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**Notice Regarding Misconduct in the Testing of Marine Engines
(Submission of Report on Internal Investigation)**

Kawasaki Heavy Industries, Ltd., announced today that it has collated the findings of its internal investigation into misconduct in the testing of marine engines—first announced in a press release published on August 21, 2024 (“Notice Regarding Misconduct in the Testing of Marine Diesel Engines”)—and has compiled these results in a report, which has been submitted to Japan’s Ministry of Land, Infrastructure, Transport and Tourism (MLIT). The Company takes this incident very seriously and offers its assurances to stakeholders that it will take resolute steps to ensure that such misconduct does not happen again.

In addition to the information contained in the interim report submitted to the MLIT on September 27, 2024, the report includes information on the impact of this misconduct on compliance with regulations governing NOx emissions*1 and CO₂ emissions, namely, the energy efficiency design index (EEDI)*2 and the energy efficiency existing ship index (EEXI),*3 based on the Company’s ongoing internal investigations, and an analysis of the root causes of this misconduct, as well as an outline of the actions the Company is taking to prevent recurrence. The following is a summary of the report, the English version of which will be published in the near future.

On September 13, the MLIT completed an on-site inspection subsequent to the rectification of testing equipment, and shop trials commenced thereafter. On November 11, the Company obtained Engine International Air Pollution Prevention (EIAPP) certificates and shipments gradually resumed.

The Company is currently examining whether this matter will impact its financial results and will immediately issue notification should such an impact be confirmed.

*1 NOx emissions regulations for marine engines are based on Annex VI to the International Convention for the Prevention of Pollution from Ships (MARPOL), which came into effect in May 2005, with the aim of preventing air pollution caused by exhaust emitted from ships. These regulations were applied retroactively to ships the keels of which were laid on or after January 1, 2000. Tier II and Tier III NOx emissions regulations, setting more stringent targets, came into effect for

engines installed in ships the keels of which were laid on or after January 1, 2011, and January 1, 2016, respectively. Tier III regulations apply only to the specified ships while operating in Emission Control Areas.

*2 The EEDI, which applies to new ships of 400 gross tonnage or above that will engage in international voyages, aims to reduce the CO₂ emissions and environmental impact of individual ships by assessing their energy efficiency.

*3 The EEXI is used to assess the energy efficiency of existing ships of 400 gross tonnage or above that are engaged in international voyages.

Summary of the Report

1. Findings of the investigation

The Company inspected 674 marine engines subject to NO_x emissions regulations for marine vessels, manufactured by the Energy Solution & Marine Engineering Company (an internal company), which were installed on vessels constructed after January 1, 2000.

1.1 Areas in which misconduct in testing was uncovered

After confirming shop trial records and interviewing pertinent parties, it was ascertained that data had been altered for 673 two-stroke marine engines, out of a total of 674 marine engines inspected, and that misconduct in testing during shop trials was to satisfy the required customer specifications or compensate for the accuracy levels of testing equipment. Misconduct fell into one or more of five categories, as indicated below, with data including results from the investigation subsequent to the interim report of September 27, 2024.

Category		Number of engines (as of September 27, 2024) (interim report date)	Number of engines (as of December 25, 2024) (this report date)
(1)	Unauthorized alteration of fuel consumption test data	588	593
(2)	Unauthorized alteration of fuel consumption rate test data	565	569
(3)	Unauthorized alteration of exhaust gas temperature test data	309	309
(4)	Adjustment of amplifiers for water brake torque indicators subsequent to amplifier calibration	353	362
(5)	Unauthorized operation of turbocharger intake temperature adjustment function for other-than-intended purposes	14	14

1.2 Impact on NO_x and CO₂ emissions

Recalculations using specific prototype engines (parent engines)*⁴, for which records regarding the alteration of fuel consumption rate test data existed, confirmed that the number of engines for which compliance with NO_x emissions regulations were impacted was as indicated below.

Category	Total number of parent engines* ⁴ (Japan-registered vessels in parentheses are included in the total)	Total number of member engines* ⁵ (Japan-registered vessels in parentheses are included in the total) (member engines related to parent engines in the left column)
A	1 (1)	0 (0)
B* ⁶	200 (10)	465 (17)
C	0 (0)	0 (0)
D	2 (0)	6 (0)

- A: No alteration of data was found and actual measured values did not deviate from NOx emissions regulation values.
- B: Alteration of data was found, but actual measured values did not deviate from NOx emissions regulation values.
- C: Alteration of data was found and actual measured values deviated from NOx emissions regulation values.
- D: Further investigation is required, owing to difficulties in confirming actual measured values.

Reference: Status of confirmation as of September 27, 2024

Category	Total number of parent engines (Japan-registered vessels in parentheses are included in the total)	Total number of member engines (Japan-registered vessels in parentheses are included in the total) (member engines related to parent engines in the left column)
No alteration of data was found and actual measured values did not deviate from NOx regulation values	1 (1)	0 (0)
Alteration of data was found and compliance with NOx emissions regulations is currently being calculated	157 (9)	357 (10)
Actual measured values do not exist	45 (1)	114 (7)

In addition, because fuel consumption rates used in NOx emissions verification tests are also used for calculations to determine compliance with CO₂ emission regulations, namely, EEDI and EEXI, after verifying NOx emissions regulations, the Company continued to probe the impact of the unauthorized alteration of test data, adjustment of amplifiers for water brake torque indicators subsequent to calibration and unauthorized operation on compliance with CO₂ emissions regulations, which confirmed the appropriateness of water brake torque indicators. Accordingly, trial EEDI calculations were performed in cooperation with classification societies, shipyards and other relevant organizations. Calculations for all 139 engines that may be subject to EEDI (of which five were installed in Japan-registered vessels) revealed a low likelihood of exceeding these regulations.

*4, *5 When multiple engines are manufactured with the same specifications or with equivalent NOx emissions, a representative engine is chosen as the parent engine and is subject to NOx emissions verification tests and pre-shipment tests, and other engines are treated as member engines. Providing that specifications and modifications are identical, verified NOx emissions for the parent engine are applied to member engines.

*6 Category B included 31 parent engines (of which three are installed in Japan-registered vessels) and 61 member engines (none of which were installed in Japan-registered vessels) with numerical values that did not deviate from NOx emissions regulation values because steps were taken to shrink the operational tolerances (margins assuming engine adjustments and other factors that lead to higher NOx emissions) that affect NOx emissions as much as was feasible.

1.3 Verification of NOx and CO₂ emissions going forward

(1) Verification of Category B

Although internally calculated actual measured values did not deviate from NOx emissions regulation values, once the validity of those calculations is verified by relevant organizations (flag states and classification societies), NOx technical files are corrected and a request is made for the revision of EIAPP certificates.

(2) Verification of Category D

- Investigations continue with the aim of confirming actual measured values that make it possible for the Company to calculate NOx emissions. If no such values can be confirmed, the Company cooperates with relevant organizations to explore technical approaches to determining compliance with NOx emissions regulations.

If confirmed actual measured values deviate from NOx emissions regulation values, discussions are held with relevant organizations, as well as with customers, on how to ensure compliance.

- In the absence of confirmed actual measured values, one possible approach to verification involves using actual measured values that are confirmed for engines with the same specifications or equivalent NOx emissions. If values thus yielded deviate from NOx emissions regulation values, consideration is given to immediately taking steps such as modifying maximum in-cylinder pressure and other performance parameters.

The Company also continues to recalculate EEDI and EEXI with the cooperation of classification societies, shipyards and other relevant organizations. If any vessel is found not to comply with the regulations, the Company responds promptly by consulting with relevant ship owners and ship management companies to determine the optimum steps to achieve compliance as quickly as possible.

2. Status of efforts to analyze causes and prevent recurrence

2.1 Analysis of causes by the internal company

Based on an analysis of the results of interviews with pertinent parties, the internal company has classified the root causes of this misconduct as (1) internal company organizational system–related issues, and (2) corporate culture– and mindset–related issues, and has identified the essential contributing factors as follows:

(1) Internal company organizational system–related Issues

- (a) Systems for documenting processes for, and the basis of, decision making were deficient.
- (b) Procedures at the shipping stage were lacking, with trade-offs made between competing priorities, i.e., quality and delivery time, or quality and cost.
- (c) Systems and frameworks to ensure compliance were insufficient.
- (d) Rather than a function-based organization, the internal company continued to deploy a product department organization, with authority in this particular situation concentrated in marine engine departments, meaning that quality assurance and other functional departments were unable to perform internal checks.
- (e) When the internal company's automatic measuring system was created, oversight functions failed to recognize that specification data could be tampered with or to rectify this problem.
- (f) In marine engine departments, the personnel rotation system did not work effectively, making it possible for misconduct involving a limited number of employees to continue undetected.

(2) Corporate culture– and mindset-related issues

- (a) The corporate culture discouraged the acknowledgment or reporting of incidents, even if they were recognized as a compliance violation (a culture of following precedent), and instead priority was accorded to issues of delivery and profit over quality.
- (b) Compliance awareness (crisis recognition) on the part of executives and department heads was lacking.
- (c) The corporate culture was such that the falsification of quality records was justified in order to avoid having to explain discrepancies to customers.
- (d) The corporate culture encouraged a self-contained, insulated approach to resolving issues and problems that eschewed assistance from other departments or third parties.

2.2 Wide-ranging efforts by the internal company to prevent recurrence

The internal company will implement the following measures to prevent recurrence based on the analysis of the results of the internal investigation .

(1) Measures to prevent the recurrence of internal company organizational system–related issues

Measures to prevent the recurrence of internal company organizational system–related issues will be incorporated into the quality management system so that prevention becomes an intrinsic component of related processes. The specific measures to be implemented, some of which are already in place, are as follows:

- (a) Regulations will be established to preserve records pertaining to decision-making in order to deter the justification of testing misconduct, while regular sampling audits will be conducted to confirm the effectiveness thereof.
- (b) Regulations regarding quality confirmation procedures for products at the shipping stage, which had involved trade-offs between competing priorities, will be revised.
- (c) Unlike in 2010 and 2014, when a Companywide investigation failed to uncover testing misconduct, the compliance configuration has now been modified so that compliance-related personnel are full-time, rather than concurrently assigned to business departments, thus ensuring their independence. In addition, the compliance reporting and consultation system now includes an anonymous whistleblowing channel to external legal experts.
- (d) In terms of organizational structure, whereas quality assurance departments were previously part of individual product divisions, in April 2021 they were separated out to create an independent division, clarifying responsibility for overall quality assurance and facilitating the provision of internal checks. The internal company will also conduct in-depth audits of processes and will encourage the horizontal deployment of this practice for other products.
- (e) Rules will be established to verify the soundness of the automatic measurement system, ensuring that specification data cannot be tampered with and that related checks do not fail.

- (f) Beginning in 2021, the internal company set a limit on the term of service for line managers at five years and is implementing personnel rotations that prevent employees becoming entrenched in one place.
- (2) Measures to prevent the recurrence of corporate culture– and mindset-related issues
- In response to issues identified through the internal investigation, the internal company will implement a thorough review of its corporate culture and foster a new culture as follows.
- (a) Executives and managers will seek to build closer relations with employees, as well as to promote more open communication.
 - (b) Measures will be implemented to foster a compliance-first mindset on the part of executives and managers.
 - (c) Employees will be encouraged not to conceal mistakes, but rather to acknowledge them without fear, with the understanding that the act of honestly revealing any mistakes will be commended and that they are not solely responsible for rectification.
 - (d) Employees will be urged to speak up about issues in their own departments. Moreover, rather than viewing issues in other departments as someone else's problem, they will be encouraged to recognize the potential for similar issues in their own department, and to express their views and raise constructive points.

The Special Investigative Committee for Marine Engines created to probe this specific incident, which comprises neutral third-party experts, continues to examine the details and will advise the Company going forward regarding its analysis of causes and recommended measures for preventing recurrence. Taking into account causes cited by this committee, as well its recommendations for measures to ensure such misconduct does not happen again, the Company will take decisive steps to prevent recurrence along with the above actions.

3. Groupwide measures

Cognizant of the gravity of this and other recently identified incidents of misconduct, the Company has established the Special Compliance Promotion Committee, which is chaired by Representative Director, President and CEO Yasuhiko Hashimoto. This committee is working diligently not only to clarify and eradicate the problems that led to these specific incidents, but also to prevent recurrence by scrupulously reforming the Company Group's compliance and governance framework through the building of systems that prevent misconduct, strengthening of detection capabilities and reform of its corporate culture.

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