財團法人驗船中心
CR CLASSIFICATION SOCIETY

台北總部 HEADQUARTERS
台北市中山區南京東路3段103號8樓
8F., No. 103, Sec. 3, Nanjing E. Rd., Taipei City 104707, Taiwan (R.O.C.)
Tel:+886-2-25062711 Fax:+886-2-25074722 E-mail:cr.tp@crclass.org

www.crclass.org

高雄連絡處 KAOHSIUNG OFFICE
高雄市苓雅區海邊路31號26樓之3
26F.-3, No. 31, Haibian Rd., Lingya Dist., Kaohsiung City 802609, Taiwan (R.O.C.)
Tel:+886-7-3305617 Fax:+886-7-3306295 E-mail:cr.kh@crclass.org

基隆連絡處 KEELUNG OFFICE
基隆市中正區義一路43號9樓之3
9F.-3, No. 43, Yi 1st Rd., Zhongzheng Dist., Keelung City 202001, Taiwan (R.O.C.)
Tel:+886-2-24282797 Fax:+886-2-24282297 E-mail:cr.kl@crclass.org

日本代表處 JAPAN OFFICE
〒650-0031 日本神戶市中央區東町116-1シティライフ三宮ビル9階
9F., No. 116-1, Higashimachi, Chuo-ku, Kobe 〒650-0031, Japan
Tel:+81-78-333-8515 Fax:+81-78-333-8506 E-mail:crskobe@silver.ocn.ne.jp

大陸代表處 CHINA OFFICE
Mobile:+86-134-162-52949
E-mail:cr.cn@crclass.org

香港代表處 HONG KONG OFFICE
Tel:+852-5394-0874
E-mail:cr.hk@crclass.org

新加坡代表處 SINGAPORE OFFICE
E-mail:cr.sg@crclass.org

南非代表處 SOUTH AFRICA OFFICE
P. O. Box 298, Plumstead 7801, Cape Town, South Africa 23, Manson Close. Bergvliet Cape Town, South Africa
Tel:+27-21-7125382 Fax:+27-862736840 Mobile:+27-82-8813690
E-mail:frank7yang@hotmail.com

Since 1951

財團法人驗船中心
CR CLASSIFICATION SOCIETY

CR Annual Report 2023

台北總部
HEADQUARTERS

台北市中山區南京東路3段103號8樓
8F., No. 103, Sec. 3, Nanjing E. Rd., Taipei City 104707, Taiwan (R.O.C.)
Tel:+886-2-25062711 Fax:+886-2-25074722
E-mail:cr.tp@crclass.org

財團法人驗船中心
CR CLASSIFICATION SOCIETY

www.crclass.org

克服挑戰，CR 邁向高峰
您在航運與風能產業的好夥伴

Conquer Challenges, Head to the High CRest.
Your Reliable Partner in the Shipping and Wind Energy Industry.

Annual Report 2023

contents

CR 簡介

鑒於船舶檢驗與航行安全息息相關，世界各航運大國均設立本國驗船機構以執行船舶之嚴格檢驗。我航運業、保險業及造船業各界有識之士，為求航業蓬勃發展，幾經磋商籌劃，始於民國 40 年 2 月 15 日在台北市成立「社團法人中國驗船協會」，復於民國 67 年 7 月 1 日接受民間捐助，改組並更名為「財團法人中國驗船中心」。英文名稱為 CR Classification Society(former name: China Corporation Register of Shipping)，簡稱 CR。

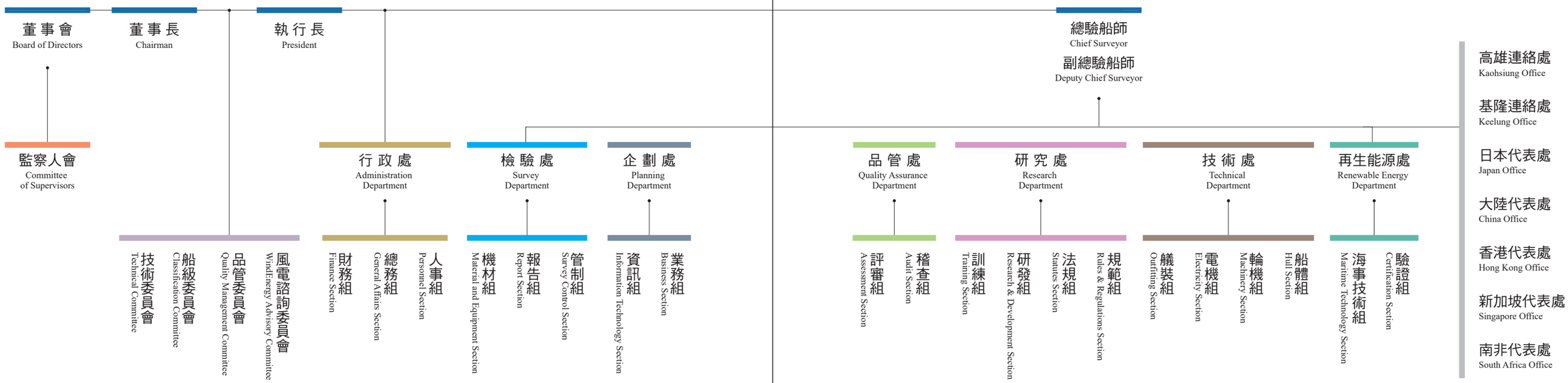
本中心為一民間純技術性，不以營利為目的之服務事業機構，其目標為提供優良之技術、高度之效率與熱忱之服務。組織型態 (如下表) 及工作內涵，一如世界各大驗船機構，其服務工作據點遍及世界各重要港口，為船東、造船廠及機材製造廠商提供最便捷之服務。

Brief Introduction of CR

As survey of ships and safety of navigation are closely related, countries throughout the world engaged in shipping activities have their own classification societies in order to conduct ship surveys in a strict manner. A good number of people of insight from the shipping industry, insurance industry, and shipbuilding industry in Taiwan share the same views on the importance of establishing this country's own classification society for the prosperity of its shipping industry. After repeated negotiations and adequate preparation, "CR Classification Society" (former name: China Corporation Register of Shipping), also know as CR, was founded on February 15, 1951, in Taipei City. On July 1, 1978, it was restructured after receiving financial contributions from non-governmental sources and hence changed its Chinese name.

CR is a non-governmental and nonprofit organization rendering technical services. The purpose of its work is to provide excellent techniques, high efficiency and cordial services. Its structure (see the following Organization Chart) and scope of work are similar to those of the other leading classification societies in the world , and it has a worldwide network of branch offices in important foreign ports, rendering quick services to shipowners, shipyards, and manufacturers of materials and equipment.

組織架構 Organization



董事長感言

感謝交通部、海巡署、海軍、航商及各界在 2023 年一如既往支持驗船中心 (CR)，去年 CR 在業務成長、檢驗成果、技術能量方面皆有亮眼的成績，除我船旗國持續於東京備忘錄 (Tokyo MOU) 名列「白名單」，CR 於認可機構評比亦維持「高表現度」，由衷感謝交通部與航港局的督導以及所有船東的努力，使我船旗國與 CR 能順利維護我國良好的海運安全管理績效。

CR 成立迄今超過 72 年，為我國船舶執行各項檢驗工作，確保船舶符合國際公約，順利航行於世界各地。在檢驗成果上，CR 全程參與審圖和檢驗的「澎湖輪」、「新臺馬輪」以及首艘國造海事工程船「環海翡翠輪」皆於 2023 年順利完工啟用；「澎湖輪」和「新臺馬輪」是提供離島鄉親與觀光載運更優質的海運服務及維持離島與本島間穩定民生物資運輸的重要里程碑；而「環海翡翠輪」為全球第二大浮吊船，技術層次及工法是我國造船史上之最，成為國內離岸風機運輸與安裝的生力軍，未來更會拓展服務至國際離岸風電市場，能參與我國打造精品級船舶過程 CR 深感與有榮焉。

在技術能量上，因應航運界節能環保、減少溫室氣體排放的浪潮，未來以徵收碳費等機制達到零碳排的全球戰略目標，將促使各航商力行減碳、導入替代燃料甚至零碳燃料，為此 CR 訂定「船舶使用氣體或其他低閃點燃料準則」、「船舶使用甲醇 / 乙醇燃料準則」、「船舶使用氨燃料準則」等多項替代燃料技術準則供業界參考使用，更成立技術團隊開發「航行最佳化」計算程式 CRVO(CR Voyage Optimizer)，客製化提供貨櫃船及散裝船船東最低成本、最低碳排的雙目標最佳化航行規劃；同時持續關注並發佈即時 IMO 及歐盟的最新動態與發展，並舉辦產業趨勢研討會，集結國內各航商高階技術主管，共同關注 MEPC 會議重點，全力協助我國航商與國際法規接軌，鞏固台灣在全球航運中的重要地位。

CR 自 2012 年跨足離岸風電以來，結合既有的專業知識與技術，成為台灣第一家可完整提供離岸風場海事保證鑑定服務的本土驗證單位，並擔任政府在船舶檢驗諮詢領域的重要智庫，同時做為產業與政府溝通的橋梁，協助經濟部標準檢驗局建構離岸風力發電技術指引。CR 從 2019 年起遵循國際 ISO/IEC 17065 專案驗證作法，先於 2020 年 7 月取得離岸風場設計審圖範疇的驗證模組資格、再於 2021 年 9 月取得安裝施工範疇的驗證模組資格，今年更進一步通過 TAF 與外部技術專家群的審核評鑑，取得試運轉及運維驗證資格。因此，CR 成為國內第一個離岸風場全生命週期完整模組發證資格的驗證機構。此外也於今年進一步取得適用於船舶 500 總噸以上，及 / 或船體長度 24 公尺以上之大型船舶 (Common Marine Inspection Document, CMID) 檢驗資格，可即時提供業者 CMID 檢驗服務。為提前布局台灣浮式風電及氫能與低碳燃料的未來發展， CR 已投入浮式風電研究計畫，已初步完成浮式風電驗證技術能量建置；另與哥本哈根基礎建設基金 (CIP) 簽署「航運產業減碳暨低燃料發展合作備忘錄」，將來 CR 能更精確掌握台灣航運產業的減碳規劃與需求。

未來，CR 將持續與業界保持良好交流互動，盡最大努力提供航商優質及高滿意度的技術協助與支援，同時也持續關注並發布即時國際海事組織及歐盟的法規動態與發展供業界參考，支持我國航運產業維持航行安全並兼顧高效營運，加強國際市場競爭力，促進產業升級、創造榮景。

驗船中心 董事長 謝謂君

Chairman's Speech

We would like to express our sincere appreciation to continuous support from Ministry of Transportation and Communications R.O.C., Coast Guard Administration, Navy Command R.O.C., shipping companies and other concerned Parties in 2023. Last year, CR achieved outstanding results in business growth, survey outcomes, and technical capabilities. Additionally, R.O.C. flag has also continuously listed in “White List” of the Tokyo MOU. CR has continuously maintained “High Performance”. We heartfully appreciated guidance of Ministry of Transportation and Communications R.O.C. and Maritime Port Bureau as well as effort of all shipowners. This enables R.O.C. flag and CR to successfully maintain good performance in maritime safety management.

Established over 72 years, CR has been conducting various surveys for vessels registered in R.O.C. flag, ensuring compliance with international conventions for seamless navigation worldwide. Regarding the results of the survey work, CR is fully responsible for the drawing approval and on-site survey for vessels such as the "M.V. Penghu", " M.V. New Taima", and the first domestically built offshore engineering ship, the " M.V. Green Jade", all successfully completed and commissioned in 2023. The ""M.V. Penghu " and M.V. New Taima " mark significant milestones in providing enhanced and convenient transportation services for island residents and stable transportation of essential livelihood goods between offshore islands and Taiwanese mainland. The " M.V. Green Jade "stands as the world's second-largest floating crane ship, representing the pinnacle of technological advancement in the history of Taiwan's shipbuilding. It is a vital asset for offshore wind turbine transport and installation, and we anticipate it may expand its services to the international offshore wind energy market. It is CR’s pride to participate in this remarkable project.

Regarding the technical capability, in response to the global trend in the shipping industry toward energy efficiency and environmental sustainability, and the strategic goal of achieving zero carbon emissions through mechanisms like carbon taxation, shipping companies are increasingly adopting carbon reduction measures, alternative fuels, and even zero-carbon fuels. CR has already stipulated “Guidelines for Ships Using Gases or Other Low-Flashpoint Fuels” and “Guidelines for Ships Using Methanol and Ethanol Fuels” for industry reference. Additionally, CR has established a technical team to develop the "CR Voyage Optimizer (CRVO)," a customized program offering container and bulk carrier shipowners optimized voyage planning to achieve the dual objectives of minimum cost and carbon emissions. CR remains vigilant in monitoring and disseminating the latest developments from the International Maritime Organization (IMO) and the European Union (EU), organizing industry trend seminars, and engaging domestic shipping executives to focus on key points in MEPC meetings. This effort aims to assist local shipping companies in aligning with international regulations and consolidating Taiwan's crucial position in global shipping.

Since venturing into offshore wind industry in 2012, based on our existing expertise, CR has become the first Taiwanese certification organization who is capable of providing comprehensive maritime warranty services for offshore wind farms. CR serves as a significant think tank for the government in ship inspection consultation and acts as a bridge between industry and government, aiding the Bureau of Standards, Metrology, and Inspection of the Ministry of Economic Affairs in constructing offshore wind technical guidelines. CR had been following the ISO/IEC 17065 since 2019, CR obtained certification module qualifications for offshore wind farm design review in July 2020 and installation construction in September 2021. Furthermore, CR recently achieved certification qualifications for commissioning and operation after undergoing assessments by TAF and external technical experts. This accomplishment positions CR as the first domestic certification organization with complete module certification for the entire lifecycle of offshore wind farms. In addition, this year, CR obtained inspection qualifications applicable to large vessels (over 500 gross tons) and/or vessels with a length of 24 meters or more under the Common Marine Inspection Document (CMID). This allows CR to offer real-time CMID inspection services. To proactively prepare for Taiwan's future development in floating wind power, hydrogen energy, and low-carbon fuels, CR has invested in a floating wind power research project and has completed the initial establishment of technical capabilities for floating wind power certification. Moreover, CR signed a "Memorandum of Cooperation on Shipping Industry Decarbonization and Low-Fuel Development" with the Copenhagen Infrastructure Partners (CIP). This collaboration positions CR to accurately understand Taiwan's shipping industry decarbonization planning and requirements.

In the future, CR will continue to maintain good communication and interaction with the industry, making every effort to provide high-quality technical assistance and support to shipping companies. CR will also stay informed of and disseminate real-time updates on international regulations and developments from the International Maritime Organization and the European Union for industry reference. This commitment is aimed at helping Taiwan's shipping industry maintain safe navigation, ensure efficient operations, enhance international market competitiveness, promote industrial upgrading, and create a bright future.

CR Classification Society
Chairman
David W. Hsieh

董事會 Board of Directors

董事會係本中心最高管理階層，共有董事 23 人，監察人 3 人，第 15 屆董事會任期自 2021 年 5 月 18 日起至 2024 年 5 月 17 日止，為期三年，董事長由董事會遴選之。第 15 屆董事會之董事及監察人如下：

The Board of Directors, consisting of 23 directors and 3 supervisors, is the top management of CR. The term of the Board of Directors is 3 years, starting from May 18, 2021 to May 17, 2024. The Chairman is elected from the directors. The name list of directors and supervisors is given below:

董事 Director	現任職務 Position
謝謂君 Wei-Chun Hsieh	驗船中心董事長 Chairman, CR Classification Society
韓振華 Chen-Hua Han	交通部航政司副司長 Deputy Director of Department of Navigation and Aviation, Ministry of Transportation and Communications R.O.C.
葉協隆 Hsieh-Lung Yeh	交通部航港局局長 Director-General of Maritime and Port Bureau, Ministry of Transportation and Communications R.O.C.
盧公宇 Gong-Yeu Lu	海洋委員會海巡署後勤組副組長 Deputy Chief of Logistics Division, Coast Guard Administration, Ocean Affairs Council
鄭貞茂 Cheng-Mount Cheng	陽明海運股份有限公司董事長 Chairman, Yang Ming Marine Transport Corporation
劉文慶 Wen-Ching Liu	台灣航業股份有限公司董事長 Chairman, Taiwan Navigation Co., Ltd.
張秋波 Chiu-Po Chang	中鋼運通股份有限公司董事長 Chairman, China Steel Express Corporation
張衍義 Yen-I Chang	長榮海運股份有限公司董事長 Chairman, Evergreen Marine Corporation
王文潮 Wilfred Wang	台塑海運股份有限公司董事長 Chairman, Formosa Plastics Marine Corporation
陳柏廷 Po-Ting Chen	萬海航運股份有限公司董事長 Chairman, Wan Hai Lines Ltd.
王書吉 C. K. Ong	裕民航運股份有限公司總經理 General Manager, U-Ming Marine Transport Corporation
李健發 Kenneth Lee	世邦海運股份有限公司董事長 Chairman, TVL Marine Co., Ltd.
藍俊昇 James Lan	慧洋海運股份有限公司董事長 Chairman, Wisdom Marine Group
張瑞宗 Ray-Chung Chang	台灣中油股份有限公司發言人 Spokesperson, CPC Corporation, Taiwan
黃健強 Edward Huang	台灣水泥股份有限公司資深副總經理兼達和航運公司董事 Senior Vice President, Taiwan Cement Corporation
周志明 Chih-Ming Chou	台灣國際造船股份有限公司副總經理 Vice President, CSBC Corporation, Taiwan
陳德勝 T. S. Chen	德翔海運股份有限公司董事長 Chairman, T.S. Lines
戴聖堅 James S.C. Tai	中國航運股份有限公司總經理 President, Chinese Maritime Transport Ltd.
許志堅 Chih-Chien Hsu	益利航運股份有限公司董事長 Chairman, Eddie Steamship Co., Ltd.
許金泉 Chin-Chuan Hsu	富邦產物保險股份有限公司董事長 Chairman, Fubon Insurance Co., Ltd.
宋道平 Charles Sung	台灣產物保險股份有限公司副董事長 Vice Chairman, Taiwan Fire & Marine Insurance Co., Ltd.
蕭捷明 Jimmy C. Hsiao	明台輪船股份有限公司董事長 Chairman, MingTai Navigation Co., Ltd.
藍心琪 Irene Lan	四維航業股份有限公司董事長 Chairman, Shih Wei Navigation Co., Ltd.

監察人 Supervisor	現任職務 Position
梁正德 Cheng-Te Liang	兆豐產物保險股份有限公司董事長 Chairman, Chung Kuo Insurance Co., Ltd.
程藍瑩 Lan-Ying Cheng	能源航運股份有限公司副總經理 Vice President, Energy Shipping Co., Ltd.
康江良 Jiang-Liang Kang	交通部統計處副處長 Deputy Director of Department of Statistics, Ministry of Transportation and Communications, R.O.C.

船級委員會 Classification Committee

職別 Title	姓名 Name	現任職務 Position
主任委員 Chairman	梅家禮 Charlie Mei	中國航運股份有限公司執行副總經理 Executive Vice President, Chinese Maritime Transport Ltd.
副主任委員 Vice-Chairman	鄭正雄 James Jeng	陽明海運股份有限公司技術長 Chief Technical Officer, Yang Ming Marine Transport Corporation
委員 Member	王士玫 Shih-Mei Wang	交通部航港局船舶組副組長 Vice Director, Vessel Management Division, Maritime and Port Bureau, MOTC
委員 Member	許健明 Chien-Ming Hsu	中鋼運通股份有限公司總經理 President, China Steel Express Corporation
委員 Member	林正川 J. C. Lin	四維航業股份有限公司經理 Manager, Shih Wei Navigation Co., Ltd.
委員 Member	吳巨聖 James Wu	裕民航運股份有限公司副總經理 Vice President, U-Ming Marine Transport Corporation
委員 Member	呂學修 S. S. Lu	台塑海運股份有限公司協理 Assistant Vice President, Formosa Plastics Marine Corporation
委員 Member	黃崇榮 Ron Huang	長榮海運股份有限公司船舶本部本部主管 Div. Chief of Ship Division, Evergreen Marine Corporation
委員 Member	欒文斌 Wen-Pin Luan	新興航運股份有限公司副總經理 Vice President, Sincere Navigation Corporation
委員 Member	林家淦 C. K. Lin	前明台輪船股份有限公司副總經理 Former Vice President, MingTai Navigation Co., Ltd.
委員 Member	陳俊杰 Benson Chen	萬海航運股份有限公司工務部經理 Deputy Vice President, Engineering Division, Wan Hai Lines Ltd.
委員 Member	范永政 Rice Fan	世邦海運股份有限公司協理 Senior General Manager, TVL Marine Co., Ltd.
委員 Member	袁國龍 Gordon Yuan	台灣國際造船股份有限公司設計處處長 Director of Design Department, CSBC Corporation, Taiwan
委員 Member	郭志成 C. C. Kuo	光明海運股份有限公司總經理 President, Kuang Ming Shipping Corporation
委員 Member	黃崇智 Eddie C. Huang	協榮航業股份有限公司總經理 President, Glory Navigation Co., Ltd
委員 Member	吳偉國 Wei-Kuo Wu	新健海運公司副總經理 Vice President, Hsin Chien Marine Co., Ltd
委員 Member	褚世傑 Dino S.J. Chuu	中國航運股份有限公司海運部協理 Assistant Vice President, Shipping Division, Chinese Maritime Transport Ltd.
委員 Member	曹祥超 Hsiang-Chao Tsao	慧洋海運股份有限公司技術長 Chief Technology Officer, Wisdom Marine Lines S.A.
委員 Member	謝敏雄 Alan Shieh	達和航運股份有限公司總經理 President, Ta-Ho Maritime Corporation
委員 Member	黃戊辰 W. C. Wu	台灣中油股份有限公司造船組組長 Section Manager, Ship Building Section, CPC Corporation, Taiwan

技術委員會 Technical Committee

職別 Title	姓名 Name	現任職務 Position
主任委員 Chairman	王偉輝 W. H. Wang	國立臺灣海洋大學名譽教授 Professor Emeritus, National Taiwan Ocean University
副主任委員 Vice-Chairman	鄧運連 Y. L. Teng	驗船中心顧問 Consultant, CR Classification Society
委員 Member	劉詩宗 Shy-Tzong Liou	台灣國際物流暨供應鏈協會理事長 Chairman, Taiwan International Logistics and Supply Chain Association
委員 Member	邵維揚 Wei-Yang Shao	國防部參事 Counselor, Ministry of National Defense R.O.C.
委員 Member	劉嘉洪 C. H. Liu	交通部航港局船舶組組長 Director, Vessel Management Division, Maritime and Port Bureau, MOTC
委員 Member	韓碧祥 P. H. Han	中信造船股份有限公司董事長 Chairman, Jong Shyn Shipbuilding Co., Ltd.
委員 Member	鄭正雄 James Jeng	陽明海運股份有限公司技術長 Chief Technical Officer, Yang Ming Marine Transport Corporation
委員 Member	黃守真 Sheldon Huang	龍德造船工業股份有限公司董事長 Chairman, Lung Teh Shipbuilding Co., Ltd.
委員 Member	鄭添元 T. Y. Cheng	前中國鋼鐵股份有限公司冶金技術處專案副處長 Former Deputy Director of Metallurgical Dept. , China Steel Corporation
委員 Member	林頂光 D. K. Lin	台灣中油股份有限公司儲運處副處長 Deputy Director of Department of Storage and Transportation, CPC Corporation, Taiwan
委員 Member	江茂雄 Mao-Hsiung Chiang	國立台灣大學工學院院長 Dean of Engineering College, National Taiwan University
委員 Member	戴聖堅 James S. C. Tai	中國航運股份有限公司總經理 President, Chinese Maritime Transport Ltd.
委員 Member	顏春木 C. Y. Yen	台灣國際造船股份有限公司督導 Supervisor, CSBC Corporation, Taiwan
委員 Member	謝曜安 Yao-An Hsieh	財團法人船舶暨海洋產業研發中心副執行長 Vice President, Ship and Ocean Industries R&D Center
委員 Member	吳金河 Chih-Ho Wu	海洋委員會海巡署中部分署副分署長 Deputy Director, Central Branch of Coast Guard Administration, Ocean Affairs Council

品管委員會 Quality Management Committee

職別 Title	姓名 Name	現任職務 Position
主任委員 Chairman	林沛樵 P. C. Lin	全國船聯會秘書長 Secretary General, National Association of Chinese Shipowners
副主任委員 Vice-Chairman	黃志文 Chih-Wen Huang	經濟部標準檢驗局第六組組長 Director of 6th Division, Bureau of Standards, Metrology and Inspection, MOEA
委員 Member	黃姿婷 T. T. Huang	交通部航港局船員組簡任技正 Senior Technical Specialist, Maritime and Port Bureau, MOTC
委員 Member	仇忠林 Jong-Lin Chyu	台灣航業公司總經理 President, Taiwan Navigation Co., Ltd.
委員 Member	楊弘明 Hong-Ming Yang	長榮海運股份有限公司船舶本部海員部部主管 Head of Seaman Department of Ship Division, Evergreen Marine Co., Ltd.
委員 Member	邱增玉 Tseng-Yu Chiu	陽明海運股份有限公司行政長 Chief Administration Officer, Yang Ming Marine Transport Corporation
委員 Member	劉守麟 Shou-Lin Liu	裕民航運股份有限公司專案經理 Project Manager, Marine Department, U-Ming Marine Transport Corporation
委員 Member	王紹培 Davis Wang	台灣中油股份有限公司儲運處組長 Section Manager, Marine Management Section, CPC Corporation, Taiwan
委員 Member	林暐傑 Wei-Chien Lin	四維航業股份有限公司海務部襄理 Assistant Manager, Shih Wei Navigation Co., Ltd.
委員 Member	俞克維 K. W. Yu	國立高雄科技大學副校長 Vice President, National Kaohsiung University of Science and Technology.
委員 Member	林彬 B. Lin	國立臺灣海洋大學商船學系教授 Professor, Department of Merchant Marine, National Taiwan Ocean University

風電諮詢委員會 WindEnergy Advisory Committee

職別 Title	姓名 Name	現任職務 Position
主任委員 Chairman	謝翰璋 Han-Chang Hsieh	經濟部標準檢驗局副局長 Deputy Director General, Bureau of Standards, Metrology and Inspection, MOEA
副主任委員 Vice-Chairman	沈淑賢 Shu-Hsien Shen	交通部航港局航安組組長 Director, Maritime and Port Bureau, MOTC
委員 Member	吳志偉 Chih-Wei Wu	經濟部能源署副署長 Deputy Director General, Energy Administration, MOEA
委員 Member	江茂雄 Mao-Hsiung Chiang	國立台灣大學工學院院長 Dean of Engineering College, National Taiwan University
委員 Member	黃金城 Chin-Cheng Huang	國家原子能科技研究院機械及系統工程研究所所長 Director, Department of Mechanical and Systems Engineering, National Atomic Research Institute
委員 Member	張勳彬 Keith Zhang	富邦產物保險股份有限公司工程暨海上保險商品部資深經理 Senior manager, engineering & marine insurance product department, Fubon Insurance Co., Ltd.
委員 Member	辛敬業 Ching-Yeh Hsin	中國造船暨輪機工程師學會理事 Director, Taiwan Society of Naval Architects and Marine Engineers
委員 Member	鍾承憲 Cheng-Hsien Chung	財團法人船舶暨海洋產業研發中心研發海洋產業處處長 Director, Marine Industrial Department, Ship and Ocean Industries R&D Center
委員 Member	蔡英聖 Ing-Sheng Tsay	台灣電力股份有限公司再生能源處處長 Director, Department of Renewable Energy, Taiwan Power Company
委員 Member	鄭文傑 Wen-Chieh Cheng	中能發電股份有限公司統包工程副總監 Deputy EPC Director, China Steel Power Corporation
委員 Member	楊迅 Augustine M. Yong Hsun	海鼎離岸風電計畫品質經理 Formosa III Certification Manager

建造中入級 Classification of Ships During Construction

2023 年建造中入級 CR 的船舶共計有 41 艘，分列如下：

There were a total of 41 ships classed by CR during construction in 2023 as listed below:

船東 Owner	造船廠 Shipyard	建造地點 Place	船型 Ship type	艘數 Number
海洋委員會海巡署艦隊分署 Fleet Branch, Coast Guard Administration, Ocean Affairs Council	CSBC Corporation, Taiwan	台灣 TAIWAN	100 噸級巡防艇 100 ton PATROL BOAT	2
海洋委員會海巡署艦隊分署 Fleet Branch, Coast Guard Administration, Ocean Affairs Council	Jong Shyn Shipbuilding Co., Ltd.	台灣 TAIWAN	35 噸級巡防艇 35 ton PATROL BOAT	6
海洋委員會海巡署艦隊分署 Fleet Branch, Coast Guard Administration, Ocean Affairs Council	Jong Shyn Shipbuilding Co., Ltd.	台灣 TAIWAN	600 噸級巡防艦 600 ton PATROL VESSEL	2
海洋委員會海巡署艦隊分署 Fleet Branch, Coast Guard Administration, Ocean Affairs Council	Karmin International Co., Ltd.	台灣 TAIWAN	沿岸多功能艇 FRP PATROL BOAT	4
海洋委員會海巡署艦隊分署 Fleet Branch, Coast Guard Administration, Ocean Affairs Council	CSBC Corporation, Taiwan	台灣 TAIWAN	1,000 噸級巡防艦 1,000 ton PATROL VESSEL	1
海洋委員會海巡署艦隊分署 Fleet Branch,Coast Guard Administration, Ocean Affairs Council	Jong Shyn Shipbuilding Co., Ltd.	台灣 TAIWAN	100 噸級巡防艇 100 ton PATROL BOAT	2
財政部關務署基隆關 Customs Administration, Ministry of Finance, Keelung Customs	CSBC Corporation, Taiwan	台灣 TAIWAN	100 噸級巡緝艇 100 ton PATROL BOAT	1
財政部關務署高雄關 Customs Administration, Ministry of Finance, Kaohsiung Customs	CSBC Corporation, Taiwan	台灣 TAIWAN	100 噸級巡緝艇 100 ton PATROL BOAT	2
財政部關務署臺中關 Customs Administration, Ministry of Finance, Taichung Customs	CSBC Corporation, Taiwan	台灣 TAIWAN	100 噸級巡緝艇 100 ton PATROL BOAT	1
澎湖縣望安鄉公所 Wangan TownshipHall, Penghu County	Jiou Cing International S.B. Co., Ltd.	台灣 TAIWAN	100GT 客船 100GT PASSENGER SHIP	1
台灣航業股份有限公司 TAIWAN NAVIGATION CO., LTD.	San Yang Shipbuilding Co., Ltd.	台灣 TAIWAN	帶纜工作船 WORK BOAT	2
金門縣港務處 Harbor Breau, Kinmen County	Jade Shipbuilding Co., Ltd.	台灣 TAIWAN	SRP 拖船 SRP TUG BOAT	1
臺灣港務港勤股份有限公司 TIPC Marine Corporation, Ltd.	Jong Shyn Shipbuilding Co., Ltd.	台灣 TAIWAN	5,000 匹拖船 5,000HP TUG BOAT	2
台灣中油股份有限公司 CPC CORPORATION, TAIWAN	Fa Chu Shipbuilding Co., Ltd.	台灣 TAIWAN	除污船 WORK BOAT	1
連江縣政府 LIENCHIANG COUNTY GOVERNMENT	Miura Shipbuilding Co., Ltd.	日本 JAPAN	駛上駛下客船 Ro-Ro Passenger Ship	1
WAN HAI LINES (SINGAPORE) PTE. LTD.	Japan Marine United Corporation, Tsu Shipyard	日本 JAPAN	3,013TEU 貨櫃船 CONTAINER CARRIER	1
WAN HAI LINES (SINGAPORE) PTE. LTD.	Japan Marine United Corporation, Kure Shipyard	日本 JAPAN	3,035TEU 貨櫃船 CONTAINER CARRIER	1
裕民航運 (香港) 有限公司 U-MING MARINE TRANSPORT(Hong Kong) Limited	Oshima Shipbuilding Co., Ltd.	日本 JAPAN	99,000DWT 散裝船 99,000DWT BULK CARRIER	1
百麗航運股份有限公司 BRAVE LINE CO., LTD.	Murakami Hide S.B. Co., Ltd.	日本 JAPAN	1,400DWT 貨船 1,400DWT GENERAL DRY CARGO SHIP	1
飛馬輪船股份有限公司 FEI MA SHIPPING CO., LTD.	Glow Marine Pte Ltd.	印尼 & 新加坡 INDONESIA & SINGAPORE	499GT 鋁合金客船 PASSENGER SHIP	1
台灣航業股份有限公司 TAIWAN NAVIGATION CO., LTD.	PaxOcean / PT. Graha Trisaka Industri	印尼 & 新加坡 INDONESIA & SINGAPORE	VSP 拖船 VSP TUG BOAT	3
台灣航業股份有限公司 TAIWAN NAVIGATION CO., LTD.	PaxOcean / PT. Graha Trisaka Industri	印尼 & 新加坡 INDONESIA & SINGAPORE	SRP 拖船 SRP TUG BOAT	2
臺灣港務港勤股份有限公司 TIPC Marine Corporation, Ltd.	PT. United Sindo Perkasa	印尼 & 新加坡 INDONESIA & SINGAPORE	SRP 拖船 SRP TUG BOAT	1
海有航運股份有限公司 HAI YOU SHIPPING CO., LTD.	Glow Marine Pte. Ltd.	印尼 & 新加坡 INDONESIA & SINGAPORE	499GT 鋁合金客船 499GT PASSENGER SHIP	1

現成船入級 Classification of Existing Ships

2023 年現成船入級 CR 的船舶共計有 35 艘，分列如下：

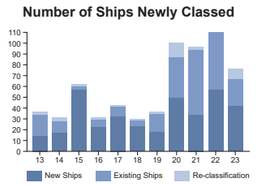
There were a total of 35 existing ships classed by CR in 2023 as listed below:

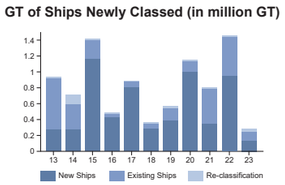
船名 Shipname	船東 Owner	船旗 Flag	總噸位 GT	船型 Ship type
向陽山 SUNNY BRIGHT	豐陽船舶股份有限公司 SUNNY BRIGHT MARINE CO., LTD	中華民國 R.O.C.	1,358	OFFSHORE SERVICE VESSEL
奕洋 1 號 GRAND SEAS NO.1	奕洋船舶股份有限公司 GRAND SEAS SHIPPING CO., LTD.	中華民國 R.O.C.	2,974	油品船 OIL PRODUCT TANKER
金星 JIN XING	金東洋海上遊樂股份有限公司 JIN DONG YANG MARITIME PLEASURE CO., LTD.	中華民國 R.O.C.	229	客船 PASSENGER SHIP
永康 655 號 EC 655	永康船舶股份有限公司 EVER COMFORT SHIPPING CO., LTD.	中華民國 R.O.C.	433	拖船 TUG BOAT
裕風 6 號 UMO GREEN	裕民風能航運股份有限公司 U-MING Marine Offshore Company Limited	中華民國 R.O.C.	268	客船 PASSENGER SHIP
裕風 7 號 UMO JADE	裕民風能航運股份有限公司 U-MING Marine Offshore Company Limited	中華民國 R.O.C.	268	客船 PASSENGER SHIP
英勇 ALIANT	大川吉海事工程股份有限公司 DA CHUAN CHI MARINE ENGINEERING CO., LTD.	中華民國 R.O.C.	191.88	CREW BOAT
洋民 101 號 AL SEALAND 101	世洋機械科技股份有限公司 OCEAN WORLD ENGINEERING & TECHNOLOGY CO., LTD.	中華民國 R.O.C.	294	CARGO BOAT
海東 HAI TONG	翁逸民 WENG YI MIN	中華民國 R.O.C.	99.91	WORK BOAT
宏略 1 號 HONG LUE NO.1	宏略興業股份有限公司 HONG LUE ENTERPRISE CO., LTD	中華民國 R.O.C.	30.84	WORK BOAT
白海豚 -2032 BH-2032	翁逸民 WENG YI MIN	中華民國 R.O.C.	30.84	WORK BOAT
白海豚 -2067 BH-2067	翁逸民 WENG YI MIN	中華民國 R.O.C.	30.84	WORK BOAT
SEAJACKS ZARATAN	Seajacks 3 Japan LLC	日本 Japan	9,068	自昇式平台 SELF-ELEVATING UNIT
PACIFIC HAWK	TIDEWATER OFFSHORE OPERATIONS PTE. LTD	新加坡 Singapore	4,059	OFFSHORE SERVICE VESSEL
PACIFIC LEGACY	TIDEWATER OFFSHORE OPERATIONS PTE. LTD	新加坡 Singapore	5,179	OFFSHORE SERVICE VESSEL
MP PROSPECT	MARCO POLO OFFSHORE PTE LTD	新加坡 Singapore	2,562	OFFSHORE SERVICE VESSEL
PACIFIC VALKYRIE	TIDEWATER OFFSHORE OPERATIONS PTE. LTD	新加坡 Singapore	2,147	OFFSHORE SERVICE VESSEL
MMA PINNACLE	MMA Offshore Malaysia Sdn Bhd	馬來西亞 Malaysia	5,138	OFFSHORE SERVICE VESSEL
BINH AN	Petrovietnam Technical Service Corporation	越南 Vietnam	1,948	SUPPLY AND FIRE FIGHTING VESSEL
MP PRIDE	PT. PELAYARAN NASIONAL BINA BUANA RAYA TBK	印尼 Indonesia	2,562	OFFSHORE SERVICE VESSEL
TERRA PLANA	Boskalis Westminster Shipping B.V.	賽普勒斯 Cyprus	498	挖泥船 DREDGER SHIP
SHOREWAY	Boskalis Westminster Shipping B.V.	賽普勒斯 Cyprus	5,005	HOPPER DREDGER
BOLD TERN	BOLD TERN AS	馬爾他 Malta	17,294	自昇式平台 SELF-ELEVATING UNIT
BOKA NORTHERN OCEAN	BOSKALIS OFFSHORE TRANSPORT SERVICE N.V.	馬爾他 Malta	11,264	OFFSHORE SERVICE VESSEL
MIGHTY SERVANT 3	Mighty Servant 3 B.V.	庫拉索 Curacao	23,123	SPECIAL SERVICE SEMI SUBMERSIBLE HEAVY LIFT VESSEL
BOKA ATLANTIC	BOSKALIS OFFSHORE TRANSPORT SERVICE N.V.	馬紹爾群島 Marshall Islands	8,842	SHIP-SHAPED DRILLING UNIT
SYMPHONY PROVIDER	Symphony DP Equity II B.V.	荷蘭 Netherlands	6,740	一般乾貨船 GENERAL DRY CARGO SHIP
BREUGHEL	DELTA RIVER SHIPPING SA	荷蘭 Netherlands	11,136	HOPPER DREDGER
COASTAL CROWN	Coastal Shipping B.V.	荷蘭 Netherlands	427	Anchor Handling Tug
APOLLO	DEME OFFSHORE PROCUREMENT & SHIPPING LU SA	盧森堡 Luxembourg	10,510	自昇式平台 SELF-ELEVATING UNIT
VITUS BERING	SODRACO INTERNATIONAL SAS	盧森堡 Luxembourg	8,048	HOPPER DREDGER
BOURBON ENTERPRISE	BOURBON ENTERPRISE SNC	盧森堡 Luxembourg	3,052	OFFSHORE SUPPLY VESSEL
SIEM TOPAZ	Siem AHTS pool AS	挪威 Norway	7,473	OFFSHORE SERVICE VESSEL
VETAG 8	VETAG GmbH & Co., KG	德國 Germany	2,242	駁船 BARGE
VOE EARL	DELTA MARINE LTD.	英國 United Kingdom	199.8	拖船 TUG BOAT

新入級船舶 Newly Classed Ships

2023 年經審核後正式入級的船舶有 76 艘共計 289,497 總噸，艘數為在級船舶的 14%，其中新船入級 41 艘，現成船入級 26 艘，重新入級 9 艘。

After careful review, a total of 76 ships with 289,497 gross tonnage were formally classed with CR in 2023. The number of ships accounted for 14% of the number of those already classed with CR. Among these newly classed ships, there were 41 new ships, 26 existing ships, and 9 re-classed ships.



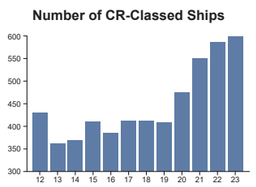


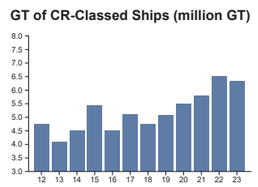
在級船舶 Classed Ships

截至 2023 年底，維持 CR 船級之船舶有 654 艘，共計 6,356,409 總噸，平均船齡為 12.2 年。

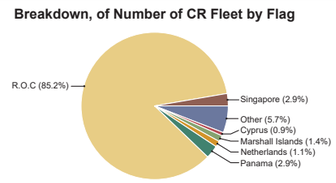
Up to the end of 2023 there were 654 ships maintaining CR class with 6,356,409 gross tonnage, and the average age of ships was 12.2 years.

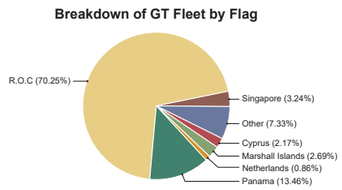
歷年在級船舶艘數及總噸 The number of CR-classed ships over the years and their gross tonnage



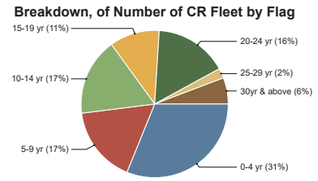


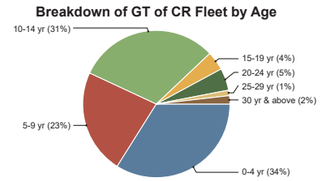
在級船舶之船旗國分析 Analysis of flag states of CR-classed ships



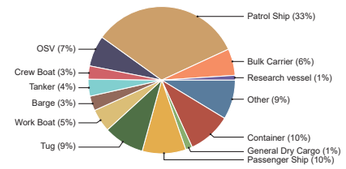


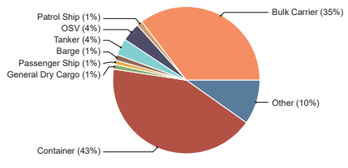
在級船舶之船齡分析 (平均船齡 12.2 年) Analysis of age of CR-classed ships (the average age of ships: 12.2 years)





在級船舶之船型分析 Analysis of types of CR-classed ships





政府授權 Government Authorization

CR 接受交通部委託，承辦本國籍船舶之國際公約檢驗。此外，本中心亦符合 IMO 決議案 MSC.349(92) RO Code 之規定，並獲得巴拿馬、貝里斯等 7 國政府之授權執行各該國籍船舶之國際公約檢驗。

交通部航港局於 10 月 26 日至 27 日至本中心高雄連絡處和台船高雄廠執行驗船機構現成船垂直合約稽核，認可本中心符合驗船機構章程 (RO Code) 之規定，繼續授權本中心執行船舶法定檢驗及發證。

交通部航港局於 12 月 5 日辦理遊艇驗證機構之年度查核，本中心已順利通過查核。

國家通訊傳播委員會 (NCC) 於 11 月 6 日順利完成對本中心授權無線電委辦業務查核之年度稽查工作。

CR is authorized by the Ministry of Transportation and Communications to carry out statutory surveys of ROC ships. In addition, we have met the requirements of IMO Resolutions MSC. 349 (92) RO Code and obtained authorization from the governments of Panama, Belize, and other five countries for conducting statutory surveys of ships registered with these governments.

Maritime and Port Bureau(MPB) has conducted an the recognized organization audit at CR Kaohsiung Office and CSBC Kaohsiung on October 26-27. CR was recognized to comply with requirements of RO Code, and authorized to conduct statutory surveys and certification.

CR has smoothly passed the annual audit on yacht inspection conducted by Maritime and Port Bureau on December 5.

CR has smoothly passed the annual audit on radio inspection conducted by National Communications Commission (NCC) on November 6.

ISM, ISPS 及 MLC 評鑑
ISM, ISPS & MLC Verifications

2023 年 CR 辦理航業公司及其所屬船舶申請國際安全管理章程 (ISM) 及國際船舶與港口設施保全章程 (ISPS) 及海事勞工公約 (MLC) 之評鑑及發證工作，共計符合文件 (DOC) 評鑑 38 家，船舶管理評鑑 (SMC) 65 艘，國際船舶保全 (ISPS) 評鑑共 56 艘次及海事勞工公約 (MLC) 檢查共 67 艘。

In 2023, CR conducted ISM, ISPS and MLC verification and certification work, carrying out DOC verifications for 38 companies, SMC verifications for 65 ships, ISPS verifications for 56 ships, and MLC inspection for 67 ships.

港口國管制 Port State Control

為維持我國國輪在港口國管制 (PSC) 之檢查成績，自 2017 年起，配合主管機關政策向國輪航商宣導強化管制檢查措施，內容如下：

一、擬定管制檢查措施，針對高風險船舶，本中心驗船師將會同航務中心檢查員每 2~4 個月登輪執行預防性加強檢驗，以及每 6 個月登輪執行船舶 SMC、ISSC 及 MLC 額外評鑑。

二、高風險船舶前往澳洲、香港、新加坡、日本及韓國五處港口前，必須申請預防性加強檢驗，本中心驗船師登輪檢驗後將核發效期最長 2 個月之檢驗報告。

三、高風險船舶每次前往澳洲、香港、新加坡、日本、韓國及俄羅斯等港口，應提送「港口國管制檢查表 (到港前使用)」給公司，再由公司提送給中心備查。

四、若國輪遭留置 (包含中國)，船舶本身以「高風險船舶」標準及管理公司以「低表現度」標準予以管制至少一年。

五、若國輪遭開列超過 5 項缺失 (包含中國)，船舶本身以「高風險船舶」標準予以管制至少一年。

本中心提供「港口國管制檢查表 (到港前使用)」及「船上保養檢查表」，請船東及船員落實使用，由本中心驗船師登輪檢驗時查核使用狀況。

本中心提供 IMO 決議案 A.1155(32) Appendix 2 所列之可留置缺失項目，提醒船東注意。

本中心於社群軟體 LINE 建立「CR PSC 應急群組」，方便船舶遇有港口國管制官員登船檢查時，船上人員可即時加入此群組以取得本中心之協助。

依東京備忘錄 (Tokyo MOU) 發布之年報，本中心十餘年來皆獲得「高表現度」之評比；國輪亦持續維持名列「白名單」，足見強化管制檢查措施顯具成效。後續本中心將持續配合主管機關政策執行國輪強化管制檢查措施，以維持國輪在港口國管制的良好成績。

In order to maintain performance of R.O.C flagged vessels in Port State Control (hereinafter refers to as PSC), CR has implemented enforcement control measures in accordance with government policies as follows:

1. CR has stipulated control measures, which for high-risk vessels, CR surveyors and administration inspectors will conduct preventive surveys onboard every two to four month and board the ship every 6 months to perform additional evaluation of the ship's SMC, ISSC and MLC.

2. High-risk vessels must apply for additional survey requested by flag State (hereinafter refers to as ASFS) before sailing to the ports of Australian, Hong Kong, Singapore, Japan and Korea. The ASFS report with a validity period of up to two months will be issued after examination by CR surveyors.

3. Every time a high-risk vessel goes to the ports of Australian, Hong Kong, Singapore, Japan, Korea and Russia, it should submit a "Pre-arrival Port State Control Checklist" to the company, which will then submit it to CR for reference.

4. If the R.O.C. flagged vessel was detained by PSC (included in China), the Company and the ship will be identified as "Low performance" and "High-risk vessel", subject to enforcement control measures for a minimum duration of one year.

5. If the R.O.C. flagged vessel has more than 5 deficiencies after a PSC inspection, the ship will be identified as "High-risk vessel", subject to enforcement control measures for a minimum duration of one year.

CR has provided "Pre-Arrival PSC Checklist" and "Onboard Maintenance Checklist" for shipowners and crew to use. CR surveyors will check those document when conducting surveys onboard.

CR has drawn shipowners' attention to those detainable deficiencies listed in IMO Resolution A1155(32) Appendix 2.

CR has created a Line group link for PSC inspection. Once there are PSC officers onboard, the crew could join the group immediately to seek CR's assistance.

According to annual reports published by Tokyo MOU, CR has been listed in "High Performance" for more than ten years, and R.O.C. flag continues to maintain its position on "White List". It is proved that enforcement control measures are effective. In the future, CR will continue to implement enforcement control measures on R.O.C flagged vessels in accordance with government policies in order to maintain good performance of R.O.C. flagged vessels in Port State Control.

規範發展 Rules Development

本中心自行開發所有入級規範與認證規範，並因應最新國際法規及技術發展，每年實行規範之修訂與更新並經本中心技術委員會審查通過。目前本中心所編撰之規範有：

All the CR classification rules and certification rules are self-developed by the Society and have been revised and updated every year in response to the latest international conventions and the development of technology. In addition, the amendments to CR rules are also validated by the Technical Committee of CR. At the moment, we are compiling the classification and certification rules listed below.

- **鋼船建造與入級規範**
  Rules for the Construction and Classification of Steel Ships
- **高速船建造與入級規範**
  Rules for the Construction and Classification of High-Speed Craft
- **海巡艦艇建造與入級規範**
  Rules for the Construction and Classification of Coast Guard Ships
- **玻璃纖維強化塑膠船舶建造與入級規範**
  Rules and Regulations for the Construction and Classification of Ships of Fibreglass Reinforced Plastics
- **貨櫃建造與發證規範**
  Rules for the Construction and Certification of Freight Containers
- **貨物裝卸設備構造與檢驗規範**
  Rules for the Construction and Survey of Cargo Gear
- **離岸風場認證規範**
  Rules for the Certification of Offshore Wind Farms

研究成果 Research Results

因應國際海運節能減碳趨勢，本中心於 2023 年發表兩篇航行最佳化研究論文，並刊登於學術品質極高的 SCIE 國際期刊 Journal of Marine Science and Engineering (JMSE)，深受國際認可與肯定。這兩篇論文以中心自主開發的 CRVO (CR Voyage Optimizer) 程式，使用基因演算法分別針對貨櫃船及散裝船的營運特性，探討船速及燃料比例進行最佳化計算，並可將區域性的規定、航程上的天氣納入演算考量，有助於航商做出最佳決策，可有效降低碳排放、掌握營運成本和船舶能源效益。

In response to the international maritime trend of energy conservation and carbon reduction, CR published two research papers in 2023, which were subsequently featured in the high end SCIE international journal, the Journal of Marine Science and Engineering (JMSE). This acknowledgement highlights the international acclaim and appreciation for our research. These two papers utilize CR's proprietary CRVO (CR Voyage Optimizer) program, employing genetic algorithms to optimize the operational characteristics of container ships and bulk carriers. The research focused on optimizing vessel speed and fuel ratios while accounting for regional regulations and weather conditions in voyage planning. The objective of these efforts is to assist maritime operators in making informed decisions, thereby effectively reducing carbon emissions, managing operational costs, and improving vessel energy efficiency.

論文之刊登網址如下，或掃描圖片中的 QR CODE 亦可立即閱讀，也歡迎各界參閱文章並與我們交流

The URLs for both published papers are given below, and we invite you to access them for further reading. We are open to discussing and interacting with the wider community to exchange ideas and insights. Find the articles online or scan the QR code below for immediate access, and feel free to contact CR with any inquiries or discussions

https://doi.org/10.3390/jmse11040758

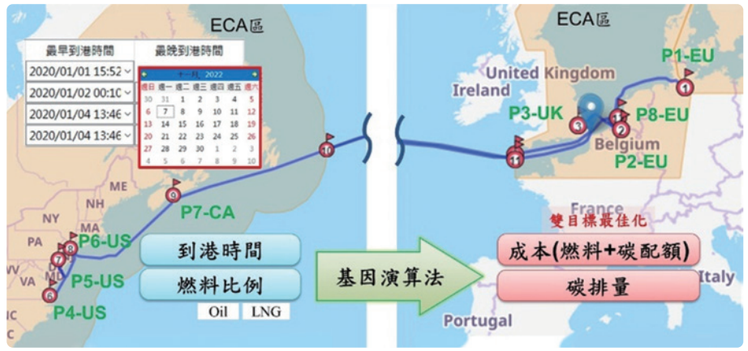
https://doi.org/10.3390/jmse11102000

智慧減碳先驅－雙燃料船航行成本與碳排最佳化

Speed and Fuel Ratio Optimization for a Dual-Fuel Ship to Minimize Its Carbon Emissions and Cost

論文連結

本中心針對近年熱門的雙燃料貨櫃船，以 CRVO 的基因演算法找出 LNG 雙燃料船的航速和燃油 /LNG 燃料使用比率最佳方案。該程式選用的參數包含燃油 /LNG 的燃料成本、燃料消耗、到離港時間與航段距離等，並考慮船舶營運的碳強度指標 (CII)、低硫排放管制區 (ECA) 以及歐盟碳交易配額 (EU ETS) 等法規的影響，最終計算出該航程規畫下，航行船速和燃油 /LNG 燃料使用比例之間的最佳化配置。這使得船東能夠最大限度地減少碳排放並掌握營運成本。本研究成果可為船舶能源效益提供重要的參考價值。



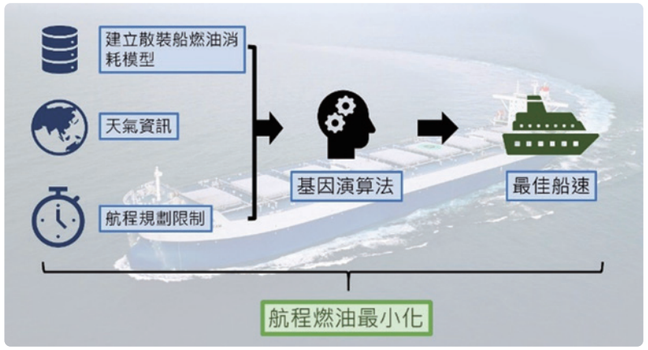
The paper, titled "Speed and Fuel Ratio Optimization for a Dual-Fuel Ship to Minimize Its Carbon Emissions and Cost", specifically focused on the increasingly popular dual-fuel ships, such as container vessels. The genetic algorithm of CRVO helped it find the optimal combination of speed and fuel oil/LNG ratio for LNG dual-fuel ships. The program accounted for parameters such as fuel oil/LNG cost, fuel consumption, port arrival/departure times, and voyage distances. Furthermore, the study considered the Carbon Intensity Index (CII), Emission Control Areas (ECA), and regulations of the European Union Emission Trading System (EU ETS). The ultimate goal was to calculate the best configuration of vessel speed and fuel oil/LNG fuel usage for a given voyage, allowing shipowners to minimize carbon emissions while optimizing operational costs. Our research outcomes provide valuable insights for enhancing vessel energy efficiency.

風行無阻－散裝船航行智慧優化

Speed Optimization in Bulk Carriers: A Weather-Sensitive Approach for Reducing Fuel Consumption

論文連結

本中心特別考慮散裝船的營運特性並結合 CRVO 最佳化計算，分析海況對油耗的敏感性。在維持原定到港時間的同時，採用基因演算法為每個航段提出最佳航速建議，以在良好的風況下增加航行距離，並減少在惡劣天氣中的不必要燃油消耗。本案透過與中鋼運通的密切合作，使得 CRVO 得以根據即時天氣、運營限制等進行實際應用並做出最佳決策，有望節省整個航程的燃油消耗、降低碳排放，並提升船舶能源效率。為航運界規劃出一套高效便捷的航行最佳化工具，以提升船舶能效管理。



The paper, titled "Speed Optimization in Bulk Carriers: A Weather-Sensitive Approach for Reducing Fuel Consumption", focused on the operational characteristics of bulk carriers. Combining CRVO's optimization calculations with a weather-sensitive analysis of weather conditions, the paper provided a weather-sensitive approach to reducing fuel consumption. It used a genetic algorithm to recommend optimal speeds for each voyage segment, with the aim of increasing voyage distance under favorable weather conditions while minimizing unnecessary fuel consumption during adverse weather. We collaborated closely with China Steel Express Corporation to enable the practical application of CRVO, allowing real-time decisions based on weather and operational constraints. This goal of using this method is to save fuel throughout the entire voyage, reduce carbon emissions, and improve the vessel's energy efficiency. It provides the maritime industry with an efficient and practical voyage optimization tool that can enhance vessel energy management.

再生能源服務 Renewable Energy Services

專案驗證 Project Certification

於經濟部標準檢驗局指導下，CR 成為本土首位通過 ISO/IEC 17065 認證，取得 11 項模組之離岸風力發電專案驗證單位，憑藉對臺灣本土特殊環境之熟稔，能提供自場址條件評估、設計基礎評估、整合負載分析、風力機 / 轉子機艙總成與支撐結構設計評估、風力機 / 轉子機艙總成、支撐結構製造監督、運輸與安裝、試運轉與運維、最終評估等模組之服務，為客戶控管專案之風險。

CR was the first local authorized party to achieve 11 modules accredited under the ISO/IEC 17065 in Taiwan. We were selected by BSMI to become a member of the project certification team. CR can assist customers in assessing domestic regulations and developmental risks. In terms of project verification, CR can provide site condition evaluation, design basis evaluation, integrated load analysis, support structure design evaluation, support structure manufacturing surveillance, transportation and installation surveillance, commissioning supervision, wind turbine/RNA design evaluation, wind turbine/RNA manufacturing surveillance, final evaluation, operation and maintenance supervision services to manage project risks for clients.


TAF
財團法人全國認證基金會
Taiwan Accreditation Foundation
Certificate of Accreditation
(Certificate No : PC060-230619)

This is to certify that

CR Classification Society
6F, No.130, Sec 2, Nanjang East Rd., Zhongshan Dist., Taipei

is accredited in respect of
Product Certification Work

Accreditation Criteria : ISO/IEC 17065:2012
Accreditation Number : PC060
Originally Accredited : July 10, 2020
Effective Period : July 10, 2023 to July 09, 2026
Accredited Scope : See described in the Appendix

Ching-Chang Lien

Ching-Chang Lien
President, Taiwan Accreditation Foundation
June 19, 2023

P1, total 2 pages


Certificate No: I PC060-230619

Accreditation Number : PC060

Accredited Scope :

Item code	Field/Certification Scheme	Category
2001	Offshore wind farm project certification	Site conditions evaluation
2002	Offshore wind farm project certification	Design basis evaluation
2003	Offshore wind farm project certification	Integrated load analysis
2004	Offshore wind farm project certification	Support structure design evaluation
2005	Offshore wind farm project certification	Support structure manufacturing surveillance
2006	Offshore wind farm project certification	Transportation and installation surveillance (valid from September 23, 2021)
2007	Offshore wind farm project certification	Commissioning supervision (valid from June 19, 2023)
2011	Offshore wind farm project certification	Wind turbine/RNA design evaluation (valid from June 19, 2023)
2012	Offshore wind farm project certification	Wind turbine/RNA manufacturing surveillance (valid from June 19, 2023)
2015	Offshore wind farm project certification	Final evaluation (valid from June 19, 2023)
2016	Offshore wind farm project certification	Operation and maintenance supervision (valid from June 19, 2023)

(Blank)

P2, total 2 pages

海事保證鑑定 Marine Warranty Survey

CR 擁有豐富的船舶檢驗經驗，與國際知名機構 ABL Group 共同提供臺灣地區離岸風電之海事保證鑑定服務，涵蓋專案開發、建設、運維以及除役階段，已參與工程項目包含水下基座、風力機、外部與陣列電纜運輸安裝等。

CR with high experience in ship inspection, cooperates with ABL to jointly provide Marine Warranty Surveys in Taiwan. Some MWS services we participated in includes transportation and installation of foundations, wind turbines, export and inter-array cable transportation and installation for over 5 offshore wind farms in Taiwan.

技術盡職調查 Technical Due Diligence

CR 可依客戶需求提供風場與船舶技術盡職調查、技術諮詢之相關服務，範圍包含風場發電量評估、風場設計、專案團隊能力、品質管理系統、工程技術供應能力、許可與法規、環境與社會影響等之評估與審查。

CR provides wind farm and ship technology due diligence, technical consulting and other related services according to customer needs, covering wind farm power generation evaluation, wind farm design, project team capabilities, quality management systems, engineering technology supply capabilities, permits and regulations, and the environment and social impact evaluation and review.

技術服務 Technical Services

ETAS 緊急技術評估服務
Emergency Technical Assessment Service (ETAS)

本中心提供各航運公司船舶之緊急技術評估服務(ETAS)，截至 2023 年服務中船舶共計有 34 艘。

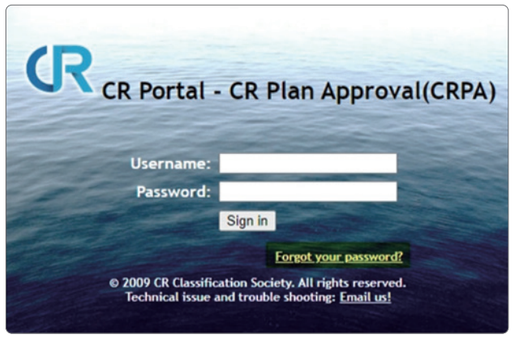
CR provides Emergency Technical Assessment Service (ETAS) to shipping companies. Up to the end of 2023, 34 ships have applied to CR for this service.

工廠認可及型式認可
Works Approval and Type Approval

2023 年 CR 執行船舶用品工廠認可及產品型式認可共計 62 家 105 型，並執行危險品容器之檢驗業務，共計廠商 24 家，型式 128 小型及 7 中型。

In 2023, CR conducted works approval of 62 companies and type approval of 105 products for use on vessels, and also carried out certification of packagings for dangerous goods for 24 companies and 128 types and 7 types (IBCs).

CRPA 電子審圖
CR Plan Approval (CRPA)



為加強新造船設計圖審核效率，並減少紙張印刷之資源浪費，本中心自行開發電子審圖系統（CRPA），其功能包括由船廠傳送設計圖電子檔、本中心審核意見退審、現場驗船師查詢審圖意見、船廠處理退審意見、船東查詢送圖及審圖進度等。

In order to enhance the efficiency of plan approval for newbuildings and to reduce paper consumption in the office, we have developed CR Plan Approval (CRPA). Its functions include submission of design drawings in electronic form by the shipyard, approval of drawings by CR with comments and return of drawings, review of approval comments by the field surveyors, handling of comments on returned drawings, and inquiries from the shipowner about submission of drawings and progress of drawing approval.

對外研討會 External Workshops

本年度對外共舉辦 3 次研討會，深獲與會人士好評。

We held 3 external workshops during 2023, which received favorable responses from participants.

日期 Date	研討會內容 Topic
2023.3.21	• 提升船舶管理績效，降低船舶留置風險 Improve ship management performance and reduce ship detention risks. • MEPC 79 會議重點，聚焦能源轉型 MEPC 79 meeting focus, focusing on energy transformation • Moving Big Things to Zero in Shipping
2023.7.17	• CR 近期成果分享 Sharing of CR's research results • MEPC 80 焦點：綠色航運里程碑 - IMO 新溫室氣體減排戰略目標 MEPC 80 Highlight：Milestone in Green Shipping - IMO's New GHG Strategy • 歐盟 Fit for 55：EU 海運碳排交易制度及 FuelEU 草案 EU Fit for 55: EU maritime carbon emissions trading system and FuelEU draft
2023.8.23	• 2023 重點檢查活動 Fire Safety Concentrated Inspection Campaign (CIC) 2023 on Fire Safety • MEPC 80 焦點：綠色航運里程碑 - IMO 新溫室氣體減排戰略目標 MEPC 80 Highlight：Milestone in Green Shipping - IMO's New GHG Strategy • 歐盟 Fit for 55：EU 海運碳排交易制度及 FuelEU 草案 EEU Fit for 55: EU maritime carbon emissions trading system and FuelEU draft • 船舶回收公約簡介 Introduction to the Ship Recycling Convention

教育訓練 Training

CR 應業界要求舉辦公司保全員 (CSO) 及港口設施保全員 (PFSO) 之訓練課程，本年度舉辦公司保全員共 2 班次計 45 人，及港口設施保全員共 3 班次計 120 人。

另並舉辦國際安全管理 (ISM) 內部稽查訓練課程共 2 班次共計 61 人，PSC 檢查機制重點及應對策略訓練課程共 2 班次共計 103 人，教育訓練課程均深獲參與學員之好評。

In response to the request of the shipping industry, CR has offered 2 CSO training courses for a total of 45 participants and 3 PFSO training courses for a total of 120 participants. Moreover, CR has also held 2 ISM Code training courses for a total of 61 participants and 2 PSC inspection mechanism key points and response training courses for a total of 103 participants.

The above-mentioned educational training courses all drew high praise from the participants.