

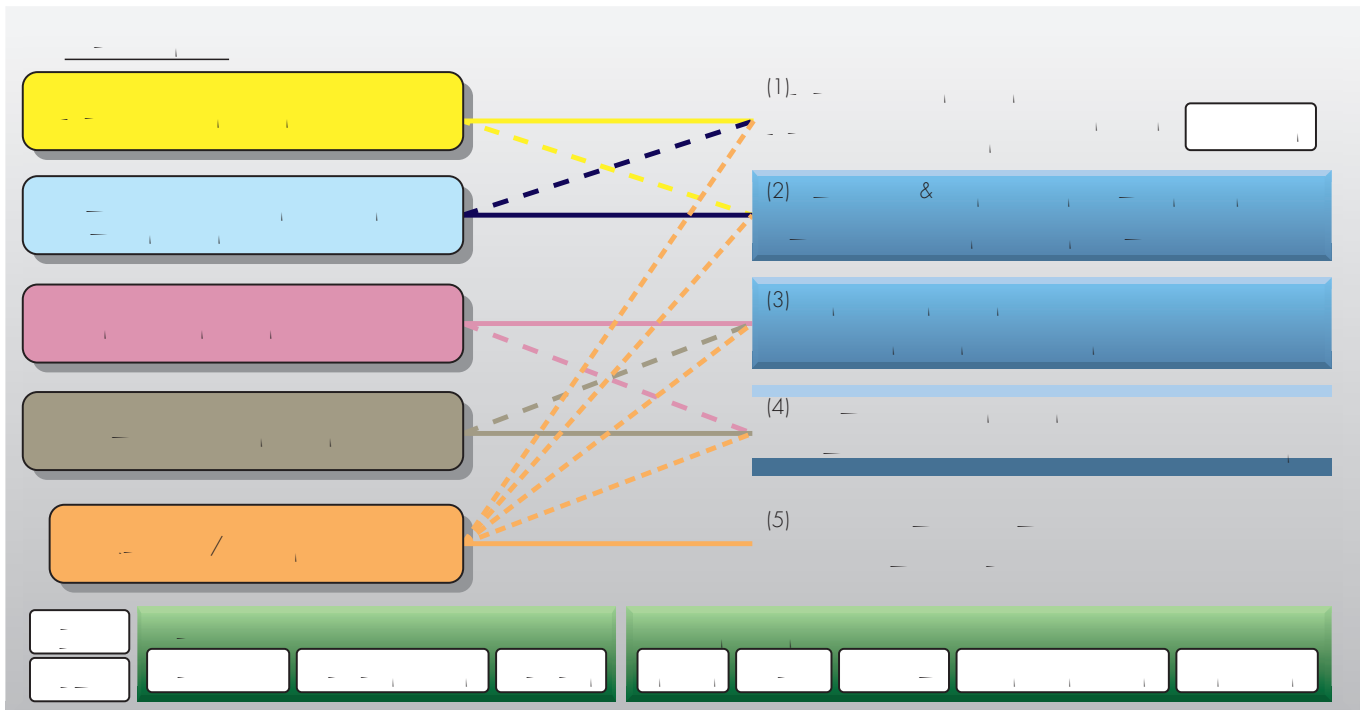
Plant & Infrastructure Company products and technologies



Technology
& Infrastructure

1 About the Company

Plant & Infrastructure Company products and technologies



improvements to its ash handling equipment and developed peripheral systems based on the newly acquired technology. After building up an excellent track record of delivering state-of-the-art ash handling systems designed to meet customers' exact needs, Kawasaki now enjoys a glowing reputation in the industry plus a huge market share. A flood of orders for ash handling systems are now flowing in as the number of coal-fired power plant projects for independent power producers (IPPs) is growing ahead of the scheduled 2016 liberalization of the electricity market.

(iv) Civil engineering machinery (tunneling machines)

Kawasaki's tunneling machines include shield machines used for underground construction work, tunnel boring machines (TBMs) designed for excavating hard rock, as well as vertical boring machines.

Built for shield tunneling, the shield machine moves forward to excavate the earth, leaving a cylindrical shield (segmented ring) in its path that prevents the newly formed tunnel from collapsing. Kawasaki manufactures all types of shield machines, including slurry, earth-pressure balanced, mechanical, semi-mechanical, and hand-mining shield machines, and leads the industry in the large-diameter category. In 2012, its earth-pressure balanced shield machine with a diameter of 12.55 meters completed excavation for the construction of Tokyo's Central Circular

Route Shinagawa North Line (which went into service in March 2015). By the end of fiscal 2014, Kawasaki delivered a total of 35 slurry shield machines to Singapore to be used by Singapore Power as well as to build a subway.

A TBM is a machine designed to bore through hard rock in order to dig tunnels for motorways, railways, headrace channels, as well as water and sewer systems. A pioneer in Japanese TBM technology, Kawasaki boasts an excellent track record when it comes to supplying TBMs for small and medium-scale hydropower development and sewer work, as well as road and rail tunneling such as the Channel Tunnel running beneath the Dover Channel that links France with England. In total Kawasaki has delivered about 1,400 shield machines and TBMs across the globe.

(2) Chemical plant and cryogenic storage system engineering

(i) Chemical plants

The Plant & Infrastructure Company's chemical plant business boasts a wealth of experience and technological capabilities. When it comes to engineering coal-chemical, fertilizer, ethylene, methanol, flue gas desulfurization, petrochemical, and chemical synthetic fiber plants, the Plant & Infrastructure Company has it all covered. On top of that it manufactures all the core components of these plants like reactors, towers, vessels, heat exchangers, furnaces, and more.

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supplying all types of large-scale LNG storage tanks. These include double-containment in-pit tanks whose inner tank is made of 9% nickel steel and aluminum alloy, full containment LNG storage tanks outfitted with a prestressed concrete (PC) dike, in-ground membrane tanks made of thin stainless steel, and more. Kawasaki now claims more than 50% of the Japanese market for large-scale LNG storage tanks. Overseas, it recently brought in an order for four full containment cryogenic tanks to be employed in Australia's Ichthys project, which is being headed up by INPEX Corporation, along with an order for three LNG storage tanks to be constructed at the Taichung LNG plant of CPC Corporation, a state-owned oil and gas company of Taiwan.

Demand for LNG is soaring across the globe as an alternative to petroleum, and Kawasaki is keeping pace as it works hard to expand the scope of its operations to include not only storage tanks but also the construction of LNG terminals.

Kawasaki developed the containers used to transport liquefied hydrogen and the compressed hydrogen trailers, by applying its advanced insulation technology accumulated over the years. It is an investment that has made the dream of transporting large quantities of hydrogen a reality and laid the foundation for a hydrogen energy supply chain. The widespread use of fuel cell vehicles and hydrogen power plants is expected to usher in the era of hydrogen energy, and Kawasaki is poised to leverage its technological expertise in producing, transporting, storing, and using hydrogen as it zeroes in on realizing its concept of a hydrogen energy supply chain.

(3) Energy plant engineering

Since its beginning Kawasaki has manufactured extensive lines of unique thermal power plant products for both land and marine applications. Designed to meet a world of customer needs, these products have been delivered to markets across the globe. These power plants can be applied to various types of

