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Global and China Marine Power System Industry Report, 2011

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Abstracts

By usage, marine power systems can be divided into main engines and auxiliaries. Main engines can be classified into internal combustion engines and turbine engines. Turbine engines are primarily used in the naval field. Internal combustion engines are mainly diesel engines, including low-speed (Rpm1100) ones. Auxiliaries mainly include generators and auxiliary equipment.

Diesel engine was invented by a German in 1875. Over 100 years later, the threshold of the marine diesel engine industry is still very high. MAN, where the inventor of diesel engine worked, designs 80% of the low-speed diesel engines in the world. MAN also produces a small amount of low-speed diesel engines, licenses a large number of other companies to produce the low-speed diesel engines designed by it, and charges design fees and royalties from them. After acquiring Swiss Suzler, Wartsila enters the field of low-speed diesel engines and occupies 18% market share, while Japan's Mitsubishi Heavy Industries (MHI) has 2% market share.

In the field of medium-speed diesel engines, Wartsila is the absolute leader with nearly 50% market share. Like MAN, Wartsila licenses other companies to produce the diesel engines designed by it, but the number of its licensed manufacturers is lower than that of MAN. MAN and Caterpillar also produce medium-speed diesel engines. Caterpillar entered this field through acquiring Germany's MAK in 1998.

In the field of high-speed diesel engines, there are many manufacturers, and the largest one is Germany's Tognum (MTU), followed by Japan’s Yanmar, France’s SETI (MAN), Caterpillar, Cummins, Volvo and John Deere.

Although the shipbuilding industry is in a downturn, there are many highlights in the field

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of marine power, wherein the hottest topics are the implementation of IMO TIER III standards in 2016 and LNG-fuelled vessels. Compared with IMO TIER II standards implemented in 2011, IMO TIER III standards will require that NOx emissions should be lower than the level stipulated by IMO TIER II standards by at least 70%, which is quite a challenge.

In the world, only a small number of vessels comply with IMO TIER III standards, tens of thousands of ships cannot do so. There are two solutions: first, to install SCR and EGR systems in engine systems. Germany, Finland, the United States, Japan and other leading countries started the development of SCR systems in late 1980s, and have achieved full automated monitoring and management of SCR systems.

In 2010, Wartsila Group and ABB cooperated with Swiss Hug Engineering developed a compact SCR system which was 80% smaller than the traditional system. In March 2011, MAN installed the compact SCR systems developed by itself in 6S46MC-C8 low-speed marine diesel engines for the first time; in June, NYK, Oshima Shipbuilding, MHI, Akasaka and other companies cooperated to complete the world’s first shipboard trial on large low-speed diesel engine SCR system; in July, South Korea's HHI successfully developed SCR systems. China has not started to develop marine SCR systems.

The second solution is to adopt lean-burn gas engines (namely LNG-fuelled engines) which can meet IMO TIER III standards without adding any auxiliaries. Lean-burn gas engine manufacturers mainly include Wartsila and Rolls-Royce.

LNG has gradually shown its advantages as ship-use fuel. Compared with marine fuel oil (MFO) and heavy fuel oil (HFO), LNG is cheaper; LNG can help reduce the emissions of carbon dioxide and other waste and particulate matter significantly; besides, LNG long-term supply is stable. Therefore, in the next 5 to 10 years, the number of vessels taking LNG as fuel will continue to increase.

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