Measures for Expanding Globally

Expanding our global presence is fundamental to fulfilling the goals of our Grand Design 100 medium-term management plan. We are therefore establishing and expanding overseas production platforms, fortifying our global marketing, cultivating new markets, and deploying new products for overseas customers. Here are some recent highlights of our efforts.

**Russia: expanded production capacity for passenger car tires**

We held the formal opening in May 2012 for our first tire plant in Russia. That plant produces passenger car tires to help expand our already fast-growing sales in Russia’s tire market. Output there will reach the plant’s full capacity of 1.4 million tires a year in summer 2013, and we will increase the plant’s capacity to 1.6 million tires a year in autumn 2014.

**China: “offtake” agreement for off-the-road tires**

We signed an offtake agreement in August 2012 to obtain off-the-road radial tires from China’s Shandong Xingda Tyre Co., Ltd., to market under the Yokohama name. Under the agreement, we will provide Shandong Xingda with product and production technology to help ensure Yokohama-level quality. We will begin marketing the China-made tires worldwide in the latter half of 2013.

**India: construction of new tire plant**

Construction got under way in October 2012 on our first tire plant in India. That plant, in the state of Haryana, will produce passenger car tires, with production scheduled to begin in July 2014. We will invest ¥4.4 billion in the plant, which will have an initial production capacity of 700,000 tires a year.

**China: testing and evaluation center for raw materials**

In January 2012, Yokohama China Technical Center began operation on the grounds of our passenger car tire production subsidiary Hangzhou Yokohama Tire Co., Ltd. The new center conducts raw material testing and evaluations and is our first such facility outside Japan. Conducting testing and evaluations in China shortens lead times greatly in adopting competitively priced materials from Chinese suppliers for our operations worldwide.

**Singapore: new sales company for industrial products**

In April 2013, we established an industrial products sales company in Singapore. The new company will strengthen our marketing of those products in Southeast Asia and in Oceania.

**Vietnam: revamped sales and production**

In Vietnam, we have strengthened our presence by transferring a production and marketing joint venture’s operations to our wholly owned subsidiary Yokohama Tyre Vietnam Inc. Yokohama Tyre Vietnam exports small spare tires, as well as serving local demand.
**Japan: production consolidation**

Ongoing moves to streamline our Japanese manufacturing operations for diversified products include relocating our high-pressure hose assembly operations from Kanagawa Prefecture to Nagano Prefecture. We produce metal joints for hoses at a plant in Nagano, and we will build a plant nearby in 2013 to begin doing the assembly work in 2014.

**China: new plant for high-pressure hoses**

Construction work commenced in May 2013 on a plant in Hangzhou, China, where we will produce hydraulic hoses. The plant, scheduled to begin operation in July 2014, will have production capacity of 400,000 meters of hose a year.

**Thailand: expanded production capacity for truck and bus tires**

Expansion is also under way at our subsidiary Yokohama Tire Manufacturing (Thailand) Co., Ltd. We are investing ¥8.0 billion in expansion work that will begin there in July 2013 to increase that company’s production capacity for truck and bus tires to 700,000 a year, from 350,000. The new capacity will come online in April 2015, and we expect the expanded plant to reach full-scale output by December of that year.

**North America: new plant for truck and bus tires**

In April 2013, we acquired land in Mississippi to build a plant for truck and bus tires. We will invest $300 million in the plant, which will have a production capacity of one million tires a year. Construction will get under way in September 2013, and we expect the plant to begin operation in October 2015.

**Philippines: expanded production capacity for passenger car tires**

We are expanding production capacity at our subsidiary Yokohama Tire Philippines, Inc., which manufactures passenger car tires. Expansion work got started there in 2011 that will increase the plant’s capacity to 10 million tires a year, from 7 million, in 2013. A second stage of expansion work, which will get under way in 2013, will increase the plant’s capacity to 12.5 million tires a year in 2015. Further expansion work will increase the plant’s capacity to 17 million tires a year in 2017.
Special Feature 2

Fostering Business Opportunities

Advances in support of growth in electric vehicle transport
We are tackling diverse R&D with an eye to serving diverse applications in electric vehicles. In January 2013, we unveiled the AERO-Y concept car as a showcase for our electric vehicle technologies. The AERO-Y features an aerodynamically optimized body and tires, and it contains several components based on our advances in aircraft components and in adhesives.

Aircraft components

Prepreg for high-strength, lightweight carbon fiber-reinforced plastic
We were the first Japanese supplier certified by the world’s largest aircraft manufacturer for prepreg (preimpregnated composite fibers) for carbon fiber-reinforced plastic. And we have fine-tuned our prepreg for applications in the AERO-Y. The result is high-strength and highly durable yet ultralight components, which help minimize power consumption.

Sealants and adhesives

Superior adhesiveness for composite materials
Manufacturers of electric vehicles are likely to rely increasingly on weight-saving composite materials for vehicle bodies and other components. The composites frequently comprise highly dissimilar materials, such as aluminum and plastic, which are difficult or impossible to weld and require adhesive bonding. Our adhesives for electric vehicle components incorporate our experience in an extensive range of adhesive applications, including automobiles and construction.

Tires

Energy efficiency and quiet ride suitable to electric vehicles
Our electric vehicle tires feature our nano Blend Compound, which incorporates orange oil and other advances in rubber compounding, and tread patterns designed to maximize energy efficiency and minimize noise. They thus help extend the driving distance per battery charge and ensure a quiet ride while providing excellent performance on dry and wet surfaces.

Reduced air drag
We have employed original advances in tire aerodynamics to help maximize overall energy efficiency. Dimpling on the outer sides of the tires reduces air drag, and fins on the inner sides generate air flows in the wheel wells that push the vehicle forward.

Yokohama tires on electric vehicles in grueling hill-climb race
We support competitors in electric vehicle races around the world and have entered a team annually since 2009 in the Pikes Peak International Hill Climb. That race unfolds on the eponymous mountain in Colorado. Our entries, equipped with our energy-efficient tires, won the electric vehicle category in 2010 and 2011 in record times.
with Next-Generation Technologies

A two-vessel monitoring system for enhancing safety during cargo transfers at sea

The volume of crude oil and natural gas transferred between vessels at sea is burgeoning as demand for energy resources swells worldwide. We unveiled a two-vessel monitoring system in February 2012 based on sensor- and transmitter-equipped pneumatic marine fenders. Our system enhances safety during cargo transfers between vessels and thereby helps prevent collisions and resultant cargo spillage.

A 70% share of the global market

We have been supplying pneumatic marine fenders since 1958 and serve about 70% of the global demand for those products. Pneumatic fenders are invaluable in providing buffers between ships during cargo transfers at sea and in harbors, especially during turbulent hydrographic conditions. Our pneumatic fenders are the global standard for performance, and their specifications became the basis for the ISO 17357 international standards established for this product category in 2002.

The world’s first wireless monitoring system for marine fenders

We have developed a system for monitoring conditions in marine fenders used between two vessels. Each fender contains built-in sensors and a transmitter. That allows for monitoring pressure and deformation continuously in real time and, with differential global positioning system (DGPS) technology, the precise positions of the vessels and the velocity of contact. Our system is the world’s first of its kind.

Attention from leading oil companies

Our two-vessel monitoring system is in trial operation with natural gas carriers at the port of Tomakomai, in Hokkaido. Leading oil companies have exhibited interest in the system, and it is a candidate for employment at the world’s first seaborne liquefaction plant for natural gas.

How the two-vessel monitoring system works

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<td>DGPS*</td>
<td>Ship A</td>
</tr>
<tr>
<td>Ship B</td>
<td>DGPS*</td>
<td>Ship B</td>
</tr>
</tbody>
</table>

Information about each vessel
- Speed, position

Information about fenders
- Air pressure (safety indicator)

* Differential global positioning system

Information about each vessel
- Distance from other vessel, positioning speed, position

Information about fenders
- Air pressure, deformation, rebound, absorption energy

Information about each vessel
- Spacing

Information about fenders
- Air pressure, deformation, absorption energy