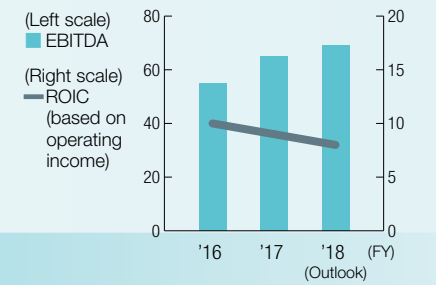


# MATERIALS

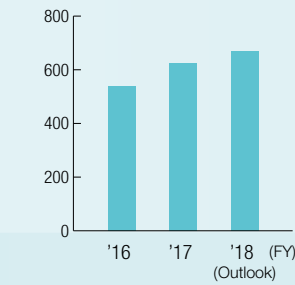
**Yasumichi Takesue**  
Senior Executive Officer,  
Member of the Board  
President, Materials Business  
Field of Teijin Group



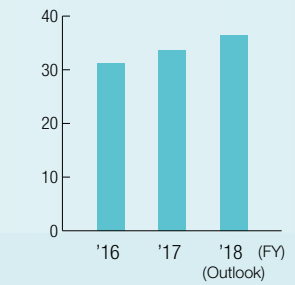
EBITDA (Billions of yen)  
ROIC (based on operating income) (%)



Net Sales (Billions of yen)



Operating Income (Billions of yen)



## Material Business Group

### Aramid Fibers



Global share of para-aramid fibers  
*Twaron* and *Technora*  
**Approx. 50% (1st)**

Meta-aramid fiber  
*Teijinconex* for  
firefighting uniforms  
in Japan  
**Top share**

#### Business Opportunities

Aramid fibers possess outstanding features such as high strength and heat resistance. They can be divided into two broad categories: para-aramid fibers and meta-aramid fibers. Para-aramid fibers are particularly outstanding in terms of strength and heat resistance. Accordingly, they are mainly used as reinforcement for tires and friction material for automobile brake pads, as well as reinforcement for optic fiber cables. The market for para-aramid fibers is expected to grow at an annual rate of 3%. Meta-aramid fibers have outstanding long-term heat resistance and flame retardant properties, enabling them to be used in heat-resistant filters and special environment uniforms such as those worn by firefighters, as well as other industrial materials where heat resistance is required.

#### Fiscal 2017 Performance

**Sales of aramid fibers expanded mainly for automotive and infrastructure-related applications**

Sales of *Twaron* para-aramid fibers expanded firmly, centered on automotive applications, such as friction materials and rubber reinforcements, and optical fiber applications. Sales were firm for *Technora* para-aramid fibers both for automotive applications in Japan and also for infrastructure-related applications overseas. Sales of *Teijinconex* meta-aramid fibers were robust for use in automotive applications, as well as protective clothing and industrial applications.

#### Production Sites

Para-aramid fibers ..... The Netherlands, Japan  
Meta-aramid fibers ..... Japan, Thailand

### Carbon Fibers



Global share of carbon fibers  
Among the **top class**

Contributing to  
**energy conservation**  
and **CO<sub>2</sub> emissions cuts**  
through weight reduction

#### Business Opportunities

With ten times the strength and only one-quarter of the weight of steel, carbon fiber is attracting interest as an environmentally friendly material that will contribute to CO<sub>2</sub> emissions cuts and provide other benefits. This growing interest has driven expansion in demand particularly for aerospace applications and industrial applications. The Teijin Group's *TENAX* carbon fibers boast a high global market share, mainly in aircraft applications. Moreover, against a backdrop of tighter environmental regulations in recent years, carbon fiber is expected to see rapid growth in applications as automotive components.

#### Fiscal 2017 Performance

**Sales for use in aircraft grew steadily**

Sales of *TENAX* carbon fibers continued to grow steadily for use in aircraft. Among other applications, we drove growth in sales volume of compound applications, as well as sports and leisure applications in Asia. However, rising raw material and fuel prices pushed down earnings.

#### Production Sites

Carbon fibers ..... Japan, Germany

### Resin and Plastics Processing



Polycarbonate resins  
Among the **top class**  
in Asia

Providing high added  
value through  
**Teijin's proprietary  
technologies**

#### Business Opportunities

With an impact resistance 200 times greater than glass, and only half the weight, polycarbonate (PC) resins offer outstanding heat resistance, transparency and weatherability. These resins are now widely used in the markets of the electronics and automotive fields, with market growth projected at an annual rate of about 3–4%. Teijin has a strong presence in Asia, mainly in the electronics field. The reason is that we have materials technologies that comprise compounds and are developing specialty polymers, and we also have large-scale molding and coating technologies. Polycarbonate films and sheets are also used in products that leverage their functionality due to factors including sophisticated optical control technologies.

#### Fiscal 2017 Performance

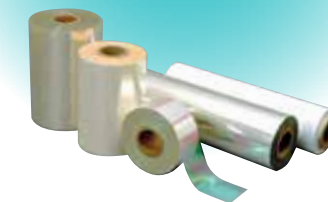
**Sales mix improved due to firm demand for polycarbonate resin**

Market prices for our *Parlite* and *Multilon* mainstay polycarbonate resin increased due to tightening supply and demand. In this environment, high capacity utilization was maintained at our production sites for polycarbonate resin and compounds in Japan and abroad. In addition, we significantly expanded sales of high-performance products for the automotive, semiconductor manufacturing-related, and optical lens fields, which have been key areas of focus in recent years.

#### Production Sites

Polycarbonate resins ..... Japan, China  
Polycarbonate films and sheets ..... Japan

### Films



Expanded Teijin's proprietary  
**PEN film products**  
to automotive applications

**Strengths in processing  
technologies**  
Multi-layer film formation  
technologies and surface  
processing

#### Business Opportunities

Polyester films feature balanced physical properties in terms of such characteristics as strength, heat resistance, and optical properties, together with outstanding cost performance. For these reasons, polyester films are used in a wide array of applications. Our proprietary development polyethylene naphthalate (PEN) is a highly functional film used in high-density data backup tapes, electronic materials, and the automotive field.

#### Fiscal 2017 Performance

**Sales expanded for use in smartphones and automotive electronics**

Although overall sales declined due to the impact of the integration of domestic production facilities, we expanded sales of *Purex*, which is used as a release film for manufacturing processes mainly for multilayer ceramic capacitors for smartphones and automotive electronics.

#### Production Sites

Polyester films ..... Japan, Indonesia

# MATERIALS

## Material Business Group

Medium- and Long-Term Strategies

Accelerate measures to build a stable earnings base by expanding solutions-oriented businesses

We aim to drive the expansion of high-performance materials that realize higher fuel efficiency through weight reduction, for aircraft, automobiles and other applications, in order to address global needs to reduce environmental impact.

The Teijin Group will deliver optimal solutions by working to properly address heightened disaster mitigation awareness and growing needs for refurbishing and expanding infrastructure.

### ▶ Aramid fibers

In para-aramid fibers, particularly *Twaron*, Teijin will work to develop air freight containers with high durability and fire resistance in the aircraft field. In the automotive field, we will focus on expanding products to address demands for weight reduction and higher performance, including tire reinforcement materials and rubber materials. We will also use *Technora* to respond to the expansion of demand for the reinforcement of rubber materials in the automotive field. In infrastructure, demand for *Technora* is anticipated in a wide range of demand of applications, such as rope and deep sea oil drilling.

For the meta-aramid fiber *Teijinconex neo*, we will drive growth in demand for protective clothing in Asia and emerging countries, where high growth is expected against the backdrop of increasingly stringent regulations pertaining to flame-retardant materials and environmental safety.

### ▶ Carbon fibers

In the aircraft field, we will intensively allocate resources to intermediate materials. We will build a competitive edge by accelerating the expansion of thermoplastic prepreg and the textile materials business, thereby steadily expanding sales. Moreover, we will address growing needs for use in the infrastructure and energy fields. Specifically, we will work to expand sales of pressure vessels for the transportation of shale gas, along with sales of products and materials for wind turbine blades.

To address further growth in demand for carbon fiber primarily in North America, we have begun construction of a new carbon fiber production facility in the U.S. and the construction work is proceeding steadily.

### ▶ Resin and plastics processing

We will strive to add even more value by proposing weight reduction and design improvements using our high-performance compound products that use the “super engineering plastic” polyphenylene sulfide (PPS) resin and suchlike, in addition to polycarbonate resins.

Moreover, Teijin has decided to establish a resin compound plant and a related R&D facility in Thailand to advance further global development in the resin business. Teijin is working to enhance value-added resin products using the compound technologies it has developed over many years, with the aim of achieving further business expansion in China and ASEAN, both of which are growing regions.

### ▶ Films

We will enhance cost competitiveness by steadily realizing the benefits of integrating domestic production sites.

In addition, we will strive to supply high-quality products in line with further growth in demand for release films for manufacturing processes for electronic components. We will also develop various films for use in electric vehicles.



## Polyester Fibers & Trading and Retail Business Group



Specialized textiles trading company  
Among the **top class** in Japan

Delivering innovative **solutions** by integrating manufacturing and trading company functions

### ■ Business Opportunities

Teijin Frontier Co., Ltd. is among the top class of specialized textiles trading companies in Japan and develops a wide array of products. These products include fiber materials and sewn products in the fashion and apparel field. In the industrial textiles and materials field, products include automotive materials and components, materials for tents, and living-related materials. In April 2017, Teijin Frontier integrated the polyester fibers business into its business operations. Teijin Frontier's strengths lie in its integrated system spanning materials development to production and sales, as well as research and development, production and sales of polyester fiber. Leveraging these strengths, Teijin Frontier is expanding its business globally.

### ■ Fiscal 2017 Performance

#### Functional materials for sports and outdoor use for Europe and the Americas held firm, while civil engineering materials declined

In the fiber materials and apparel field, sales of functional fabrics remained favorable for sports and outdoor use for Europe and the Americas. Firm sales were posted for uniforms. In functional textiles and apparel, performance was sluggish, amid continued weakness in domestic market conditions. In the industrial textiles and materials field, we posted firm sales of automotive-related reinforcement materials and synthetic leather car seat fabric. In fiber materials, there was a downturn in sales of civil engineering materials as earthquake reconstruction demand and orders received for new infrastructure construction settled down.

### ■ Production Sites

Polyester fibers ..... Japan, Thailand  
Textiles ..... Japan, China, Thailand  
Sewn products ..... Japan, Vietnam, Myanmar

Medium- and Long-Term Strategies

Contribute to the enhancement of people's lifestyles and daily lives through chemical products such as textiles, resins and films

To rigorously pursue a customer-focused approach, that is, to further advance its solutions-oriented business model, Teijin will strive to further enhance services for customers as the only enterprise in the industry that conducts integrated fiber manufacturing and sales.

Our strengths lie in our global supply chain spanning manufacturing to retail. We will create and supply products that meet customer needs, as well as products that are not currently available on the market, by developing even more sophisticated differentiated products. Teijin will continue to reinforce its production capabilities through proactive M&A and alliances in pursuit of globally optimized local production for local consumption. Notably, in automotive materials, we are working to strengthen supply chains in the key regions of Japan, China, ASEAN,

Europe and the Americas, in conjunction with expanding our production sites, thereby paving the way for higher sales.

In addition, Teijin will lay the groundwork for further growth and development by taking full advantage of its ability to rapidly address market needs through integrated development and production spanning yarn to materials and products converting.

In the environmental field, we formulated *THINK ECO* as an activity guideline based on the seven main themes of 1) recycling; 2) derived from biomaterial; 3) energy conservation; 4) organic; 5) reduced use of hazardous chemicals; 6) reduced emissions of environmental-burdening substances; and 7) adapting to climate change. With this in mind, we are working to build and expand our environment-conscious business, in addition to focusing on CSR procurement activities.