



# MHI's Energy-Efficient Technology Crossing the Seas

Turbochargers are indispensable marine machinery for diesel-powered ships, and with over a century of production to its credit, MHI\*1 ranks as one of the world's three largest turbocharger manufacturers. Keiichi Shiraishi has devoted his entire career to the development and design of turbochargers at MHI Nagasaki Shipyard & Machinery Works. In a highly competitive business, this engineer, a seasoned player on the world stage, talks about the sources of his inspiration and the secrets of business success.

## What is a turbocharger?



An essential device for any diesel-powered ship; it delivers a large volume of oxygen in the form of compressed air to the engine to ensure significantly improved fuel combustion and engine performance.

## Challenging numerous projects

### Q Why are MHI turbochargers so popular?

A Marine engine turbochargers are essential to speed up ships and have a long and brilliant history at MHI. Today we are maintaining our tradition for superb engineering, and our turbochargers are renowned in the shipping industry for outstanding reliability, simplified structures to facilitate maintenance even by the crew, and high performance that keeps engines in good condition. When I joined MHI in the 80s, the basic design was well established and for many years I have helped to improve and advance it.

## Pick Up Innovator >>>

### Profile Keiichi Shiraishi Senior Manager

Mitsubishi Heavy Industries  
Marine Machinery & Engine Co., Ltd.

Since joining MHI in 1986, Shiraishi has worked exclusively on turbochargers, developing a stream of hybrid, VTI, and electric assist turbochargers. Today he is involved in planning and sales.



### Q And your most memorable project...

A We wanted to retain the basic design and yet come up with something really novel, so we successfully developed a hybrid turbocharger\*2 by adding a power generation capability. An engineer working for an overseas marine engine manufacturer, a client of ours, gave us a hint, and when we heard our competitors had given up on the idea, I kept saying within MHI that this was something we needed to pursue. Finally our team managed a power test of an existing turbocharger equipped with a small-sized power generator. Really the key point and challenge was working with a world-class overseas power generator manufacturer with a lot of technical know-how. At the time many people thought that communication would obviously be easier with domestic manufacturers, but by overcoming the language barrier, the project engineers came up with really innovative solutions leading to a truly wonderful product.

## Ideas: The developer's lifeblood

### Q Inspiration, where and when?

A Normally I'm not very good at idling away my time. I am always thinking about work or hobbies. It was during my so-called free-time, when I was looking at a cross-section of an existing product, that inspiration struck. The exhaust gas inlet area of our conventional turbochargers is divided into two parts, and I wondered what would happen if we installed valves on one side, and then maybe by simply closing the valves, the force of exhaust gas would increase, thus restraining fuel consumption. I controlled my excitement and quickly sketched this idea. It turned out to be rather practical and became the VTI turbocharger.\*3

### Q What's it like when an idea takes shape?

A The moment I had this VTI turbocharger idea, I became really confident, and my whole body was filled with a feeling of positive exhilaration, as if I was a genius. MHI thoroughly grasps the challenges of engineers, and once a drawing is sent to production, they produce a prototype. Honestly, it's a dream place for engineers.

### Q What's important when dealing with world markets?

A Meeting our customers' demands is a minimum obligation. We always need to add a bit of extra value in some way. Responding quickly and with information that catches the customer's interest is also essential. Particularly for those customers who respond quickly to our proposals, I reply immediately. Being honest, even if the news is not good for MHI, and informing the customer right away helps in winning their trust and respect. They know we are not here to waste their time.

## Benefits of turbochargers to our life

### Q How do turbochargers contribute to society?

A Marine transport will continue as the mainstay of global economic transport activities and logistics. Turbochargers are widely used in large container carriers, pure cargo containers for coal, iron ore, and grain and even in fishing boats. If turbochargers reduce the fuel consumption of diesel engines, this will significantly benefit transport costs and favorably impact the global prices of exports and imports. Also, improved fuel efficiency will reduce CO2 and exhaust gas emissions and minimize the use of fuel oil, resulting in decreased consumption of limited fossil resources. Moreover, hybrid turbochargers are capable of providing all onboard electricity requirements.

### Q And for the future...

A My present role is to more broadly promote MHI turbochargers. Listening closely to our customers and providing feedback to our design teams will help in delivering excellent products all over the world.



\*1 Mitsubishi Heavy Industries  
Mitsubishi Heavy Industries Marine Machinery & Engine Co., Ltd. is a wholly owned subsidiary of MHI launched on October 1, 2013. Business activities in this article occurred before the new company was set up, and, thus, the MHI name is used.

\*2 Hybrid turbocharger  
A highly efficient generator coupled with a turbocharger. Engine exhaust gas is used for driving the turbocharger compressor and for generating power for the ship's electrical systems.

\*3 Variable turbine inlet turbocharger  
A turbocharger with a variable turbine nozzle in the exhaust gas inlet area that allows two-step variation of the turbine capacity. Even at low-speeds, the device rotates the turbine at high speed, delivering improved fuel consumption.