The assessment of the G/E exhaust gas heat recovery unit developed jointly in 2013 by MIURA Co., Ltd. (Head Office: Matsuyama, Ehime, President: Yuji Takahashi) and TSUNEISHI SHIPBUILDING Co., Ltd. (Head Office: Fukuyama, Hiroshima, President Takao Kawamoto) is completed and patents have been awarded (Patent Nos. 5611278 and 5611281). Two technologies are covered by the patents. The unit is the first of its kind in the shipbuilding industry. The G/E exhaust gas heat recovery unit is a device that recovers waste heat from generator engine installed on ships for reuse as a heat source. It converts this to heat energy through the composite boiler. It can reduce fuel consumption of the composite boiler from 12 to 25%.

Two technologies were awarded patents, the smoke tube system and water tube system. These technologies relate to the heat exchange between the exhaust gas from the generator engine and water of the composite boiler. With the smoke tube system, water for the composite boiler is taken up into the G/E exhaust gas heat recovery unit, passing high temperature exhaust gas through heating tubes within the unit to recover the heat. With the water tube system, the unit is filled with high temperature exhaust gas, through which water from the composite boiler passes through numerous heating tubes to recover the heat. Both have a simple structure in which adjustment of the water level is achieved by natural circulation. At the development stage of the G/E exhaust gas heat recovery unit, both systems appeared promising, and so two patents were sought. The smoke tube system was employed in the G/E exhaust gas heat recovery unit developed in 2013, and the layout of the ducts of the generator engine and the installation of the unit outside the composite boiler are designed for easy maintenance.

The G/E exhaust gas heat recovery unit is already scheduled to be installed in 19 bulk carriers to be built at the Tsuneishi Group’s shipyards in Japan and overseas. In the first half of 2015, the first issue of the unit will be installed in the new TESS58 vessels built at TSUNEISHI HEVY INDUSTRIES (CEBU), Inc. in the Philippines, and performance tests are scheduled on board the ship during construction in February 2015. The unit will be employed as standard equipment on newly developed Tsuneishi Shipbuilding vessels after 2012. In addition, some shipowners have decided to incorporate the unit as an option in new vessels developed after 2012 where it is not installed as standard, attesting to the high regard of customers for the technology.
Features

The unit is installed outside the several generator engines located in the engine room, and it is connected to the composite boilers of conventional waste heat recovery equipment. Waste heat is recovered efficiently from several generator engines, complementing exhaust heat recovery of the main engine.

When heat recovery from generator engine is built into ships built by TSUNEISHI SHIPBUILDING, about 10% of the heat is recovered from the main engine, enabling steam to be generated at about 100 kg/h. The steam required for the ship can be obtained without increasing the size of the auxiliary boiler itself.

As added value the unit incorporates a dedicated silencer (patent pending) newly developed with cooperation from DAIHATSU DIESEL MFG. CO., LTD. (Head Office: Osaka), adding noise reduction to the heat recovery function. This contributes to reducing the effects of noise in surrounding areas when the ship is in port.

Flexible layout is possible, taking into account the structure of the generator engine and auxiliary boiler and the arrangement of pipes, ensuring sufficient maintenance space.

In order to prevent the buildup of soot in the heating tubes inside the unit, each heating tube is provided with a high pressure compressed air soot blower*3.

*1: According to research by MIURA Co., Ltd.
*2: TESS35 (35,300 tonnes), TESS58 (57,700 tonnes), TESS64 AEROLINE (63,700 tonne bulk carrier)
*3: A device that blows compressed air through the heating tubes to prevent the build-up of soot from combustion gas, thereby preventing a decline in the thermal conductivity of the tubes.

Overview of MIURA Co., Ltd.

President : Yuji Takahashi
Head Office : 7 Horie-cho, Matsuyama, Ehime
Established : May 1959
Employees : 4,205 (consolidated, as of March 31, 2014)
Capital : 9,544 million yen (as of March 31, 2014)
Sales : 85,535,000,000 yen (fiscal 2014 consolidated accounting)
Main business : The manufacture, sale and maintenance of small once-through boilers, ship machinery boilers, water management systems, cooling equipment etc.

Overview of TSUNEISHI SHIPBUILDING Co., Ltd.

President : Takao Kawamoto
Head Office : 1083 Tsuneishi, Numakuma-cho, Fukuyama, Hiroshima 720-0393
Established : July 1917
Employees : About 710 people (as of December 2013)
Capital : 100 million yen
Sales : 215.9 billion yen
Main business : Shipbuilding and repairing ships
News Release

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