to them. A certain level of honesty too is needed from all of us, as some maritime topics can easily be taught online, while others cannot. Only two sets of people can identify which courses are appropriate for online education based on practical experience, namely students and teachers. In the current pandemic-related travel and meeting restrictions, there is a need for all of us MET providers to identify these and share our learnings with each other. Else there could be a real danger of lowering of MET standards.

Similarly, from accumulated qualifications, knowledge or competencies and experiences, competent teachers will need to move forward from rigid adherence to rules to a more intuitive mode of reasoning (unconscious competence) or proper analysis (conscious competence) and be transformed into proficient (Competency + Experience) teachers, expert Teachers or "*Master*" teachers, much like "*Master Shifu*" in the famous Hollywood animation film *Kungfu Panda*.

However, to ensure that teachers' competencies move towards proficiency, expertise, and mastery, they must form part of their aspirations, goals, and plans to support their appraisals. There are various ways and means (as earlier presented using action words) that teachers can use to build upon their **C-O-M-P-E-T-E-N-C-I-E-S**. The teachers themselves would have to self-monitor them to see if they are progressing in the right direction.

4. Conclusions

The journey towards becoming an excellent maritime teacher and trainer is lengthy. This article presents some signboards and direction indicators for this path. At the end of the day, we all are masters of our destiny in our life journey. Either we stagnate, or we move forward. It is a personal choice that we all must make. Let us help our teachers in this journey.

Note:
GlobalMET is conducting research on the benefits and limitations of online education, particularly in the maritime sector. If you would like to give your views in this regard, please contact Capt. Sriram Rajagopal (rajagopals@angloeastern.com and Sriram.rajagopal@globalmet.org).

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Professor Angelica Baylon, Ph.D is the External Relations Director at the GlobalMET member Maritime Academy of the Asia Pacific (MAAP), Philippines. She holds four Masters and two Ph.D. degrees, all earned with distinctions and grants. Her teaching and research expertise are in the field of chemistry, maths, physics, educational administration, shipping business management, bioethics, global public health, and sustainability. She has been recognized in the Philippines as a scientific expert and was featured by the Department of Science and Technology in its 2013 issue of Philippine Men & Women of Science for her contributions in governmental, educational and international policy.

Views presented in this article are the author's own, and need not represent her employer's views.

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