

AN INTRODUCTION TO FUEL MEASUREMENT

Nigel Draffin



AN INTRODUCTION TO FUEL MEASUREMENT

PETROSPOT

Dedication

I would like to dedicate this book to the many senior officers at sea, measurement specialists on shore and cargo surveyors, all of whom spent time trying to teach me about the measurement of liquids on ships. They are not named here as there were many of them and to name just a few would be to discriminate.

I also dedicate this book to my wife, Chris, for putting up with me 'writing yet another book', and to my mother who valiantly tries to persuade her visitors that they should read her son's latest efforts.

Nigel Draffin



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by

Nigel Draffin

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Foreword by

Seah Khen Hee

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Foreword

International shipping is a challenging business at the best of times. Shipowners, operators, managers and charterers have to deal with a plethora of operational, technical, environmental and business issues in a tough, dynamic environment to stay ahead. One of the most important matters that they pay much attention to concerns the procurement of bunker fuel and managing the ship board fuel inventory and consumption, because bunker fuel is the biggest component of the operating cost of a ship.

On the other side of the transaction, bunker suppliers, bunker tanker operators and traders have to contend with managing their bunker supply chain from origin to final custody transfer.

Included in the mix are other stakeholders and service providers, such as bunker surveyors, oil terminal operators, lawyers, port authorities and regulators, and media practitioners.

For all these groups of industry players, the starting point is the measurement of bunker fuel which has a considerable impact on cost and profitability.

Globally, some 250 million metric tonnes of bunker fuel are currently delivered to ships. This enormous amount of fuel needs to be accurately measured, not only during delivery to ships but also at each stage of the bunker supply chain, for the purpose of managing inventory or custody transfer. Every 0.1% variance in quantity arising from measurement of this volume translates to a shortage or gain of \$125 million in custody transfer or inventory balance.

Given the considerable financial impact of measurement, industry players are wise to be equipped with the knowledge of the principles and methodologies of bunker fuel measurement, the equipment used, the product characteristics and the physical environment in which the measurement is undertaken, and the human factors and practices that may be encountered.

Nigel Draffin's book, *An Introduction to Fuel Measurement*, is a comprehensive tome on this important subject that draws on his in-depth knowledge and practical experience of 50 years in shipping and bunkering. It is written clearly and presented with numerous diagrams, tables, charts, photographs and illustrations for easy understanding. The book not only provides many examples of how quantities are computed, it also touches on fraudulent practices and handling disputes. Its section on quantity measurement of liquefied natural gas (LNG) reflects the ongoing worldwide interest in assessing LNG as a bunker fuel of the future.

One section of the book covers mass flow metering, a game-changing new method of bunker fuel measurement that Singapore, in another pioneering effort,

has successfully tried out since 2009 and is leading the world in implementing it. The international shipping community is increasingly demanding more bunker fuel delivery through the mass flow meter as the industry gains trust and confidence in this method of measurement.

This book is a valuable resource for all industry practitioners around the world. It is equally useful to new entrants to the shipping and bunkering industries who need to be quickly acquainted with this fundamental subject. It complements established bunkering standards such as the Singapore Standard Code of Practice on Bunkering, popularly known as SS600, or ISO 13739 – Procedures for transfer of bunkers to vessels.

Nigel has been a speaker on many occasions at SIBCON, the world's biggest bunkering conference and exhibition, since its inception in 1988. His latest book is a most welcome addition to the body of information on marine fuels and I believe it will be well received by the industry.

Seah Khen Hee

June 2015

Seah Khen Hee is Chairman, Technical Committee for Bunkering, Singapore Standards Council and a former Chairman of the SIBCON Steering Committee (1988-1995).

Preface

The measurement of the quantity of fuel delivered to ships remains the trigger point for the majority of disputes between buyers and sellers of marine fuel. It also leads to disagreement between the buyers and the ships' staff receiving the fuel, yet it is one of the few routine operations for which vessel personnel and those dealing with the commercial aspects of the deal have very little training.

As a bunker buyer, the issue of fuel measurement was annoying and caused friction with my ships' staff and with head owners. As a broker, it became a large stone marker attached to every bunker deal where one or other party protested about the quantity. Quality disputes for the most part could be clarified by investigation and analysis; quantity discrepancies just sat there and festered.

I have been addressing this issue for years on bunker training courses and I have been persuaded to write a book to try to improve understanding of the basic process, how to get it right and where it can go wrong.

In common with many of my peers, I was given no formal training in measurement of liquid volumes onboard as an apprentice marine engineer. Working for a major tanker fleet, I received guidance onboard from the deck officers and from experienced ships' engineers, but it was very much 'learning on the job' and meant that I did not have the proper background training to understand the process.

I had to learn these techniques from first principles and that is the way I have tried to teach my students. The time available on my courses is not enough to tackle all of the issues and I hope that this book will remedy that shortcoming.

Nigel Driffin

June 2015

About the author

An Introduction to Fuel Measurement is a clearly-written book that addresses the basics of quantity measurement and provides an excellent overview of measurement equipment and how and why it should be used. With bunker suppliers and buyers increasingly embracing the benefits of bunker metering – whether voluntarily as a means to reduce quantity disputes and increase operational efficiency or as a result of regulations introduced by maritime authorities – this book is also very timely.

Researched and written by Nigel Draffin, already author of seven other best-selling books which between them cover almost every aspect of bunkering and shipping, *An Introduction to Fuel Measurement* provides the reader with comprehensive, accessible information on a subject that everyone involved in the bunker delivery process – and invoicing – ought to be aware of.

The book looks at fuel sampling methods, fraudulent practices, and the role of the marine surveyor in bunker quantity surveys, always with a view to educating the reader and helping him or her perform better at their jobs.

Nigel has been involved in shipping for some 50 years and with the commercial bunker market for over 25 years. After joining Shell Tankers as an apprentice engineer in 1966, he rose through the ranks, serving on all classes of vessel, including very large crude carriers (VLCCs) and LNG tankers. He came ashore in 1979 to join the newbuilding department of Shell International Marine. After two years of new construction in Ireland, South Korea and the Netherlands, he transferred to Shell's Research & Development unit, specialising in control systems, fuel combustion and safety systems.

In 1986, Nigel moved to the commercial department as a bunker buyer and economics analyst. In 1988, he was promoted to be Head of Operational Economics, responsible for all of the fuel purchased for the Shell fleet, the operation of the risk management policy and the speed/performance of the owned fleet. In March 1996, he joined the staff of E.A. Gibson Shipbrokers Ltd in the bunker department, and became the manager. In 2006, this department merged with the US-based broking house, LQM Petroleum Services, where Nigel is currently Senior Broker and Technical Manager.

Nigel is a founder member of the International Bunker Industry Association (IBIA) and has served several times on its council of management and executive board. He has also served as the association's Chairman. He is the author of IBIA's *Basic Bunkering Course* and Director of several of Petrosport's industry-recognised training events, such as the *Oxford Bunker Course*, the *Oxford Bunker Course (Advanced)*, *An Introduction to LNG Bunkering* and *An Introduction to Shipping*.

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Nigel is a member of the Institute of Marine Engineering, Science and Technology and Past Master of the Worshipful Company of Fuellers.

Llewellyn Banks-Hughes
Managing Director, Petrosport Limited

June 2015

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