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Nippon Yusen Kabushiki Kaisha
Nippon Steel Corporation

World's First Highly Corrosion-Resistant Steel Plate Adopted for Use on NYK Supertankers

Two of Japan's leading companies, Nippon Steel Corporation and Nippon Yusen Kabushiki Kaisha (NYK), have jointly developed a highly corrosion-resistant steel plate, named NSGP-1 (initialism for Nippon Steel's Green Protect-1), to prevent corrosion of the inner bottom of crude-oil tanks of supertankers, and NYK has decided to use this steel plate on all new tankers, including those currently on order.

Crude oil contains salt water that has a salt concentration several times higher than seawater, and over time this salt water separates from crude oil and accumulates at the bottom of tanks. The accumulated salt water makes pits on the inner surface of the tanks, and this can then lead to oil leaks. The newly developed steel plate is designed to protect the tanks from such pits. Both NYK and Nippon Steel agreed to work together to jointly develop this highly corrosion-resistant steel plate in order to continue the efforts that both companies have been making to reduce any negative impact that they may have on the environment.

In the process of development, Nippon Steel successfully simulated an environment in which salt water accelerates the corrosion of the bottom of the tank, and discovered the types and amounts of alloying elements that should be combined to create a highly corrosion-resistant steel plate suitable for oil tanks. Building oil tanks using this steel plate requires no special management because conventional steel welding and processing techniques can be used.

To ensure the feasibility of the steel plate, the two companies used it on the tank bottom of *Takamine*, a supertanker built in 2004 by Mitsubishi Heavy Industries, Ltd. Two and a half years later, a regular inspection showed that the steel plate, which was free of any anticorrosion coating, was capable of preventing the occurrence of pits. NYK thus decided to use the steel plate on five supertankers on order from IHI Marine United Inc. and Imabari Shipbuilding Co., Ltd.

By using NSGP-1 for crude-oil tanks, anticorrosion coating becomes unnecessary, as do coating agents and volatile organic compounds. For this reason, this steel plate will make it possible to eliminate expenses for coating agents used for building or maintaining oil tanks, and will greatly contribute to creating environmentally friendly ships. Conventionally, a defective or degraded coating could hasten the corrosion of a tank, but such a problem will never occur when the new steel plate is used. This will help to greatly improve the safety and reliability of marine vessels.

Meanwhile, the International Maritime Organization (IMO), a United Nations agency concerned with the safety of shipping and cleaner oceans, has held discussions concerning measures to prevent pits and thus improve the safety of oil tankers. In the discussions, the IMO recognized anticorrosion coating as the only possible solution and began to consider making the application of anticorrosion coating mandatory on newly built oil tankers. But later, Nippon Steel and NYK proved the NSGP-1's outstanding anticorrosion performance, and now the IMO is considering adopting the use of the steel plate as another way to prevent corrosion on oil tankers. This indicates that the steel plate's effectiveness is highly recognized globally.

Nippon Steel and NYK will continue efforts to meet the needs of customers and society regarding various issues, such as the improvement of the reliability of marine vessels and protection of the global environment.

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