

Foreword

Foreword to the Special Edition on "Turbocharging Technologies"

Katsuyuki Chisawa



Japan's first encounter with turbocharging technology does not, unfortunately, make a good story. In World War II, American B-29 bombers were equipped with turbochargers that allowed them to fly at higher altitudes, taking them out of the reach of Japanese interceptors. While turbocharging technology became commonplace in the field of aeronautical engines, it only crossed over into automobile engines in fairly extreme motor sports. I can remember, in around 1980, when turbochargers were first introduced for use in commercial automobile engines. Nowadays, turbochargers are indispensable to diesel engine technology because of their effectiveness in increasing power and reducing emissions. Gasoline engine applications, however, have progressed little because power increases are limited by problems of knocking and compromised engine response.

Recently, there has been considerable activity in turbocharger development, even for gasoline engine applications, with the aim of competing with the high specific power of diesel engines. Also, current demands have led manufacturers to attempt to increase the power of engines by introducing large volumes of air into the cylinders, while using lean combustion to reduce emissions. These technologies have the added benefit of enabling engine downsizing, which reduces weight and, therefore, fuel consumption.

In the area of reciprocating engines, turbocharging has been a minor technology because of special characteristics such as high rotational speeds and high-speed air flows. Now, it is time for researchers to pluck the fruits of past technology development and catch the winds of change to fly as high as they can. I hope that this special "Turbocharging Technologies" edition will make readers aware of new aspects of the technology and accelerate the mass introduction of turbocharging for both diesel and gasoline engines.