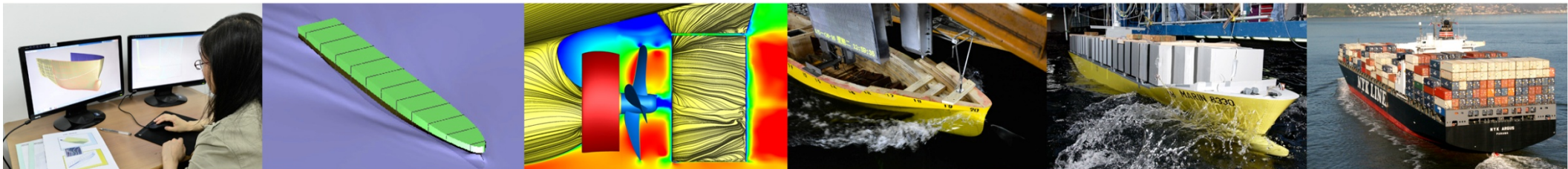


SSSRI/MARIN JOINT VENTURE 合资公司



Building a leading hydrodynamic consultancy base in Asia
创建亚洲领先的水动力学咨询基地





The Joint Venture, Our commitment

合资公司，我们的承诺

November 2008, Maritime Research Institute Netherlands (MARIN) and Shanghai Ship and Shipping Research Institute (SSSRI) signed a Memorandum of Understanding on establishing a joint venture in Shanghai, China. To serve Asian shipbuilding industries in a cooperative way under a joint brand name SSSRI/MARIN.

2008 年 11 月，上海船舶运输科学研究所 (SSSRI) 和荷兰海事研究所 (MARIN) 就在中国上海建立合资公司的事宜签署了谅解备忘录。合资公司将以 SSSRI/MARIN 这一品牌为亚洲的造船业提供优质服务。



Joint venture 合资公司

The Joint Venture followed many years of successful cooperation both on technical progress and market approach. Many common projects and the introduction of CFD and testing technology preceded this important step. The joint venture aims at bringing the high quality and experience of both organizations together, providing a good service for a competitive price to the Asian market. On the basis of clients' requirements and capabilities, either the facilities of SSSRI or MARIN will be used in combination with SSSRI/MARIN expertise.

合资公司是在多年的技术进步和市场运作的成功合作的基础上应运而生的。许多共同项目的实施、CFD 技术的引进以及试验技术的合作促成了这重要一步的迈出。合资公司旨在为亚洲市场提供具有价格竞争力的高质量 and 富有经验的优质服务。基于客户的要求，集成运用 SSSRI、MARIN 的试验设施和专业技术，为市场提供技术咨询及试验服务。

Brand name 品牌

The joint venture is denominated SSSRI/MARIN as a common brand name, which reflects more than 85 years of hydrodynamic research and industry services of MARIN in the world and the excellent services provided by SSSRI to the shipbuilding industries in the Far East.

合资公司以 SSSRI/MARIN 作为共同的品牌名称，反映并代表了 MARIN 超过 85 年之久的水动力研究和工业服务的经验以及 SSSRI 长期以来为远东地区造船业提供的优质服务。

Both MARIN and SSSRI have become reliable and independent service providers for the maritime sector. We take initiative to couple our own expertise to various application areas to broaden our ability in solving problems. By maintaining both of our leadership positions in hydrodynamic research and development, we make our accumulated know-how and experience available for the complete service chain from Consultancy, Performance Evaluation, Lines Optimisation, Model Testing to Sea Trials and Trouble Shooting for the industry. This commitment to high-quality technological innovation enables you to meet the challenges facing your industry today.

MARIN 和 SSSRI 都是可以信赖的和独立的海事技术领域的服务商。我们主动地结合双方各自拥有的专长面向不同应用领域，以拓展解决问题的能力。通过保持双方在水动力学研究和开发的领先地位，我们将致力于把长期积累的专门技术和经验应用于从前期咨询、性能预估、线型优化、模型试验到实船试航，以及售后服务的整个服务链。对高质量技术革新的承诺使我们有能力立足船舶行业，面对挑战。

Complete Service Chain

完备的服务链

We extend our services to the front door of the shipyards, designers and architects by providing a complete service chain from the conceptual design, initial design and detail design to the final design and services during and after sea trials. Wherever required, SSSRI/MARIN will be there on site to provide our complementary skills and expertise. Our customers gain access to the extensive know-how, experience and facilities available from both MARIN and SSSRI.

我们的服务面向船厂、设计院所和工程技术单位，提供从概念设计、初步设计、详细设计到终结设计以及在实船试航和试航后的完备服务链。无论哪里需要，SSSRI/MARIN 将在现场提供我们互补的技能和专门技术。我们的客户可以从 MARIN 和 SSSRI 得到专门知识、技术经验和试验设施的支持。

Consultancy 咨询

Consultancy involves taking a project from its concept specifications to a design ready for the next design stage. Together with naval architects and designers, we evaluate the specifications, identify limitations, make recommendations for improvement, and then provisionally verify the key parameters using computer simulations and elementary testing techniques. We look at propulsion performance, motion optimisation, structural response, manoeuvrability and safety, and draw on experience gained in operational performance research programmes.

咨询涉及到从项目概念阶段的规格书到下一个设计阶段的设计准备。我们与船舶工程师和设计师一起，通过评估设计规格书，辨别限制条件，提出改进建议，使用计算模拟和简单试验技术等手段来核实相应的关键参数。我们着眼于推进性能、运动优化、结构响应、操纵和安全，并从实船航行性能研究中不断积累经验。

Performance Evaluation 性能评估

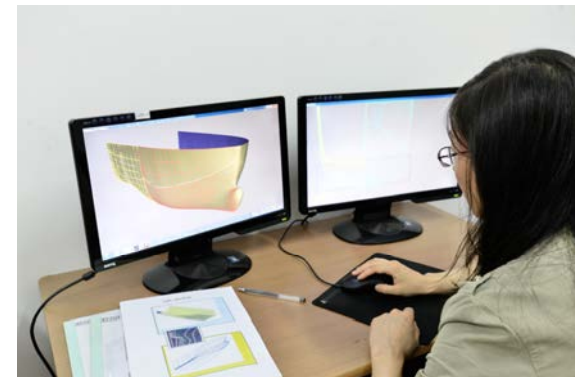
Once the main dimensions of a vessel are determined, we use our computing programs DESP and SPPS, together with correlations for similar vessels, to make an assessment of the speed-power performance. Those predictions are based on optimised ship lines and optimal selected propulsion systems. By using these speed-power evaluations, our customers can check during the early design stage whether their expectations are realistic. A ship design project can benefit from the correlations of a specific design to our huge ship database covering all kind of vessel designs.

一旦船舶主尺度确定后，我们可以利用我们的计算机软件 DESP 和 SPPS，通过对近似船的修正来评估该船的航速与功率性能。这些预报基于优化线型和最佳的推进系统。通过这些航速与功率评估，我们的客户可以在早期设计阶段校验他们的设计预期是否可以实现。通过涵盖所有船型的巨大数据库对详细设计进行相关分析，船舶设计项目可以从中受益。

Lines Optimisation 线型优化

Computational Fluid Dynamics (CFD) tools provide a cost and time effective method for optimising the hull and appendage design in the early design phase. SSSRI-MARIN uses CFD tools to optimise hydrodynamic hull design, provide information on flow behaviour around hull and propeller under various conditions, and predict propeller performance in open water and in-behind conditions. In-house developed tools are used within our Joint Venture, such as MARIN's non-linear potential flow CFD code RAPID and state-of-the-art RANS solvers PARNASSOS and ReFRESCO, as well as commercial CFD codes.

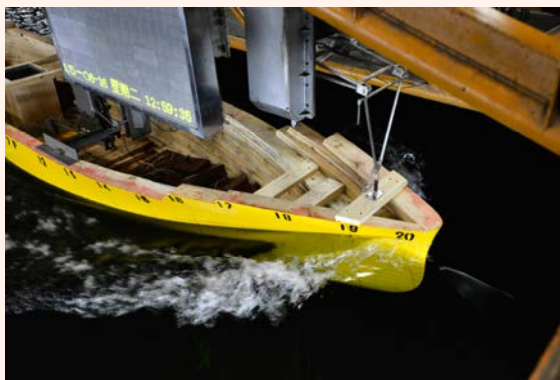
在前期设计阶段，CFD 软件提供了一个经济省时的优化船体和附体设计的方法。SSSRI-MARIN 使用 CFD 软件进行优化船体水动力设计，提供各种条件下的船体表面及螺旋桨附近的流场信息，并预报螺旋桨在敞水以及船后的性能。内部开发的软件用于合资公司，比如 MARIN 非线性势流 CFD 软件 RAPID，先进的 PARNASSOS 软件（采用 RANS 方法）和 ReFRESCO，也使用一些商业 CFD 软件。



Conceptual Model Testing 概念阶段试验

Once one or more designs come off the drawing table, the designers and architects may need to carry out swift model tests to check whether the vessel can perform as they expected, in many cases with different variants. The time schedule should be short and the focus will be on the relative differences among all variants. Stock propulsion systems - conventional, thruster or POD, will be used in these tests. With the joint facilities of SSSRI and MARIN, we are able to carry out the conceptual model tests with quick response and revertible price.

一旦一个或多个设计完成后，设计师或船舶工程师都需要进行快速的模型试验来校验其设计是否能实现他们预期的要求，而且许多情况下参数都会变化。时间日程紧凑，重点关注所有参数中相对差别。备用桨系统-常规桨，推进器或电力推进装置，都将在这类试验中采用。合资公司是快速和经济地进行概念性模型试验最佳的选择。



Final Validation Model Testing 最终验证试验

Final validation model testing directed by our joint venture, with final design propellers, guarantees a top quality of the testing with highest accuracy of the predictions. We pay a lot of attention on making accurately manufactured large ship and propeller models, on the measuring technology and instrumentation, on the data acquisition and processing, and correlation to the full-scale sea trials. The validations cover ship hydrodynamic issues, such as vessel speed-power relations, propeller cavitation performance, vibration and noise, seakeeping and manoeuvring. IMO standard final tests on manoeuvring and seakeeping are also included.

合资公司指导最终选用设计桨的验证试验，保证试验的高质量和预报的高准确度。我们十分注重加工大船模和桨模的精确度、测量技术和工具、数据采集和处理、以及实船试航的修正等。验证试验涵盖水动力试验如航速与功率关系、螺旋桨空泡性能、振动和噪音、耐波性、操纵性等。也包括 IMO 标准操纵性和耐波性的最终试验。



Full-Scale Measurements 实尺度测试

The determination of the ship's performance through full-scale measurements at sea is often the last step in the design cycle. Accurate performance of sea trials and measurement of all environmental conditions is of crucial importance to the analysis of the trials. SSSRI/MARIN offers both scale model testing and on-board measurements. This, together with the use of present-day sensors, measurement computers and analysis software, enables us to offer state-of-the-art sea trials and analyses. A standard sea trial package includes speed and power trials (for EEDI verification), IMO manoeuvring trials, noise and vibration measurements and torsional vibration measurements. Additional services can be provided together and in cooperation with the MARIN Trials & Monitoring group.

通过在海上实船测试来确定船舶的性能通常是设计周期的最后一步。实船试航性能的准确性以及对各种环境条件下的测量对试航结果分析至关重要。SSSRI/MARIN 不仅进行小尺度船模试验，也开展实船试验。配合使用先进的传感器，测量电脑和分析软件，我们能够开展先进的实船试航和分析。一套标准的实船试航包括航速和功率测试（用于 EEDI 验证），IMO 操纵试验，噪音和振动测量，扭振测量。MARIN 的试航及监测组还可以提供其它相关服务。



Exceptional Facilities

卓越的试验设备

By the joined forces of MARIN and SSSRI, we provide exceptional facilities for model testing, computer simulations, full-scale measurement and training courses. The synergy of these activities is the basis of our problem solving capacity, aiming at reliable predictions. We have the following joint facilities to solve specific design and research issues.

通过结合 MARIN 和 SSSRI 的力量，我们提供卓越的试验设备进行试验、计算机模拟、实船测量和培训课程。合资后协同配合的优势奠定了提升我们解决问题能力的基础，目的是提供可靠的预报。我们有如下的共同设施来解决特定设计和研究中遇到的问题。



Deep Water Towing Tank at MARIN 荷兰深水池

The Deep Water Towing Tank (252 x 10.5 x 5.5 m) is used to optimise resistance and propulsion characteristics of ship designs. To provide insight in the possible improvements in performance, the tank has the features to measure and observe various wave and flow patterns. In addition to the standard resistance and propulsion tests, the rudder or pod angle, pod position and propeller rotation direction can be optimised.

深水池 (252 x 10.5 x 5.5 m) 用来优化船舶设计的阻力和推进性能。水池具有测量和观测不同波和流的形态的特性，可以提供在性能上可能的改进方向的具体细节。除了标准的阻力和自航试验外，舵或 POD 的角度选取、POD 的位置和螺旋桨旋转方向都可以进行优化。



Towing Tank at SSSRI 上海拖曳水池

The Towing Tank (192 x 10.0 x 4.2m) is used to optimise resistance and propulsion characteristics of ship designs. To provide insight in the possible improvements in performance, the tank is equipped with instrumentations both for conventional single- and twin-screw propulsion systems with or without nozzle, and also for PODs and thrusters. It can also be used to perform optimisation tests for appendages and energy-saving equipments.

拖曳水池 (192 x 10.0 x 4.2 m) 用来优化船舶设计的阻力和推进性能。水池装备的测试仪器可以进行常规的单桨系统和双桨系统，带导管和不带导管，以及 POD 和推进器的试验。并可进行附体和节能装置优化试验。



Shallow Water Basin at MARIN 荷兰浅水池

The depth of the Shallow Water Basin (220 x 15.75 m) is adjustable from 0 to 1.15 m. It is used to optimise the propulsion characteristics of ships as well as the (low speed) manoeuvring behaviour in shallow water. This including factors like proximity of quays and bank suction. The tests can be used as input for simulations which help to optimise nautical strategies. The facility is also used for Concept Development and Design Support of new offshore designs in shallow water.

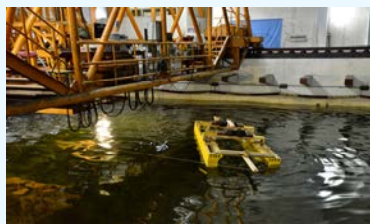
浅水池 (220 x 15.75 m) 的水深可以从 0m 调整到 1.15m。它用来浅水中船舶的推进性能和（低速）操纵性能，包括码头和岸吸因素。试验结果可以作为模拟器的输入参数来优化航海规划。这个设施还可以用来为浅水区域的海岸工程设计提供概念研究和设计支持。



Seakeeping and Manoeuvring Basin at MARIN 荷兰适航性和操纵性水池

Verifying performance and safety requires accurate representation of a ship and its ride control elements in relevant wave conditions. Our Seakeeping and Manoeuvring Basin (170 x 40 m) is designed for making arbitrary (high-speed) manoeuvres in realistic waves from arbitrary directions. The free-sailing or captive tests provide insight into the seakeeping and manoeuvring characteristics.

验证性能和安全性需要对船舶和与波浪条件相关的驾驶控制参数进行准确的描述。我们的适航性和操纵性水池(170 x 40 m)的设计可以满足实际海况中各个浪向和各种(高速)操纵。自由自航模和约束模试验提供了适航性和操纵性的详细特性。



Wind, Wave & Current Basin at SSSRI 上海风浪流水池

The Wind, Wave & Current Basin (100 x 15 x 2 m) is suitable for powering tests at deep and shallow water, as well as seakeeping tests with adjustable depth of basin. The tank is used to predict the powering characteristics at complicated waterway conditions, to research the quays and port berthing, to simulate the physical research at quays and ports.

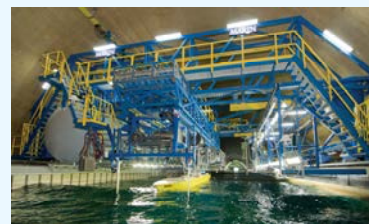
风浪流水池(100*15*2米)具有水深可变功能,从事船舶深、浅水快速性和耐波性能试验研究,分析船舶在复杂航道下的航行特征;可以适应码头、港口靠离泊和进出港研究需要,模拟相关码头、港口模型进行物模试验研究。



Manoeuvring Basin at SSSRI 上海操纵性水池

The Manoeuvring Basin (90 x 30 x 1 m) can be used to perform manoeuvring test under deep and shallow water conditions by adopting free sailing model. It can also be used to research navigation safety by simulating the waterway and quay model.

操纵性水池(90*30*1米),水深可变,从事船舶深浅水操纵性能研究——自由自航模试验研究;模拟航道和码头模型,从事船舶通航安全研究。



Depressurised Wave Basin at MARIN 荷兰减压波浪水池

Models of both ships and offshore structures can be tested in most realistic operational conditions in the Depressurised Wave Basin (240 x 18 x 8 m). The basin can be used for resistance and propulsion tests, but the capability to reduce ambient air pressure as low as 2.5% of atmospheric pressure and installed wave makers for short and long crested waves up to 0.75 m, makes it ideal for investigations into propeller and rudder cavitation, air chambers and wave impacts with air entrapment.

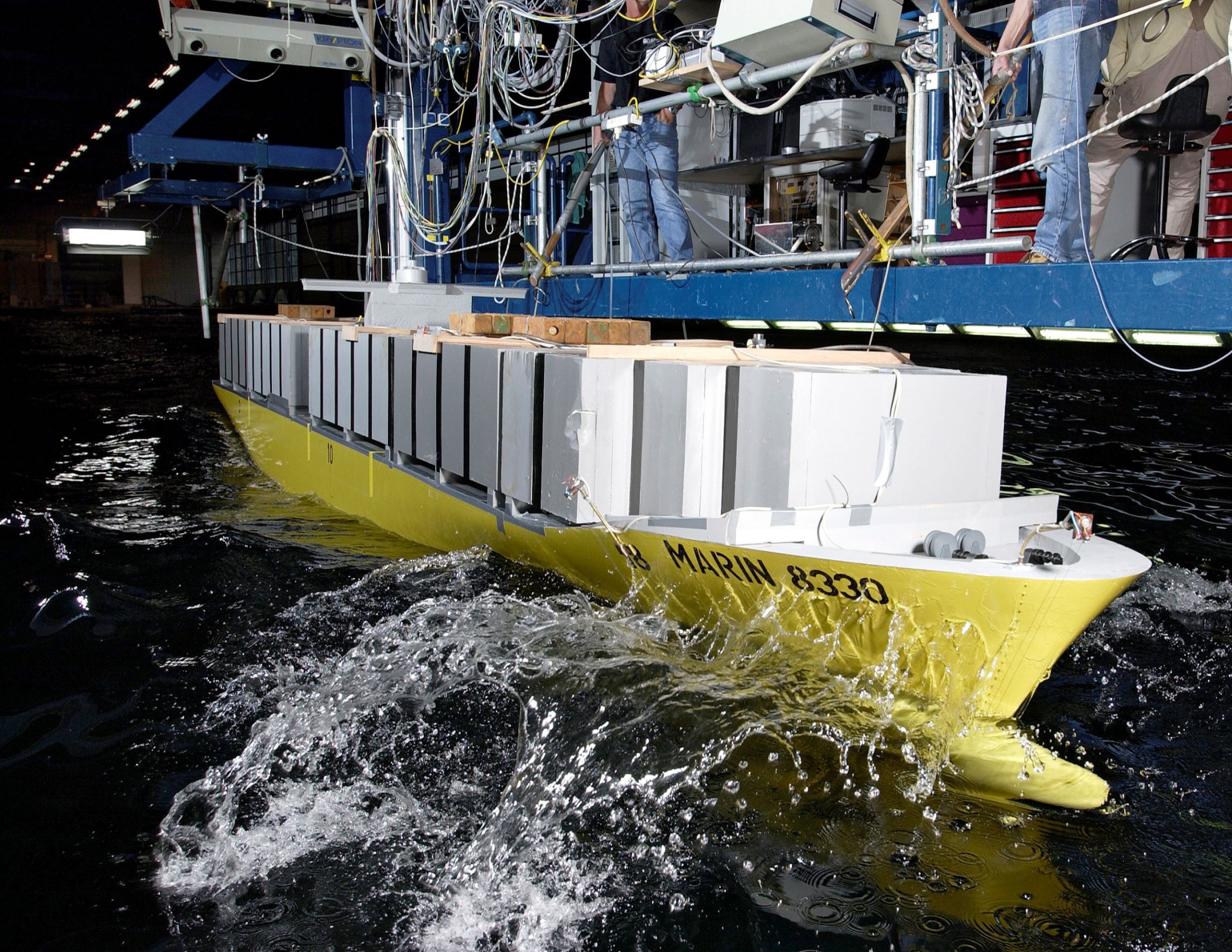
减压波浪水池(240 x 18 x 8 m)可以为船模及海洋结构物模型试验模拟最真实的运营工况。减压波浪水池可进行阻力和自航试验,但减少的环境空气压力最低为2.5%大气压,造波机可模拟的短峰波及长峰波最大为0.75m。可实现螺旋桨及舵空泡观测,气室及空气卷吸的波浪冲击等研究。



Full-mission Bridge Simulator at MARIN 荷兰全功能模拟器

By simulating the port environment and the vessel, personnel such as captains, pilots, mooring masters and tug masters can demonstrate the feasibility of a port layout in terms of safety and viability. Full-mission Bridge Simulators are also used for reducing risk and downtime in (offshore) operations by training manoeuvring and communication skills, or by optimising manoeuvring strategies, port layouts and vessel designs.

通过模拟港口条件和船舶,船长、领航员、系泊船长及拖船船长可以从安全的角度验证港口规划的可行性。全功能模拟器可以通过培训操纵和通讯技巧或优化操纵策略,港口规划和船舶设计来减少(海岸)操作中出现的风险和停工期。



Competitive Price, Excellent Quality

竞争的价格，一流的质量

With the joint force of MARIN and SSSRI, we are able to serve the shipbuilding industry in Asia with the top quality of the world, at a competitive price. We share our expertise, our facilities and our experience to provide the most effective solutions to you, our customers. We have our scientists and engineers to supervise the progress of each project.

通过 MARIN 和 SSSRI 的共同合作，我们能够以世界一流的质量和具有竞争力的价格为亚洲造船行业提供服务。我们将分享我们的专业技术、试验设施和研究经验，为客户提供最有效的解决方案。我们将有我们优秀的专家和工程师监管每个项目的进展情况。

Sharing expertise 共享专长

We see expertise as the core competency of the joint venture. In order to always stay in the technical frontier, the personnel in the joint venture followed and will continue to follow regular training programs. In the last few years, MARIN has trained SSSRI employees on lines optimisation, including the use of the RAPID program and the PARNASSOS viscous code. In addition a Joint Venture team was trained to perform full-scale trial measurements, including the use of STAIMO software and MARIN's MANVIS signal analysis software.

Simultaneously, MARIN will send scientists and experts to the Joint Venture in Shanghai, permanently and frequently, to meet you as our customers, to share ideas with you for your project, to supervise model tests, to provide consultancy and for trouble shooting.

专门知识是合资公司重要的资产。为了在科技前沿始终保持领先地位，合资公司的人员需要保持并且一直保持定期的培训课程。在过去几年中，MARIN已经在线型优化，包括使用RAPID程序和PARNASSOS粘性程序，对SSRI人员进行了培训。另外，一个合资公司团队已通过培训，可开展实船试航，包括使用STAIMO软件及MARIN的MANVIS信号分析软件。与此同时，MARIN将委派一些有经验的专家到合资公司，同客户进行会面，针对委托项目及时沟通观点，为远东造船业排忧解难、提供顾问咨询



Working Practices, Doing Business

实践中经营

SDARI - ROPAX with CRP-POD 采用对转吊舱推进系统的 ROPAX 船

Through SSSRI, Shanghai Merchant Ship Design & Research Institute (SDARI) contracted MARIN to carry out a lines optimisation program and calm water model tests for a fast ROPAX vessel with sophisticated CRP-POD propulsion systems. MARIN has made use of their experience on the ROPAX vessels built up in the last decades and their knowledge on CRP-POD propulsion systems in recent years on this project, providing the right advice both on the lines as well as the selection of the propulsors. The optimisation and test results meet the expectations of SDARI with great satisfaction.

通过 SSSRI，上海船舶研究设计院委托 MARIN 承担采用复杂的 CRP-POD 推进系统的高速客滚船的线型优化和静水模型试验项目。MARIN 将他们过去几十年在 ROPAX 船上的经验和近年来在 CRP-POD 推进系统方面的技术用于该项目上，在线型和推进器选择上都提供了正确的建议。本项目的优化与试验结果达到了预期要求，客户满意。



VRIPACK - Motor Yachts 豪华游艇

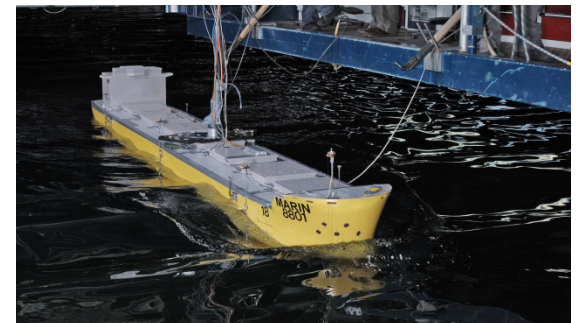
Vripack Yachting International Naval Architects BV (VRIPACK) is a well-known Dutch yacht designing and engineering office. Through MARIN, VRIPACK contracted SSSRI several times for model testing of their motor yachts' designs, with conventional hull form as well as with bulbous bow, with conventional open propellers and ducted propellers. Tests carried out at SSSRI showed a great success in applying a bulbous bow to a motor yacht, where MARIN's potential program RAPID has been used to optimise the lines.

VRIPACK 是一家著名的荷兰游艇设计工程公司。通过 MARIN，VRIPACK 的游艇设计在 SSSRI 进行了多次的模型试验，这些设计包括常规线型和有球首线型，常规螺旋桨和导管桨。在 SSSRI 进行的模型试验表明了在水上应用球首的巨大成功，而 MARIN 的 RAPID 势流程序也被用于本船的线型优化。

GLS - 80,000DWT Bulk Carrier 散装货轮

Guangzhou Longxue Shipbuilding Co., Ltd. (GLS) is one of the largest and newly established shipyards under the China State Shipbuilding Cooperation (CSSC). Through SSSRI, GLS contracted MARIN for the lines development and a complete package of model testing including calm water powering, manoeuvring and seakeeping tests. Especially for seakeeping, GLS is greatly satisfied with the results of the testing which covered added resistance in waves, sustained speed (under the influence of the added resistance from wind and waves and a "voluntary" speed reduction because of slamming and shipping water), motions and accelerations and green water on deck.

广州龙穴船厂是隶属于中船船舶工业集团公司的一家大型的新建造的船厂。通过 SSSRI，GLS 和 MARIN 签署了合同委托其进行线型优化和完整的模型试验，包括静水、操纵性和适航性试验。特别是适航性试验，GLS 对试验结果非常满意，如波浪中的阻力增加、持续航速、运动、加速度和甲板上浪。







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SSSRI/MARIN

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