

Global Business Expansion

Start of Overseas Business Expansion (1955–1970)

- **First Overseas Business Established: Trilon Co., Ltd. (Hong Kong)**

With a strong focus on exports since its time with rayon, Toray has made the development of overseas markets a central pillar of its business development. Nylon and polyester synthetic fibers made their appearance in the 1950s, and as production increased and costs reduced, demand also grew in a cycle that led to further production growth. For Toray, this dramatically increased the importance of its export business. Toray stationed employees in regions to which it shipped large volumes of exports as part of an active export promotion strategy. At this time, Toray outsourced its customer development and business operations to trading companies, and only focused on exporting orders for its products produced in Japan and providing technological services to overseas customers. It did not conduct any direct sales activities.

In 1955, Toray established trading company Trilon Co., Ltd. in Hong Kong, in a joint venture with a Japanese trading company and five overseas

Chinese businessmen, as its first step toward building an overseas operation involving capital contribution. Trilon was established on the belief that Toray needed its own sales company if it wanted to capture a competitive position in the Hong Kong market, and management was entrusted to the local operation. Although it was to merge into Toray Industries (H.K.) Ltd. (THK) in 1990, Trilon became a precedent to follow as the Toray Group's overseas trading network took shape during the 1980s.

- **Launch of Overseas Manufacturing Business**

In the 1960s, developing countries started adopting import substitution industrialization policies in an effort to develop their own fiber processing industries. In order to maintain its export trading rights, Toray set up joint venture businesses with local capital in the areas of spinning, weaving and knitting, dyeing, and sewing. From its first venture in the establishment of a nylon textiles company in Ceylon (now Sri Lanka) in 1962, Toray expanded to 40 companies in 17 countries globally by 1973. Since then, it has withdrawn from many of those companies.

Toray's first full-scale manufacturing business overseas was Thai Toray Textile Mills Co., Ltd. (TTTM), a manufacturer of polyester/rayon blended woven fabric in Thailand that it jointly established in 1963. At



TTTM (Thailand)

the time, Toray's "GOLDEN EAGLE" brand of polyester/ rayon blended woven fabric was very popular in the Thai market. TTTM took over production of the brand and launched an integrated spinning, weaving, and dyeing operation. In 1963, Toray established Toray Nylon Thai

Co., Ltd. (TNT) (now Thai Toray Synthetics Co., Ltd. (TTS)) in a joint venture with Mitsui & Co., where it started a nylon filament yarn operation in 1967.

In Indonesia, Toray cooperated with the government’s policy on developing a national fibers and textiles industry. As shown in table 7-1, it established a string of joint venture companies in the 1970s. As Toray’s core company supplying nylon filament yarn to Indonesia’s domestic market and polyester staple fiber to the Group’s spinning and weaving companies, P.T. Indonesia Toray Synthetics (ITS) was established in the Tangerang area to the west of Jakarta, and its integrated polymerization and spinning plants for those products were constructed.



ITS (Indonesia)

Table 7-1 Toray’s Presence in Indonesia (1970–1973)

Company Name	Business Type	Establishment
P.T. Century Textile Industry (CENTEX)	Polyester/cotton spinning, weaving, and dyeing	May 1970
P.T. Texfibre Indonesia (Texfibre)	Nylon, polyester filament texturing	August 1970
P.T. Indonesia Synthetic Textile Mills (ISTEM)	Polyester/rayon spinning, weaving, and dyeing	August 1970
P.T. Indonesia Toray Synthetics (ITS)	Nylon filament, polyester staple fiber, polymerization	October 1971
P.T. Acryl Textile Mills (ACTEM)	Acrylic spinning and dyeing	April 1973
P.T. Easterntex (ETX)	Polyester/cotton spinning and weaving	June 1973

In Korea, on the other hand, Toray provided woolly nylon processor Korea Nylon Inc. with manufacturing technologies and management guidance in 1963, with a capital participation coming later in 1971. In 1969, it established Korea Polyester Inc. in a joint venture with a local capital company and Mitsui & Co., while a merger between the two companies in 1981 resulted in what is now Kolon Industries, Inc. Also, in a joint venture with Samsung Group and Mitsui & Co. in 1972, it established Cheil Synthetic Textiles Co., Ltd. (name changed to Saehan Industries Inc. in 1997) for the purpose of producing polyester staple fiber.

Expansion of Overseas Business (1971–1986)

- **Initiative with the TAL Group**

In the 1970s, Japan's fibers and textiles industry faced serious changes in the form of a strong yen following the Nixon shock, and export controls from the Japan-U.S. Textile Agreement and the Multi-Fiber Arrangement (MFA). Limits to growth in production volumes started to appear with a gradually maturing of the domestic market and stagnation of exports. At this time, Toray explored international strategies based on new approaches, in addition to expanding its range of value-added products, as a new direction for its synthetic fiber business.

One of those strategies was implementation of a project in partnership with Textile Alliance Ltd. (TAL). TAL was jointly established in 1962, at a boom-time in the fibers and textiles industry in Hong Kong, by spinning business owner C. C. Lee and trading company Jardine Matheson & Co. TAL conceived a grand vision with operations spreading from upstream synthetic fiber manufacturing to downstream sewing,

in addition to the midstream spinning, weaving, and dyeing at its affiliates. Dividing its production across free trade zones for optimal efficiency, it would sell the finished garments in the United States and Europe. At the core of its operations were polyester/cotton blended fabrics, while its main garments were dress shirts.

With its technological and financial strengths, Toray was the perfect partner to TAL. With both companies in agreement, Toray invested in TAL in 1971. In 1973, Toray and TAL jointly established Penfibre Sdn. Berhad (PFR) in Malaysia's Penang state as a manufacturer of polyester staple fiber. Together with spinning, weaving, and dyeing companies already established in Malaysia by TAL, the country became Toray's integrated production site for everything from staple fiber to polyester/cotton blended fabrics. Other joint ventures for the partnership included a capital participation in Luckytex (Thailand) Company Limited (LTX) in Thailand in 1972, and establishment of P.T. Easterntex (ETX) in Indonesia in 1973.

- **TAL Group Restructuring**

In the midst of these developments, the first oil crisis struck in 1973 and tripped up Toray's plans. It set back its exit strategy, of direct sales of its own garment brands to mass retailers and major apparel stores in the West, as each TAL Group manufacturing site fell into the red. With financial support and an increased shareholding ratio, Toray had to participate directly in TAL Group management. It sent a senior sales & marketing executive and other staff to help restructure the business in 1976. After that, TAL successfully changed direction to become an OEM producing garments under client companies' brands. Back in the black in

fiscal 1978, the company was able to eliminate its accumulated losses by fiscal 1980.

After this train of events, Toray led the restructuring of the TAL Group in 1983. Toray took 100 percent ownership of upstream (staple fiber) and midstream (spinning, weaving, and dyeing) businesses, while C. C. Lee led a new company to manage downstream (sewing) businesses and TAL retained the remaining Hong Kong knitting business. In a second restructuring in 1990, Toray ceased involvement in TAL and took PFR, PAB (Penfabric Sdn. Berhad), LTX, and ETX under its wings as subsidiary companies.

Including the TAL Group, Toray's companies with manufacturing sites in Southeast Asia continued their decline into the red as economies stagnated on the back of oil crises in the 1970s and a simultaneous worldwide slump. During the 1980s, Toray again and again considered the disposal or liquidation of its overseas companies. Instead, it improved its cost competitiveness and achieved export quality through business structure reform and production technology improvements at each company, with their products outdoing Korean and Taiwanese products in Western markets. It was at this time that the cost competitiveness of products from Toray's Southeast Asian companies took a big jump forward through a currency alignment under the Plaza Accord. As a result, the companies have achieved stable profits since fiscal 1986.

- **Business Expansion into Western Countries**

Toray's expansion into the West started with the manufacture and sale of a suede-texture artificial leather in 1971. (This was selling in Japan at the time under the "Ecsaine" brand.) With demand focused on Western

countries that were familiar with leather apparel, Toray marketed this product in the United States through leading converter Spring Mills Inc. under the brand name “Ultrasuede.”



Alcantara (Italy)

In the meantime, Toray and Italian synthetic fiber company Azienda Nazionale Idrogenazione Combustibili (ANIC) S.p.A. (now EniChem S.p.A.) established Iganto S.p.A. in Milan, Italy, in 1974, with Toray holding a 49 percent share. Iganto began producing under the brand name “ALCANTARA,” and in 1977 developed an integrated production system handling everything from ultrafine staple fiber to the finished goods. In 1981, it changed its name to Alcantara S.p.A. because of the rapid sales growth its ALCANTARA products were experiencing on the back of high popularity in the market. Toray acquired management rights for the company in 1991.

In France in 1980, the government enthusiastically solicited the production of carbon fiber, which it regarded as an important material for the aerospace industry. To quickly secure its place in the European market, which had strong potential going forward, Toray decided to establish a joint venture company with state-run oil company Elf Aquitaine S.A. (now Total S.A.). In 1982, the partnership established Société des Fibres de Carbone S.A. (SOFICAR, now Toray Carbon Fibers Europe S.A. (CFE)) with Toray holding



CFE (France)

a 35 percent share, and the company started operating in 1985. Toray acquired management rights for the company in 1988.

In 1985, Toray acquired Trea Industries, Inc., a polypropylene film manufacturer in the State of Rhode Island, as a manufacturing site in the U.S. and made it Toray's first wholly-owned subsidiary (the company changed its name to Toray Plastics (America), Inc. (TPA) in 1989). Trea quickly built a new plant where it started production using Toray's technologies. Later, it started producing metalized products and finally expanded its product range to include polyester film.

Advance of Globalization (1987–1996)

- **Globalization of the Fibers and Textiles Business**

In line with its belief that “fibers and textiles are a growth industry for the world,” Toray started expanding its polyester filament business lines globally at the end of the 1980s, adding to its polyester staple fiber lines already expanding throughout the ASEAN region.

It put a number of plans into action, including transferring existing facilities from its Mishima Plant to ITS in Indonesia and producing polyester filament yarn in 1990, producing polyester taffeta fabrics, a standard product type used as lining material, at LTX in Thailand in 1989, and establishing Toray Fibers (Thailand) Ltd. (TFL, now TTS) and producing polyester filament yarn using an innovative one-step process in 1991. After Courtaulds Ltd. of the United Kingdom approached Toray about the disposal of its polyester filament textile business, Toray acquired Samuel Courtauld & Co., the polyester filament textile division of Courtaulds, and established Toray Textiles Europe Ltd. (TTEL) in

1989. Following the acquisition, it built a new plant in Mansfield to produce light-weight polyester fabric and started operation in 1993.

With its polyester staple fiber lines as well, together with capacity increases at ITS and PFR, Toray Group companies in ASEAN countries updated the looms to high-efficiency air jet looms (AJL) while also modernizing spinning, dyeing and other equipment and dramatically expanding capacity at these facilities. As a result, Toray's polyester/cotton blended fabrics operations in the ASEAN region became world-leading in terms of both production volumes and quality.

Because of the strong growth of its businesses in the ASEAN region, Toray was able to devote itself to its social contribution activities. Like in Japan, it established a local Toray Science Foundation in Malaysia, Indonesia, and Thailand in 1993 and 1994, and held its first presentation ceremonies in 1995.

- **Building an Integrated Fiber Business in Nantong, China**

Toray's involvement with China goes back to the 1950s and includes export of fiber and textile products, and export of synthetic fiber plant and technologies. However, even in the 1980s, it was still maintaining a wait-and-see approach to direct investment. In the 1990s though, with China attempting to adopt a socialist market economy, Toray also changed direction and provided technological assistance to a dyeing project in China's Shaanxi Province, with capital participation by THK. Because the deal involved a semi-government corporation in mainland China, Toray conducted research on China's "one country, two systems" principle, and the situation with its corporate management, in preparation for a full-scale investment.

It formulated a business plan to build an integrated production system for polyester filament yarn in China, handling everything from polyester polymerization and spinning to weaving and dyeing, and then



TSD (China)

started researching a location. In 1994, Toray selected a location from several options. It secured a million square meters of land in the Nantong Economic & Technological Development Zone, Nantong, Jiangsu Province, which boasted favorable conditions combining existing water, electricity and other infrastructure, a booming fibers and textiles industry, a highly-educated and extremely capable workforce, and favorable treatment of foreign companies. In August 1994, Toray and Sakai Ovex Co., Ltd. jointly established Toray Sakai Printing & Dyeing (Nantong) Co., Ltd. (TSD) as a polyester filament textile dyeing company, and then in 1995 they also established Toray Sakai Weaving (Nantong) Co., Ltd. (TSW) as a supplier of textiles to TSD. Also in 1995, Toray established Toray Fibers (Nantong) Co., Ltd. (TFNL) as a polyester polymerization and spinning company to complete a totally integrated system of production.

- **Globalization of Businesses Other Than Textiles**

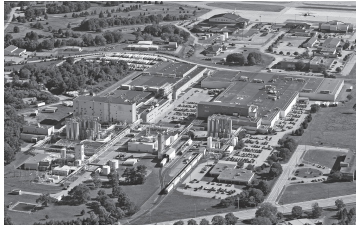
Resins Business: Along with the Nantong fibers and textiles project, Toray started to move into the rapidly expanding China market. Targeting the surging production of home appliances, office automation equipment and game machines, Toray established a number of

companies in 1995 producing acrylonitrile butadiene styrene (ABS) and other resin compound products (sales company LIBI Plastic Compounding (Hong Kong) Co., Ltd. (LCH), manufacturing company LIBI Plastic Compounding (Shenzhen) Co., Ltd. (LCS)), and molded and assembled products (sales company Toray Sanko Precision (Hong Kong) Ltd. (RKH), manufacturing company Toray Sanko Precision (Zhongshan) Ltd. (RKZ)). Considering convenience, tax advantages, and other issues, it located its sales sites in Hong Kong, created separate entities for its manufacturing sites, and located them in the Shenzhen Special Economic Zone and Zhongshan Development Zone in mainland China. On the other hand, Toray had started resin molding in Malaysia prior to its China operations, so in 1990 it followed up by establishing Toray Plastics (Malaysia) Sdn. Berhad (TPM) on PFR premises to produce “Toyolac” ABS resin. As its first overseas resin polymerization site, Toray started production in 1992 and since then has continued a program of facility enhancements. In the U.S., Toray established the Montor Performance Plastics Company in 1989 as a joint venture with the Monsanto Company, and started a nylon resin compounding business. The business was transferred to Toray Resin Co. (TREC) in 1999.



TPM (Malaysia)

Films Business: In 1988, Toray established and started operating 3TM Plastics Co., Ltd. (3^{TP}, now TTS) as the first metalized products company in Asia. The following year, it enhanced the facility to enable integrated production from the base film stage. In the meantime, in the U.S., TPA had



TPA (United States)

already started producing “Torayfan” polypropylene film. In 1991, it also started producing “Lumirror” polyester film and continued expanding capacity along with growth of the Torayfan business until 1997, when it started producing the new “Toraypef”

polyolefin foam as well. With the local community holding high expectations for TPA, the company established the Toray Plastics (America), Inc. Scholarship Endowment in 1992 to commemorate the 100th anniversary of the University of Rhode Island and to contribute to the community. Each year, interest from operating the fund is used as the scholarship capital provided to scholarship recipients. TPA provided additional support later by endowing a graduate level scholarship of one million U.S. dollars (95 million yen) in 2010, and then providing sponsorship of a new Engineering Facility for two million U.S. dollars (200 million yen) in 2014.

Carbon Fiber Composite Materials Business: Toray’s “Torayca” prepreg carbon fiber composite material is the only primary structure material used on Boeing 777 aircraft. For this reason, Toray established prepreg manufacturing company Toray Composites (America), Inc. (TCA, now Toray Composite Materials America, Inc. (CMA)) on land adjacent to the Boeing Company’s Tacoma plant in the suburbs of Seattle, Washington State, in 1992. After starting operations in 1994, TCA went through a series of capacity expansions as demand grew. With the acquisition of management rights of SOFICAR in 1988, Toray had developed a three-zone system for its carbon fiber composite materials business, in Japan, the U.S., and Europe.

- **From Globalization to Global Operations**

As the scale of Toray's overseas production increased with its push for globalization, it became necessary to look at optimizing operations for the whole Group. Examples of this were division of items according to specialized product types, adjusting operation in each region in line with strong or weak demand, from domestic to overseas, overseas to domestic, or overseas to overseas, and connecting optimal production and processing sites in the vertical operation (from filament to textiles to garments) of the fibers and textiles business. Calling this approach *global operations*, Toray sought to minimize costs through optimization of production, distribution and sales channels, and to avoid business situations it could not handle alone, and the effect of foreign exchange fluctuations.

To enable global operations, each product of Toray Group companies required the same “Made *in* Toray” quality standard regardless of which country or which plant they were made. To achieve this, Japanese plants took the role of *mother plants* and focused on transferring technologies and creating uniform production technologies. In this way, Toray's globalization evolved into global operations for each of its fibers and textiles, resins, films, and carbon fiber composite materials businesses.

- **Trading Activities**

In the middle of the 1980s, the export and marketing power of general trading companies began to decline, which required Toray to compensate for the decline and provide export support to its active companies in the ASEAN region. Toray also had to expand its manufacturer/trading company function to facilitate the global operations it launched in the 1990s, and to help drive its carbon fiber composite materials business,

and water treatment membrane business, that were focused on overseas markets and required specialist knowledge. Toray's trading activities included changing the status of its existing representative offices to local subsidiaries, establishing Toray Industries (America), Inc. (TAM) in the U.S. in 1965, THK in Hong Kong in 1974, and Tong Shing Inc. in Taiwan in 1980, while restructuring and reorganizing existing companies and establishing new ones. It also established Toray Europe Ltd. (TEL) in the U.K. in 1980, Toray Industries (Singapore) Pte. Ltd. (TSP, originally TIA) in 1982, Toray Deutschland GmbH (TDG) in Germany in 1985, and Toray Marketing and Sales (America), Inc. (TOMAC) in 1988 by spinning off the trading function from TAM. In 1989, Toray changed the general shareholder composition of each trading company to 70 percent Toray ownership and 30 percent Toray International, Inc. (TI) ownership. As its overseas trading activities later expanded, it became necessary to strengthen ties with TI and the rest of its trading function, and in 2007, Toray returned the general shareholder composition of those companies to 70 percent TI and 30 percent Toray as part of another restructuring that included name changes for a number of companies.

Rapid Expansion of Overseas Business (1997–2006)

- **Full-scale Investment in China**

Fibers and Textiles Business: TSD and TSW were in production when in 1998 they doubled the capacity of their production facilities. In 2000, they merged to form a new TSD (Toray Sakai Weaving & Dyeing (Nantong) Co., Ltd.). They continued to expand capacity and in 2004 had roughly ten times their original production capacity, including nylon

filament textiles, which started later. Meanwhile, TFNL had started polyester polymerization and spinning in 1998 using a state-of-the-art facility employing the best of Toray's technologies. However, due to continued capacity expansion with low-cost Chinese-made equipment, the company fell into the red in a chronically oversupplied China market. To resolve the issue, it installed batch processing equipment able to produce specialty products, and then installed nylon filament yarn facilities in 2005.

With the business growing, Toray established Toray Fibers & Textiles Research Laboratories (China) Co., Ltd. (TFRC) in 2002 for the main purpose of developing new products tailored to local needs. As one of Toray's global research sites, TFRC conducted research and technology development covering the full range of polymer chemistry and fiber technologies. In 2004, it opened a Shanghai branch to develop advanced polymer materials. The branch became Toray Advanced Materials Research Laboratories (China) Co., Ltd. (TARC) in 2012.

Resins Business: In 2002, Toyo Plastics Seiko Co., Ltd. (now Toray Plastics Precision Co., Ltd.) established Shanghai TPS Precision Co., Ltd. (STPS) and started supplying small precision structural components. In the following year, LCS (now Toray Plastics (Shenzhen) Ltd. (TPSZ)) installed compounding equipment for polyphenylene sulfide (PPS) resin. In 2005, Toray dissolved the joint management of LCH (now Toray Plastics (China) Co., Ltd. (TPCH)) and established its wholly-owned Toray Plastics (Hong Kong) Ltd. (TPHK). Positioning TPHK as its resin compounding business headquarters in South China, with production companies under its control, it was able to centralize its production, sales and technical services functions and develop an efficient business

management system. Then in 2006, it established Tianjin Pigment Engineering Plastics Co., Ltd. (NPT) in North China's Tianjin in a joint venture with Nippon Pigment Co., Ltd. and Toyota Tsusho Corporation. It also acquired an existing company in East China's Suzhou and established a new company (now Toray Plastics (Suzhou) Co., Ltd. (TPSU)), which completed its structure spanning South, East, and North China.

Films Business: In 2001, Toray established Yihua Toray Polyester Film Co., Ltd. (YTP) in Yizheng City, Jiangsu Province, in a 50-50 partnership with Yihua Group Co., an affiliate of the China Petrochemical Corporation, to manufacture and market polyester film. YTP purchased Yihua Group Co.'s existing equipment and started operation. Growing in size, it expanded capacity of its production facilities for packaging and industrial materials in 2004, and its production equipment for ultra-thin polyester films for capacitors in 2006.

During this period, Toray was providing indirect support for its business expansion in China while working to raise awareness of the Toray brand. In 1997, Toray became a special sponsor of the Shanghai International Marathon, which it still continues today. In 2003, Toray launched its prestige brand "Torex" simultaneously in Japan and China with outdoor signage and television commercials.

- **Establishment of Toray Saehan Inc. in Korea**

In 1997, Cheil Synthetic Textiles Co., Ltd., which had diversified and separated from the Samsung Group, changed its name to Saehan Industries Inc. However, after taking a direct hit from the Asian financial crisis spreading across markets at the time, it needed to enter a work-out program to improve its financial health. Toray was asked by Saehan

Industries to provide support, so the two companies jointly established Toray Saehan Inc. (TSI, now Toray Advanced Materials Korea Inc. (TAK)) in 1999. TSI proceeded to buy all of Saehan Industries' polyester film business and nonwoven fabrics business,

and part of its polyester filament business, and started operation in December 1999. TSI then expanded its polyester film capacity, started a film coating business, expanded capacity of its polypropylene filament nonwoven fabrics (PP spunbond) business for disposable diapers and expanded the business overseas. In 2010s, it expanded into the carbon fiber and PPS resin business domain. Meanwhile, in 2008, Toray made TSI a wholly-owned subsidiary and then changed its name to TAK in 2010.

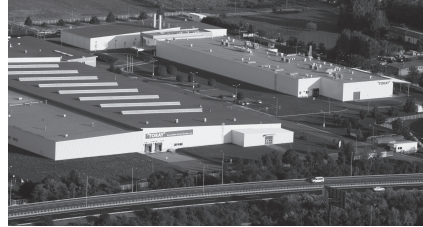
In 1995 in Korea, prior to the establishment of TSI, Toray and the Samsung Group had also established STEMCO, Ltd. for forming flexible electronic circuits and leads on polyimide (PI) film, and STECO, Ltd. for mounting driver ICs. With strong growth in these businesses, STECO was relocated to a new plant in Cheonan in 2003, followed by STEMCO relocating to Ochang in 2005. While having STECO as its largest customer, STEMCO also supplied products to other semiconductor companies and grew to become the manufacturer with the leading share of the global market.



Signing ceremony for joint venture between Toray and Saehan Industries (June 1999)

- **Actively Advancing Globalization in Every Region**

Czech Republic: In 1997, Toray established Toray Textiles Central Europe s.r.o. (TTCE) in the Prostějov industrial zone of the Czech Republic and started an integrated production system for weaving and dyeing polyester taffeta fabrics. As Toray's first business site in Eastern Europe, TTCE continued to enhance its facilities and actively expand its business, including starting production of airbag fabrics in 2006 and "Toray Waterless Plate" in 2013.



TTCE (Czech Republic)

Malaysia: In 1998, Toray started producing Lumirror at its PFR operation, where it expanded capacity to three machines by 2006 and started aluminum metalization in 2014. It also established Toray BASF PBT Resin Sdn. Berhad (TBPR) in 2004 in a 50-50 partnership with Germany's BASF SE to produce polybutylene terephthalate (PBT) resin. It started production in 2006 and sold products under both parent company brand names.

France: In 1996, Toray acquired a polyester film subsidiary of Rhône-Poulenc S.A. and established Toray Plastics Europe S.A. (TPEU). It installed a new production line using Lumirror technologies and started production in 1999. In 2010, in order to improve management efficiency, it transferred equipment from TPEU to Toray Films Europe S.A.S. (TFE), a company established in 2008 to manufacture Torayfan.

U.S.: Following the establishment of its prepreg manufacturer TCA in 1992, Toray established Toray Carbon Fibers America, Inc. (CFA, now

CMA) at Decatur, Alabama in 1997 to produce carbon fiber. It started production in 1999. In 2004, Toray installed new precursor production equipment and expanded the capacity of its carbonization facility to complete an integrated precursor, carbonization and pre-preg production system in the U.S. It continued to expand capacity afterward as well.

In 2001, Toray obtained management rights of a U.S. company with 50 percent share of the global market in PPS fiber. In 2002, it also acquired a fluorofiber business from DuPont and secured usage rights for the extremely well-known ‘Teflon’ brand name. With these and other developments, it drove a program of mergers and acquisitions in the area of high-performance fibers.

- **Establishment of Regional Supervisory Organizations**

In 2002, Toray reformed its businesses in every sector through implementation of its NT21 companywide mid-term management program. At the same time, it continued strengthening its globalization plans. It also introduced a regional supervisory organization system to enable decisions to be made quickly and autonomously, and to take advantage of the high rates of economic growth in some regions to expand its own businesses.



TCA (now CMA) (United States)



Ground breaking ceremony for South Carolina plant of CFA (now CMA) (January 2016)

Again in 2002, it established separate headquarters in China, Indonesia, Thailand, and Malaysia, and gave each president decision-making authority for capital investment. Exceeding that of divisional general managers, this authority was on the level of Toray's president.

- **Global Re-Engineering**

As Toray's overseas investments continued, its overseas production sites multiplied, and their production capacity grew. With the addition of TSI, itself a large company, to the Group, clarifying the roles of each production site, and transferring and remodeling existing production facilities, and establishing new facilities, Toray aimed to carry out production and marketing of each product in the most appropriate locations. Toray called this process Global Re-Engineering. Typical examples were the polyester film business (with six production bases globally) and polyester filament business (with five production bases globally), where this concept was implemented to enhance their total cost competitiveness and establish profit bases that allowed them to overcome global price competition.

Along with expansion of its overseas business domains, Toray held its Asia International Conference, and International Conference for U.S. and Europe Affiliates, in 2002 to monitor progress of that expansion. (These two conferences were combined into one in 2009.)

A New Global Expansion (2007–2016)

- **Global Strategy after IT-2010**

Toray launched its IT-2010 mid-term management program in October 2006, through which it launched an overseas business enhancement

project and expanded its businesses in growth regions. Although investment projects were limited by the global financial crisis of 2008, the policy of overseas business expansion was continued in Project AP-G 2013 as well, becoming the Asia and Emerging Country Business Expansion (AE) Project. Specifically, this entailed the establishment of bodies in China, India, ASEAN, and emerging countries to promote expansion, with the U.S. also added from AP-G 2016. Each committee, business expansion conference and other channel were tasked with formulating, promoting and monitoring regional strategies. Emerging countries prioritized through this project were India, Brazil, Russia, and countries in the Middle East, North Africa, and Central and Eastern Europe. Toray established local representative offices in each of these countries, collected local information and enhanced communication. (One example was the Toray India Representative Office it established in 2011, which was converted to the subsidiary Toray Industries (India) Private Limited (TID) in 2014.) At the same time, Toray continued its expansion of growth businesses in Europe and Korea.

In April 2017, Toray shifted to a three-dimensional global management matrix with the business dimension, regional dimension, and functional dimension on each axis. Decision-making authority for capital investment, etc. was also transferred to divisional general managers.

- **Business Expansion in China, a Massive Growth Market**

Fibers and Textiles Business: With TSD establishing itself as a profitable entity, Toray proceeded to expand its capacity, give it responsibility for its own business operations, and implement other ideas rooted in the production and sales workplace. Year by year, it was able to further grow

its profits, becoming a preceding model for other Toray Group companies in China. TFNL also grew on the back of its specialty product lineup, turning profitable in 2010 and entering a new phase of expansion. With growing demand for disposable diaper applications, Toray Polytech (Nantong) Co., Ltd. (TPN) was established on its Nantong premises in 2006 to produce PP spunbond nonwoven fabrics through a technology transfer from TSI. The new company experienced strong growth since starting production in 2008, and expanded capacity to four machines by 2014. In 2017, Toray Polytech (Foshan) Co., Ltd. (TPF) was also established in Foshan, China.

Resins Business: In 2010, Toray restructured Toray Plastics (China) Co., Ltd. (TPCH, renamed from TPHK) to become its resins business headquarters for the whole of China. While strengthening its unified production and sales operations, it established a new plastics technology center at TPSZ in Shenzhen to centralize its development and technical services. In 2012, Toray established Toray Plastics (Chengdu) Co., Ltd. (TPCD) in Chengdu, Sichuan Province, to make inroads into inland China. Then in 2013, it installed compounding equipment for Torayca resin at TPSZ.



TPCD opening ceremony (December 2013)

Films Business: To meet surging demand for flat panel displays, Toray transferred its Japanese polyester film production facilities to YTP in 2011. Installing the latest facilities in 2015 as well, it expanded its optical film business.

Chemicals Business: In 2009, Toray Fine Chemicals Co., Ltd. established Cangzhou Toray Fine Chemicals Co., Ltd. (TFCC) in Cangzhou, Hebei Province, to manufacture dimethyl sulfoxide (DMSO). This chemical was used in semiconductor manufacturing and other processes and was expected to see growing demand for medicine and agricultural chemical applications.

Water Treatment Business: In 2009, Toray and China National BlueStar (Group) Co., Ltd., an affiliate of the China National Chemical Corporation, jointly established Toray BlueStar Membrane Co., Ltd. (TBMC) in Beijing to manufacture water treatment membrane products. In 2016, Toray and Jiangsu Water Business Doctor Co., Ltd., a member of the Water Business Doctor Group, jointly established Toray WBD Membrane Technology (JS) Co., Ltd. (TWMT) in Yancheng, Jiangsu Province, to manufacture water treatment membranes used in the Membrane Bioreactor (MBR), membrane separation activated-sludge-method process.

Medical Products Business: With a growing dialysis market in China, Toray and Qingdao Jifa Group Co., Ltd. jointly established Toray Medical (Qingdao) Co., Ltd. (TMQ) in Jimo, Qingdao, Shandong Province in 2011. The company started manufacturing and marketing dialysis machines in 2012. It then started manufacturing artificial kidneys for sale in Japan from 2014, and within China from 2017.

- **Continuing Expansion of the Fibers and Textiles Business**

Due to a rapid increase in demand for disposable diapers in ASEAN countries as well, Toray and TAK established, and started production at, P.T. Toray Polytech Jakarta (TPJ) on ITS premises in 2011 to produce PP

spunbond nonwoven fabrics for disposable diapers using TAK technologies. It started up its second machine in 2016 and made the decision to expand capacity to six machines at Korea's TAK, starting production in fiscal 2018 and consolidating its position as the main supplier within Asia.

Globally, demand for automobile airbag applications continued to rise. In 2002, Toray appointed overseas sites for production—Thailand's TFL (now TTS) as its nylon filament manufacturer and LTX as its airbag fabric manufacturer. It enhanced its facility and started production, and since then has continued a program of capacity expansion. It appointed TTCE as a new airbag fabric manufacturer in 2006, and later established Toray Kusumgar Advanced Textile Private Limited (TKAT) in India in 2014 as a joint venture for airbag fabric, and started production in 2016. Furthermore, it established Toray Advanced Textile Mexico, S.A. de C.V. (TAMX) on the premises of Zoltek Companies, Inc.'s Mexico plant in 2015, with plans to start production of filament yarn and airbag fabric in 2018.

Toray's integrated materials and garments business conducted with UNIQLO Co., Ltd. has also expanded rapidly. For this reason, Toray developed and enhanced its filament and textiles production systems in



TKAT (India)

Japan and overseas, while securing and developing high quality clothing plants as its production system. With those plants opening in China, ASEAN countries and Bangladesh, THK is now functioning as a cornerstone of the Toray supply chain.

In 2014, through TAK, Toray made Woongjin Chemical Co., Ltd. in Korea a consolidated subsidiary, with the company changing name to Toray Chemical Korea Inc. (TCK). In this way, Toray was able to incorporate TCK's polyester filament yarn and staple fiber businesses into the Toray Group, and reap the benefits of synergies created. TCK also enhanced its facilities for low-melt polyester staple fiber and composite staple fiber for the nonwoven fabrics for which demand continued to increase.

- **Expansion of Resins Business Centered on Automobile, Electric and Electronic Applications**

While continuing to enhance production capacity of ABS resin at TPM, Toray was positioning PPS resin as a strategic growth material for the company. In addition to its Tokai Plant, it chose TAK as its overseas production site for the resin. It built a new integrated production line for processes from the synthesis of the main raw materials through to polymerization and compounding at the Saemangeum Industrial Complex in Gunsan, Jeollabuk-do Province in Korea. It started gradual production in 2015, starting from compounding, and solidified its position as a global leader for the Toray Group.

On the other hand, to meet the rising demand for compounding everywhere, Toray expanded capacity in China, and expanded nylon and PBT resin compounding capacity at ITS and PPS compounding capacity at TTS. It also established Toray Resin Mexico, S.A. de C.V. (TRMX) as a new production site on the premises of Zoltek's Mexico plant in 2014, where it started producing nylon and PBT resin compounds the following year.

- **Expansion of Film Business Centered on IT and New Energy Sectors**

In 2007, Toray expanded capacity for optical polyester film at TAK in Korea, while continuing to enhance its IT-related film coating production line.

Toray Advanced Film Co., Ltd. also established Toray Advanced Film Kaohsiung Co., Ltd. (TAFK) in 2011 in Taiwan as a new production site for “Toretac” self-adhesive polyethylene (PE) film, which it started producing the following year. When LEDs started being used for LCD backlight units, demand was expected to grow for this surface protection film, a functional film essential for the units.

Toray started battery separator film (BSF) business in 2010 by establishing a joint corporation Toray Tonen Specialty Separator Godo Kaisha (later Toray Battery Separator Film Co., Ltd. (TBSF)) in Japan, and then its subsidiary started production also in Korea. To accompany the business expansion, it enhanced the film production facilities for BSF at Toray Battery Separator Film Korea Limited (TBSK), a Korean subsidiary of TBSF, which was later absorbed into Toray Industries, Inc. in 2017. In 2015, it also established Toray BSF Coating Korea Limited (TBCK) when buying the separator coating equipment from LG Chem, Ltd. As a result, it built a system able to quickly respond to functional advances in separator film.

- **Active Expansion of Carbon Fiber Composite Materials Business to Meet Rising Demand**

While continuing to expand capacity at its three existing sites in Japan, the U.S., and Europe, Toray made TAK its fourth carbon fiber site to

capture the rapidly increasing demand in Asia, and in Korea and China in particular. TAK started production in 2013, after which Toray's global expansion continued at the four sites. CFE also acquired new land where it built Toray's third precursor production line after those in Japan and the U.S.



Zoltek (Mexico)

In 2014, Toray acquired Zoltek, the world's largest manufacturer of large tow carbon fiber products, of which wind power blades were the main application. The company had integrated production lines for everything from precursor to carbonization in both Hungary and Mexico. Toray doubled production capacity of the Mexico plant immediately after the acquisition, and since then has been further increasing capacity at both plants.

Without a prepreg production site in Europe, Toray established Composite Materials (Italy) S.r.l. (CIT) in Italy in 2015. It acquired an existing company's business and acquired shares in Delta-Tech S.p.A. (DELTA), making it a company subsidiary.

With a capital participation in Germany's Advanced Composite Engineering GmbH (ACE) in 2008, followed by a joint venture establishment of Euro Advanced Carbon Fiber Composites GmbH (EACC) with Daimler AG in 2011, Toray started producing composites in Europe. In the U.S., in 2013, Toray made a capital participation in Plasan Carbon Composites, Inc. (PCC), a Tier 1 supplier of carbon fiber reinforced plastic (CFRP) components for automobiles. Toray also built a new mass production plant at Carbon Magic (Thailand), Co., Ltd. (CMTH) in

Thailand, the production subsidiary of Toray Carbon Magic, Co., Ltd. (TCM) which it had acquired and established in Japan. Construction of the plant was completed in 2016.

In 2015, Toray and the Boeing Company signed a comprehensive long-term contract for the supply of prepreg to a new Boeing 777X program, in addition to the existing Boeing 787 program. Toray obtained new land in South Carolina to supply this contract. It decided to build a new integrated production line for everything from precursor to carbonization and prepreg, and it plans to gradually start production from 2018. At the same time, Toray merged CFA and TCA in April 2017 and launched a new company called CMA as part of a plan to further expand its business through centralized management of its three sites in the U.S.

- **Expansion of Water Treatment Business to Address Global Water Shortage**

While expanding its business in China, Toray established Toray Membrane USA, Inc. (TMUS) in the U.S. in 2006, and Toray Membrane Middle East LLC (TMME) in Saudi Arabia in 2014 through a joint venture, and started production of reverse osmosis (RO) membrane elements. Having also acquired TCK in 2014, the Toray Group had five



TMME (Saudi Arabia)

sites globally producing RO membrane elements—Japan, the U.S., China, Korea, and Saudi Arabia. Using these production sites, global sales and marketing sites including Switzerland's Toray Membrane Europe AG (TMEu), and its R&D

sites, Toray implemented an integrated global expansion to provide solutions for the world's water shortage.

- **Toray's Global Business Strategy**

When locating business sites overseas, Toray is implementing a global business strategy. This entails cycles of sustainable growth on a global scale, while applying the principle of putting down roots for the long term and contributing to the economic development of each country or region where it is located. Toray achieves sustainable growth by manufacturing both in Japan and overseas.

To do this, it follows a cycle of (1) Conducting innovative research and technology development in Japan to create advanced materials, (2) Building or selecting optimal overseas sites from various perspectives, including demand and cost competitiveness, and then expanding those businesses while meeting local needs, and (3) Reinvesting the profits into research and technological development of the next advanced materials and innovative processes together with Japan's *mother plants*.

Through these efforts, the Toray Group achieved consolidated overseas net sales of 1.1 trillion yen in fiscal 2016, surpassing 52 percent of the Group's net sales. As of March 31, 2017, it also had 156 consolidated companies in 25 countries and regions worldwide, excluding Japan. The number of Toray Group's overseas employees exceeded half of its total employees in fiscal 2001, with its overseas property, plant and equipment exceeding half in fiscal 2013, and overseas net sales exceeding half in fiscal 2014. Looking at these key indicators, Toray is truly a global company in both name and reality.