



Scrubber Systems

Technical and Commercial Feasibility, Installation and Operations

24 – 25 April 2014 | Grand Copthorne Waterfront Hotel, Singapore
28 – 29 April 2014 | InterContinental Grand Standford, Hong Kong

Key Learning Outcomes

- Be aware of the MARPOL Annex VI (2010) compliance options and ECA emission requirements
- Compare various options available to determine which best suits your shipping operation to meet emission requirements
- Evaluate the challenges and benefits of the exhaust gas cleaning systems (scrubbers) option
- Develop an informed approach to scrubber technology selection and investment
- Determine Scrubber technology options, supply and installation requirements
- Understand retrofitting installations on existing vessels
- Identify key guidelines for scrubber systems installation
- Analyze the impacts of scrubber installations on your shipping operations
- Learn how to secure financing for your scrubber systems
- Assess best practices in scrubber systems through case studies of scrubber installation on board vessels

Who Should Attend

This workshop will benefit anyone involved in exhaust gas cleaning systems and operations including:

- Ship Owners, Operators, and Managers
- Shipyards and Ship Designers
- Classification Societies
- Scrubber and Exhaust Gas System Technology Providers
- Testing and Analysis Companies and Marine Surveyors
- Consulting Organisations

Course Director

Kevin Reynolds has 20 years of marine engineering and design experience. He is a licensed naval architect and marine engineer with both vessel operations and construction expertise. He has led The Glosthen Associate's marine environmental engineering efforts, including evaluation of exhaust gas cleaning systems, design of hydrocarbon vapor control systems, and pursuit of solutions for ballast water management.



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a course Certificate

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Or register a team of 3 or more delegates and take advantage of our Special Group Rate, PLUS – the 4th delegate attends for free!



Scrubber Systems

What past delegates say about our courses

"Enriched my knowledge about advanced laytime & demurrage."

~ **PT. Pertamina Persero**

"Gain insight knowledge about shipping business, improve in critical thinking and analysis of shipping market."

~ **Pancustoms Service Company Ltd**

"The chartering concepts were clearly explained with illustrated examples. Good insights on the role of shipbroking and port agents. Better understanding of dispute resolution."

~ **Total Oil Asia-Pacific Pte Ltd**

"Learn new perspective on tender process, supplier, tenderer."

~ **Seadrill Management**

"Helped in my understanding of what to do and anticipate in a bunker dispute."

~ **Seadrill Management**

About the Course Director

Kevin Reynolds,

Principal Naval Architect and Marine Engineer,

The Glosten Associates

Kevin has 20 years of marine engineering and design experience. He is a licensed naval architect and marine engineer with both vessel operations and construction expertise and currently serves as the Principal Marine Engineer at The Glosten Associates in Seattle, WA.

His operations experience includes four years at American Trading & Transportation, serving in various operations and maintenance positions. He served aboard the University of Washington's R/V Thomas G. Thompson, supervising the vessel's engineering personnel as First Engineer in the maintenance, operation, and repair of the propulsion and ship service plants. His construction experience includes work performed prior to joining Glosten, as project engineer at MARCO Shipyard on new construction and modification projects.

For the last 12 years, Kevin has led Glosten's marine environmental engineering efforts, including evaluation of exhaust gas cleaning systems, design of hydrocarbon vapor control systems, and pursuit of solutions for ballast water management in accordance with sound environmental practice.

Kevin frequently presents in conferences and seminars relating to marine environmental engineering. His most recent work is the development of a Scrubber Practical Guide for Lloyd's Maritime Academy; discussing "Exhaust Gas Cleaning Systems Business Case: Selecting Candidate Vessels Based on Life Cycle Cost Analysis, Considering the Pros and Cons of Scrubber Systems, and Overcoming Key Challenges during Retrofit". Other works include the presentation of a selection guide for exhaust gas cleaning systems (Ship Operations Cooperative Program, 2011), and the implementation of two land-based test facilities.

About the Course

Scrubber systems are becoming an increasingly possible option for shipowners to consider for either new shipbuilding or retrofitting on their current fleet. This is because scrubber systems are capable of removing undesired SOx from a vessel's exhaust gas emission to comply with ECA emission requirements of not more than 0.1 % sulphur content. At the same time though, the use of scrubber systems has raised various key issues including its ease of implementation, the commercial feasibility and challenges faced in adopting this technology.

This 2 day course will provide a comprehensive review of key scrubber systems issues, commercial and technical considerations before adopting scrubbers and the impacts on daily shipping operations. The course focuses on three main areas: emissions regulation, economics, and installation. In each area, challenges and benefits will be discussed, and essential points of consideration will be reviewed. Investment decisions will be analyzed thoroughly, to factor in associated costs, possible savings and to determine the ROI on using scrubbers. Ship owners, managers and shipbuilders will leave this course with a more complete understanding of challenges to and solutions for this increasingly important technology.

IBC Training Academy Upcoming Training Courses!

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3 - 4 March 2014, Singapore

Advanced Bunker Operations

24 - 25 March 2014, Singapore

Fundamentals of Shipping, Ports and Logistics

15 - 16 May 2014, Singapore

Fundamentals of OSV

22 - 23 May 2014, Singapore



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To talk through the many options available please call our training specialist: Miki Kong

+65 6508 2477 onsite.training@ibcasia.com.sg

IBC Training Academy

IBC Training Academy is the Asian training division of IBC Asia, part of the Informa Group and a public listed company in the UK. Informa's main business is in the specialist information providing for global markets. We operate in 70 countries, 150 offices worldwide with over 7000 employees. We have over 25 years experience in providing innovative, focused and high quality business information and training products designed to help you improve the way your business is managed.

COURSE OUTLINE

Course Registration: 8:30am
Course Commencement: 9:00am
Course Conclusion: 5:00pm

Explanation of Timings: These times act as a guide and may be modified slightly depending on the depth of class discussion and whether assessments are being conducted.

Course Programme: This program is a guide and may be altered to better address participant requirements on a consensus basis.

DAY ONE

MAKING THE BUSINESS CASE

- 1. UNDERSTANDING MARPOL ANNEX VI (2010) REQUIREMENTS AND OPTIONS**
 - SOx/NOx reduction: Regulatory Requirements and Compliance Options
 - Integrating Solutions within NOx Technical Code, EEDI, and EEDO
 - Regulatory Timelines and Impact of Emission Control Area Boundaries
 - Developing ECA compliance strategy for shipping companies
- 2. COMPARISON TO DETERMINE WHICH OPTION BEST SUITS YOUR OPERATION IN MEETING EMISSION LEVELS FOR ECAS**
 - Switching to Low Sulfur Distillate or Natural Gas
 - LNG as Bunker Fuel
 - Employing an Exhaust Gas Cleaning System (Scrubbers)
- 3. LIFE CYCLE AND FUEL COST FUNDAMENTALS**
 - Fundamentals of Life Cycle Cost Analysis and Evaluation Metrics
 - Fuel Cost and Escalation Prediction Schemes
- 4. ESTABLISHING LIFE CYCLE COSTS FOR YOUR MARINE VESSEL**
 - Evaluating Marine Vessel Drivers for Fuel Based Life Cycle Costs
 - Estimating Operations, Maintenance, and Repair Costs
 - Setting the Distillate Baseline Cost
 - Establishing Life Cycle Costs for your Scrubber Options
- 5. UNCERTAINTY AND SENSITIVITY**
 - Identifying Key Elements that Drive Life Cycle Cost
 - Use of Scrubbers as an Inflation Hedge
 - Bounding Scrubber Upper and Lower Life Cycle Costs

CASE STUDIES

Step-by-Step Evaluation of Two Types of Marine Vessels Selected from Delegate Profiles

CASE STUDIES

A Coast-wise Containership with Significant ECA Time will be Reviewed to Identify the Breakpoint for Vessels that can Benefit by Scrubber Installations.

DAY TWO

TECHNOLOGY SELECTION AND INTEGRATION

- 6. CHALLENGES AND BENEFITS OF USING THE EXHAUST GAS CLEANING SYSTEMS (SCRUBBERS) OPTION**
 - Pros and cons of installing scrubber systems
 - Practical performance feedback
 - Risk of non-compliance
- 7. TECHNOLOGY FUNDAMENTALS AND EVALUATION**
 - Open Loop, First Generation Systems
 - Closed Loop, First Generation Systems
 - Hybrid Second Generation, Particulate Focused Systems
 - Dry and Novel Scrubbers
 - Selecting a Supplier that Aligns with your Requirements
- 8. ENGINEERING AND INTEGRATION**
 - Best Practices for Evaluation and Integration
 - Marine Regulatory Requirements
 - Effluent and Gas Stream Monitoring Schemes
 - Lessons Learned from Early Installations
- 9. RETROFITTING INSTALLATION TIMELINES AND PROCESSES**
 - Timeline for Evaluation, Selection, Integration, and Commissioning
 - Design Considerations
 - Technical & Operational Issues
 - Options and Alternatives for Installation
 - Use of Modern Techniques including Laser Scanning, Hydraulic Analysis, and Solid Modelling
- 10. IMPACTS OF SCRUBBER INSTALLATIONS ON SHIPPING OPERATIONS**
 - Are Scrubbers Reliable Enough to Ensure Consistent ECA Compliance?
 - How will Scrubber Installations Affect Daily Ship Operations?
 - Additional maintenance and crew training needed?
 - Focus on Commissioning and Regulatory Approvals
- 11. FINANCING SCRUBBER TECHNOLOGY**
- 12. FUTURE OUTLOOK ON SULFUR REGULATION REQUIREMENTS AND SCRUBBER SYSTEMS**

CASE STUDIES

Recommended Approach, Timeline, and Cost-estimate of 2 Types of Marine Vessels Selected from Delegate Profiles

If undelivered, please return to:



IBC ASIA (S) PTE LTD
COMPANY NO: 200108203N
an Informa business

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Scrubber Systems

6 EASY WAYS TO REGISTER



MAIL the attached registration form with your cheque to **IBC Asia (S) Pte Ltd** c/o Informa Regional Business Services
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Scan the QR Code with your smartphone and register today



Customer Service Hotline
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LET IBC ASIA COME TO YOU! To talk through the many options available please call our training specialist Miki Kong
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RESERVE YOUR PLACE TODAY!

- Yes! I/We Will Attend **Scrubber Systems**
24 – 25 April 2014 | Grand Copthorne Waterfront Hotel, Singapore
28 – 29 April 2014 | InterContinental Grand Standford, Hong Kong

- I cannot attend this event but please include me in your mailing list.

FEE PER DELEGATE	EARLY BIRD RATE Register and Pay on or before 21 Feb 2014	SPECIAL RATE Register and Pay on or before 28 Mar 2014	NORMAL RATE Register and Pay after 28 Mar 2014
Individuals	SGD 2,995 (Save SGD 400)	SGD 3,195 (Save SGD 200)	SGD 3,395
Special Group Discount Scheme	Book a group of 3 or more delegates and pay per delegate SGD 2,895 (Save SGD 500 per delegate and 4th attends FREE)		

- * Special Group Discount pricing is applicable to groups of 3 or more delegates from the same organisation registering for the same event, at the same time. Fee stated is the discounted price PER DELEGATE. Only one discount applies - either the early bird rate OR special rate OR Special Group Discount.
- * All fees stated include luncheons, refreshments and complete set of documentation. It does not include the cost of accommodation and travel.
- * A 7% Goods & Services Tax (GST) is applicable to all Singapore based companies for Singapore venue.

Delegate 1 Details

Name: Dr/Mr/Ms _____
Job Title: _____
Department: _____
Tel: _____
Mobile No.: _____
Email: _____

Delegate 2 Details

Name: Dr/Mr/Ms _____
Job Title: _____
Department: _____
Tel: _____
Mobile No.: _____
Email: _____

Delegate 3 Details

Name: Dr/Mr/Ms _____
Job Title: _____
Department: _____
Tel: _____
Mobile No.: _____
Email: _____

Delegate 4 Details

Name: Dr/Mr/Ms _____
Job Title: _____
Department: _____
Tel: _____
Mobile No.: _____
Email: _____

Please photocopy for additional delegates

Who is Head of your Department? _____

Who is Head of Training? _____

Company Information

Company Name: _____ | Main Business/Activity: _____
Address: _____ | Postal Code: _____

- Payment Method (Please tick):**
- I enclose my bankers draft / cheque payable to IBC Asia (S) Pte Ltd
 - I am paying by bank transfer (copy attached)
 - Payment by Credit Card. (AMEX, VISA or MasterCard accepted)

CREDIT CARD PAYMENTS

The best way to pay by credit card is through our secure on-line registration process, simply log on to the website at www.ibc-asia.com/ScrubberSystems and click "Register On-line". If you would prefer to pay over the phone please complete the contact name and details and our Customer Services Team will call within 24 hours to take payment. As we treat your credit card information in the strictest confidence, please do not send payment details by email.

Credit card contact: _____ Department: _____

Direct phone number: _____ Email: _____

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HOTEL INFORMATION

Grand Copthorne Waterfront Hotel

392 Havelock Road, Singapore 169663
Tel: +65 6733 0880 | Fax: +65 6733 1072
Contact Person: Ms Tan Ai Li
Email: aili.tan@millenniumhotels.com

Intercontinental Grand Standford, Hong Kong

70 Mody Road, Tsimshtsui East, Kowloon, Hong Kong
Tel: +852 2731 2868
Fax: +852 2721 3772
Contact Person: Helen Leung
Email: helen.leung@ihg.com

PAYMENT TERMS

Payment must be received 10 business days prior to the event. To take advantage of discounts with an expiry date, registration and payment must be received by the cut-off date.

- Payment by bankers draft or cheque in S\$ or US\$ should be made in favour of "IBC Asia (S) Pte Ltd" and mailed to: IBC Asia (S) Pte Ltd c/o Informa Regional Business Services 111 Somerset Road, TripleOne Somerset #10-06 Singapore 238164
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CANCELLATIONS / SUBSTITUTION

Should you be unable to attend, a substitute delegate is welcome at no extra charge. Cancellations must be received in writing at least 10 business days before the start of the event, to receive a refund less 10% processing fee per registration. The company regrets that no refund will be made available for cancellation notifications received less than 10 business days before the event.

IMPORTANT NOTE

Please quote the name of the delegate, event title and invoice number on the advice when remitting payment. Bank charges are to be deducted from participating organisations own accounts. Please fax your payment details (copy of remittance advice, cheque or draft to +65 6508 2407).

Attendance will only be permitted upon receipt of full payment. Participants wishing to register at the door are responsible to ensure all details are as published. IBC assumes no further liability or obligation, beyond the refund of the paid registration fee, in the event of postponement or cancellation by IBC.

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