附件 2-1　E-NNOVATE 2025 波兰国际创新展览会线上展

发明项目展板英文图片内容(一)

CAI No. 08-1

Invention: Safe and Green Recycling Methods and Procedures for Ships and Platforms 船舶与海洋平台绿色拆解与安全回收方法

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Patent No.: CN201910194104.3

Introduction：

Shipbreaking is a crucial part of the shipping industry, but it is plagued by pollution and safety concerns. Working with the world's oldest shipbreaking research institute (Hu-Yunchang Ship and Marine Structure Recycling Technology Research Center at Tianjin University) and China's largest and most advanced green shipbreaking facility (Chang Jiang Shipbreaking Yard), our team have developed a series of methods and technologies that promote environmental-friendly and safe practices in shipbreaking.

- Advantages and significance of the invention:
  1. Our novel approach of ship recycling combines alongside and floating dock methods (Figure 1), including a comprehensive framework of safety assessment -based dismantling planning for marine structures that makes sure residual strength during the dismantling process, a risk management model named "Decreasing to Zero Fault", key technologies of modular dismantling, lifting and transportation of large pieces.
  2. An improved hazardous material management system based on the substance flow analysis method (Figure 2). Key technologies that avoids creating or leaking of hazardous materials in the first place, such as cold cutting, deep-processing and reuse of materials, plasma gasification. Key techniques for handling existing hazardous materials like asbestos, polychlorinated biphenyls, and fiberglass. Optimized layout of dismantling sites and standardized dismantling processes to effectively protect the environment and workers' occupational health.
  3. Methods for improving ship design based on feedback from the shipbreaking perspective (Figure 3). Advanced methods such as modular design and construction, virtual simulation, structure optimization, and using of environment-friendly materials.
- Social contribution and international evaluation:
  1. We have successfully applied our invention to dismantle over 1000 ships and 20 offshore platforms, with remarkable environmental benefits. 13 million tons of high-quality scrap steel and non-ferrous metals were recovered, 4.11 million tons of standard coal and 22.59 million tons of water consumption were saved, 14.01 million tons of carbon emission were reduced, and economic benefits reached 6.428 billion yuan.
  2. Our project is certified by international organizations like the IMO, EU, and ISRA, and is highly regarded by shipowners such as Maersk, and third-party supervisory agencies such as

Sea2Cradle, Lloyd's Register of Shipping, China Classification Society, and Bureau Veritas.

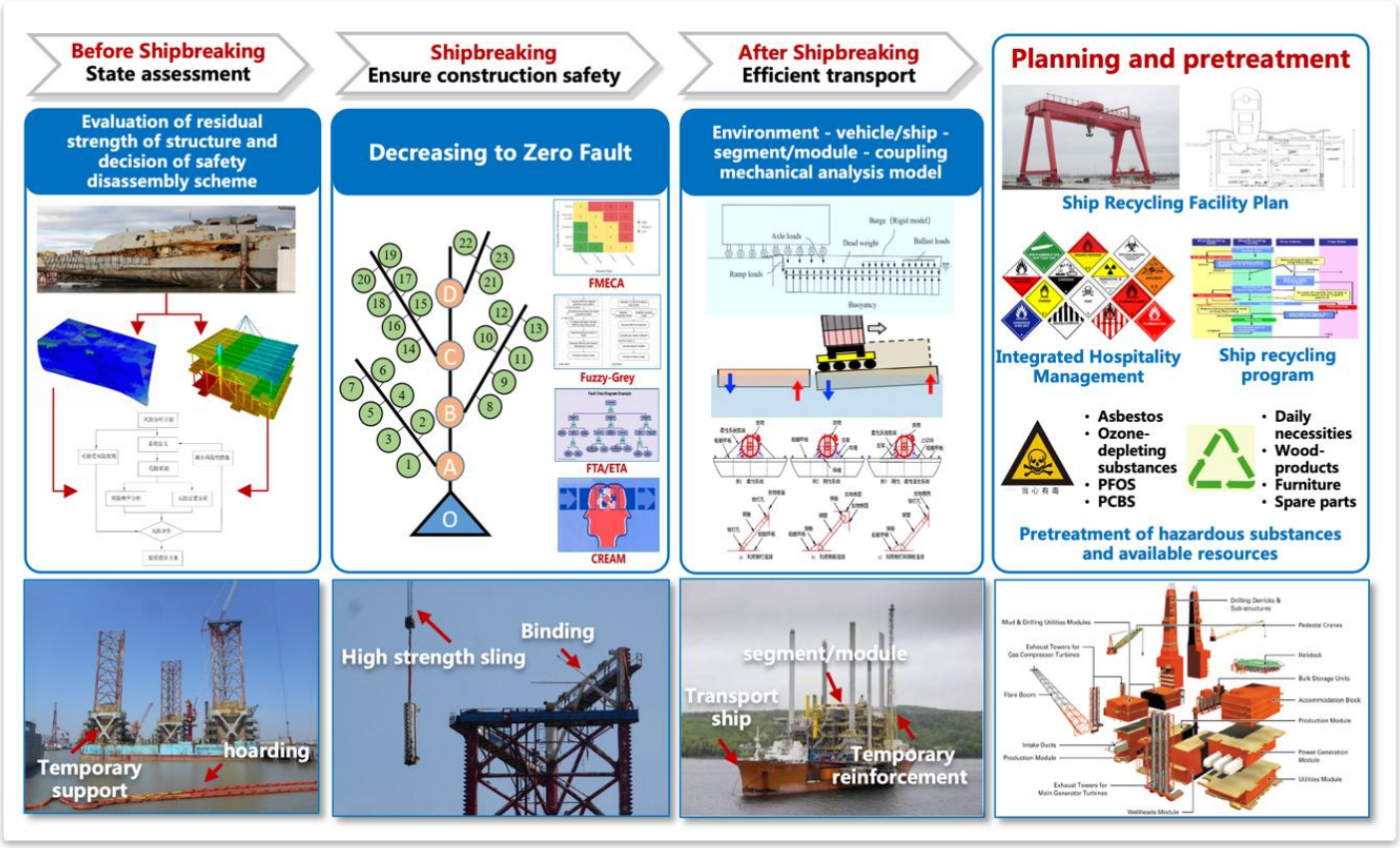

Figure 1. The novel approach and technologies of ship and offshore platforms recycling

Figure 2. The improved hazardous material management system based on substance flow analysis

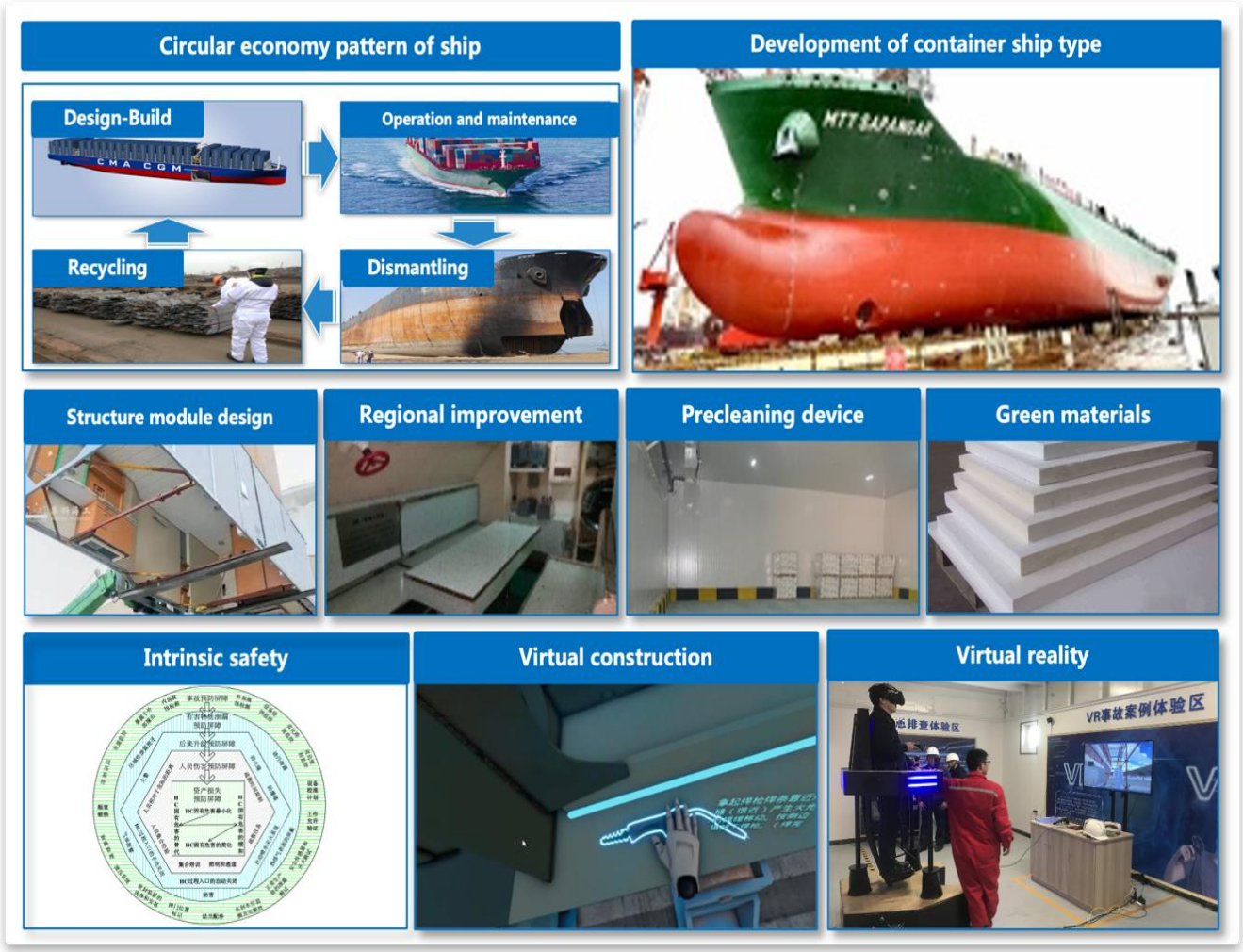

Figure 3. The method for improving ship design based on feedback from the shipbreaking perspective

Figure 4. Patents, books, papers, awards and certifications

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附件 2-2　E-NNOVATE 2025 波兰国际创新展览会线上展

CAI No. 08-2

Tianjin University (TJU)

Introduction：

Tianjin University (TJU), founded on October 2, 1895, as Peiyang University, is China's first modern university and a pioneer of modern Chinese higher education (Fig. 1).

TJU achieved the following rankings (Fig. 2):

- QS World University Rankings 2024: 269th (11th in China);
- Times Higher Education (THE) World University Rankings 2025: 201- 250th (16th in China);
- Best Chinese Universities Ranking 2024: 20th;
- Chinese University Engineering Strength Rating 2024: 10th.

TJU has 15 disciplines ranked in the top 1% of the Essential Science Indicators (ESI) database, including 5 in the top 1‰ and 2 (Engineering and Chemistry) in the top 0.1‰.

This invention is developed based on national research platforms at Tianjin University, including the National Facility for Earthquake Engineering Simulation and the State Key Laboratory of Hydraulic Engineering Intelligent Construction and Operation (Fig. 3).

The school adheres to the principle of opening up to the world and deepening international exchanges and cooperation in an all-round way. TJU has cooperated with 260 universities, research institutes, and companies in 50 countries and regions.

For a long time, through the unremitting efforts of all teachers and students, Tianjin University has become a high-level research university with strong faculty, distinctive discipline characteristics, first-class education quality, and scientific research level in China, and a significant influence in the world.

Campus Scenery

Tianjin University Gate

Jingye Lake

Qiushi pavilion

The 9th teaching building

Top view

Main Building

Zhengdong Library

Beiyang Memorial Pavilion

STATISTICAL DATA

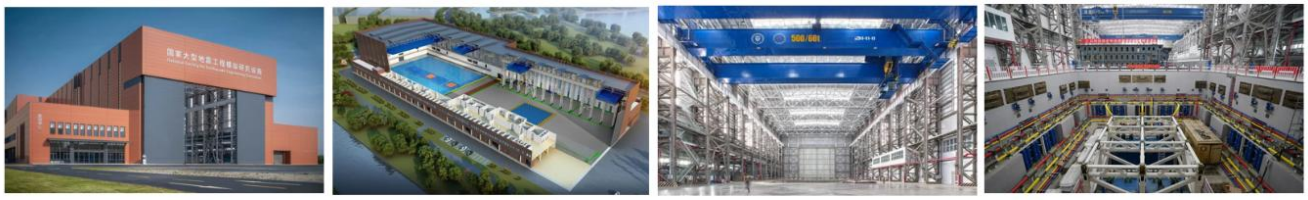
- Occupied area: 4.107 million m^2
- Number of staffs: 4830
- Number of professors: 1025
- Number of full-time students: 40277
- Number of undergraduate majors: 76
- Number of master 's degrees: 48
- Number of doctoral programs: 38
- Number of postdoctoral research stations: 37
- Number of national key laboratories: 11
- Number of national engineering technology research centers: 5
- Number of international science and technology cooperation bases: 3
- Number of Key Research Platforms: 142

269th
QS World University Rankings 2024

201-250th
Times Higher Education (THE) World University Rankings 2025

20th & 10th
China's RANKING Universities Rankings & Engineering Strength Ratings 2024

Essential Science Indicators (ESI)
- 15 disciplines in the top 1%
- 5 disciplines in the top 1‰
- 2 disciplines in the top 0.1‰



National Facility for Earthquake Engineering Simulation

State key laboratories

International Qualification

Key Members of the Green Ship-recycling Team at Jiangyin Ship Recycling Yard

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