

Manufacturing Strategy

Feature

Implementing Automation Through Ingenuity and Innovation:

Expanding “Simple/Slim & Sensible Automation” from Thailand Globally



Since the establishment of TG Pongpara Co., Ltd. in Thailand in 1994 (renamed Toyoda Gosei (Thailand) Co., Ltd. in 1998, now a consolidated subsidiary), Toyoda Gosei has focused on manual labor-intensive processes to leverage Thailand's labor cost advantages. In recent years, however, labor costs in Thailand have risen significantly year by year, creating a need for streamlining production processes through automation.

At the same time, directly implementing automation technologies from countries like Japan or North

America—where automation is more advanced—into TGT has proven challenging from an investment efficiency perspective, as comparable benefits cannot be achieved. In response, TGT has implemented so-called “Simple/Slim & Sensible Automation” by leveraging its long-standing expertise in karakuri technology^{*1}, combining ingenuity and innovation to develop low-cost, energy-efficient mechanical solutions.

^{*1} Karakuri technology: Mechanical systems that utilize mechanisms without motors or other power sources

1. What Is “Simple/Slim & Sensible Automation”?

We focus on collaborative robots^{*2} which are relatively affordable compared to conventional industrial robots and are starting to gain widespread adoption. By combining these robots with karakuri technology, a field TGT has long worked on, we are advancing the development of processes that deliver benefits with low investment.

Specifically, we have designed processing tools (EOAT^{*3}) attached to the robots, as well as tool changers for automatic tool changing, to be lightweight, simple, and highly reliable. For supplying parts and transferring finished products after processing, we utilize shooters based on karakuri



technology. These have a simple design that does not rely on motors or cylinders for power. Also, for areas beyond robots, we are committed to in-house development and production, repeating cycles of trial and error to build and accumulate technical expertise.

^{*2} Collaborative robots: A type of industrial robot equipped with safety features that enable it to stop safely when operating near human workers. These robots can be integrated into the same workspace as humans once safety is confirmed.

^{*3} EOAT: End of Arm Tooling

2. Initiatives for Global Expansion

As global travel resumed in early 2023 following the end of the COVID-19 pandemic, we began expanding horizontally within the ASEAN region. In March 2023, we hosted the ASEAN Robot Summit.

At this summit, representatives from ASEAN sites participated in a factory tour at TGT, where they observed real-world examples of smart automation using robots in production environments. To provide further insights for implementation at their respective sites, participants also toured our development rooms, in-house equipment production shops, and the TPS Karakuri Dojo, where these solutions are developed.

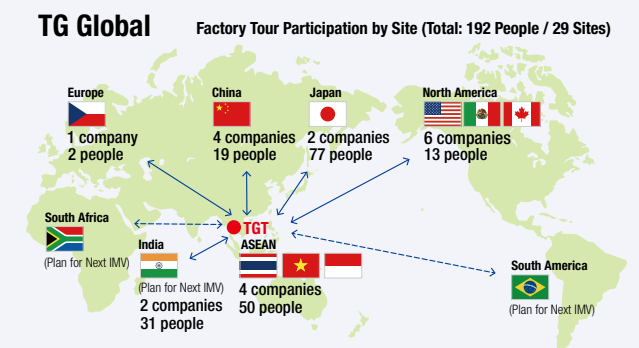
The knowledge gained from these efforts has been shared across TG Global. In regions with management environments similar to Thailand, such as India and Indonesia, where rising labor costs are a shared concern, these activities have led not only to factory tours but also to the acceptance of trainees (ICT^{*4}) for robotic automation education.

^{*4} ICT: Inter-Company Training

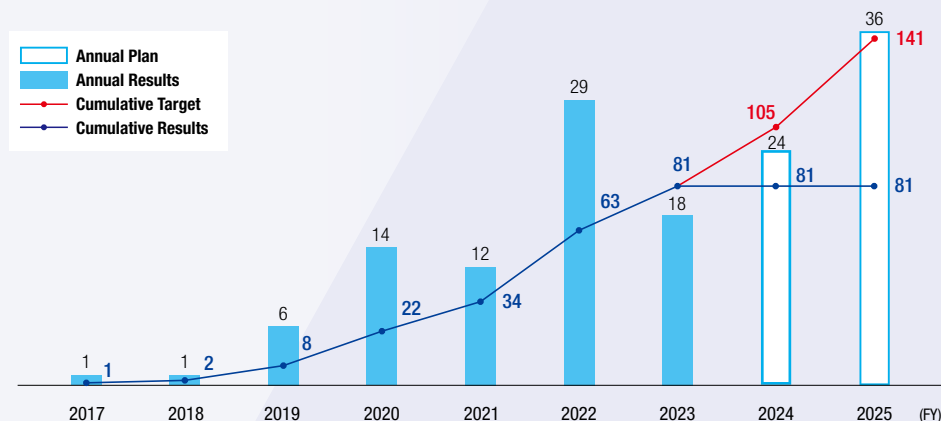
In November 2023, at the Global Summit^{*5} held in Japan, TGT's automation initiatives utilizing robots

were introduced. The positive response from this event led to an increase in factory visits to TGT from advanced automation regions such as Japan, North America, and China. As of May 2024, 192 individuals from 29 sites have visited Thailand to observe TGT's automation practices and experience firsthand the examples of smart automation driven by ingenuity and innovation.

^{*5} Global Summit: Held since 2013, this event brings together around 130 executives from TG Group companies to share insights on the current state of business, address common challenges, and foster stronger Group cohesion.



Status of Robot Automation Implementation at TGT



■ Cumulative Implementation Results (as of FY ended March 2023):
81 Processes, 91 Robots

■ Implementation Targets (as of FY ending March 2026):
141 Processes, 155 Robots



Chief of ASEAN Regional Headquarters Sadakazu Tani

Smart automation, which delivers results even in low-labor-cost regions, focuses on lightweight, simple, and highly reliable systems. The elemental technologies developed through this approach are applicable globally. As a Center of Excellence (CoE), we at TGT are committed to rapidly deploying these technologies globally while providing robust support and assistance.

I firmly believe that the connections forged among engineers at various sites through these initiatives will serve as the foundation for TG Global's integration as a cohesive and strong polymer organization, ultimately enhancing our position as a leading manufacturing company.