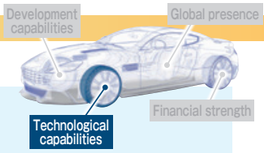


Special Feature

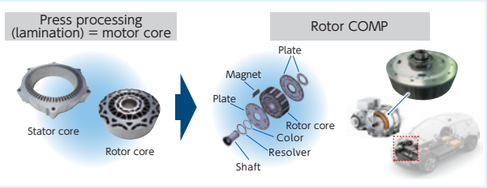
Preparing for New Businesses: Building Demonstration Lines

With the shift to EVs happening more quickly than expected due to factors such as climate change, G-TEKT has designated the establishment of EV-related businesses a management strategy and is moving forward with implementation.

New business

By leveraging the know-how we have cultivated over the years as a developer and manufacturer of vehicle bodies, we are proposing and developing platforms optimized for EVs, and working to enter new businesses related to EV batteries and electric powertrains. Electric powertrains is an area of business in which G-TEKT has not previously engaged, but because the main processing method is press processing, we leveraged the foundation enabled by our precision press technology and die manufacturing technology, received technical assistance from specialist manufacturers, and successfully deployed a demonstration line. We have set up lines for high-speed, high-precision press equipment and press fitting assembly, and are proceeding with verification in preparation for mass production, which includes trying out various facilities and dies. At this point in time we have already achieved production speeds that meet the industry standard, and going forward we will increase production speeds further, in addition to firmly establishing our original brand. We also plan to install wire-winding facilities going forward, with the objective of developing a whole sequence of powertrain technologies.

Moreover, we are moving ahead with the development of technology to allow the production of motor cores not only in Japan but also around the world, by making use of G-TEKT's global network. Basically we will deploy the same production style, but in order to deal with materials that vary slightly depending on the region, we will verify materials from each region on the demonstration line, so that it also plays the part of a global model line to allow deployment at other locations to be conducted smoothly.



300t press

Upstream of the press that stamps out the product is an uncoiler, which feeds the materials, and a sigmoid looper that removes kinks from the material and ensures correct positioning. The press can apply 300 tons of forming force, and can run at 80 to 410 strokes per minute. Because it is necessary to transport materials with high speed and precision, feeders are installed at two places, upstream and downstream. In contrast to the vehicle body dies we have handled in the past, a blanking die is used in the press to create the required number of layers, which are then laminated together. On the rotor side the structure within the die is rotated at each stroke while being swage and laminated together, while on the stator side the pieces are swage and laminated as a block without rotation, then extracted. Caulking and laminating is a processing method that requires a high level of precision in the die. In addition, the materials are designed so that they can be used without waste.

Transfer molding machines

Transfer molding machines are used to create the rotor subcomponents. Because temperature control is an important part of this process, the rotor, into which magnets have previously been inserted inside a furnace as part of advance preparations, and the resin are both heated to the required temperature. After preheating, heat is applied transfer molding machine and pressure is slowly brought to bear so that the resin fixes the magnets in place. After the completed subcomponent is fitted with shaft, resolver, plate magnets, and other parts in the press-fitting machine, it moves on to the balancing process.

Balancing machine

The rotor that rotates within the stator to generate propulsive force requires very fine balancing. The balancing machine is used to check for discrepancies in the center of gravity that arise in each process, and parts are machined as necessary. In this way adjustments are made to each individual product to complete the rotor core. Because all data for the extracted product is recorded, this simultaneously enables traceability management.

Reskilling of engineers

Due to our background in transmission product manufacturing, G-TEKT has precision press and die knowledge and know-how, but there were limits to what we could have achieved on our own in the production of motor cores, which is a new area for us. In order to receive technical assistance from specialist manufacturers, we therefore seconded our engineers to them with the aim of acquiring more specialized knowledge. Specifically, we seconded young employees from the production engineering division to each of the cooperating companies to absorb new knowledge, and to verify manufacturability and other factors through use of the actual equipment deployed. Going forward we will make use of technical assistance from specialists in preparation for acquiring further knowledge related to motors, and emphasize the development of human resources able to come up with original technology.

Sales strategy

Our view is that the rate of expansion for EVs will vary depending on the region, and our goal is to win business through careful timing of proposals. OEMs have begun development of next-generation BEVs. G-TEKT believes that body structures will be different than those that have been used until now, and that there is a possibility of radical changes in the vehicle body. In the development of the EV-related business, it is China, Europe, and North America that are leading the race. For that reason we are strengthening engineering functions that the Shanghai, Munich, and Detroit locations, and by establishing structures that enable us to respond promptly to customer needs and by sharing information on the requirements and strategies of each OEM, we seek to optimize both engineering proposals and regional strategy. In addition, because of new entrants in the area of electrical components, we expect competition to intensify. Despite this environment, by developing original technology and strengthening our proposal capabilities, obtaining the latest information from the constantly changing flow of data, and working together with other locations, beginning with the development divisions, we will move forward with preparations for proposals that will resonate with customers. We will target not only existing customers but also premium brands and mega suppliers in Europe and North America. We aim to secure volumes and expand the size of the business by proactively selling to the leading manufacturers in each region, steadily promoting our sales strategy with the objective of achieving ¥400 billion in net sales during the period of EV expansion projected for around 2027. In FY 2022 we received orders for seven different EVs. In Japan, in addition to the development of EV-related technology, the commercialization of the business as a whole and the provision of sales support are playing central roles in our sales strategy.

Gathering customer information to propose required new technology

Expanding sales with a focus on Japanese OEMs, European/North American premium OEMs, and major suppliers

Message from the front line

Commercializing the motor core business

In April 2022, I began receiving practical training at a specialized manufacturer's production sites for motor cores and dies. I was hurled into a world of high-speed, high-precision manufacturing that was very different than the production of vehicle body frame components at G-TEKT, and I came into contact with many approaches and ideas that contradicted the conventional wisdom of the operations in which I had been engaged up to that point. In some cases it was difficult to clearly grasp the principles underlying the things we learned, but by exchanging opinions with other trainees and asking for advice from those training us, we were able to acquire the basics that will become the central pillar of the motor core business. Leveraging the experience that we had accumulated over the 12 months or so that we spent on the production line, in February 2023 we began trials* to increase the speed of press production on the demonstration line that had been set up in an unused space within the Company. At first we encountered many difficulties and things did not go smoothly, but now we have gained a grasp on the key issues and are steadily increasing the speed. We also conducted trials using thinner materials to improve motor performance, and having successfully achieved lamination we have reached a level where we can mass-produce the product. The knowledge acquired in every trial led to an accumulation of know-how, and while recognizing that we are a late starter in the area of motor core manufacturing, we are taking on the challenge with a sense of urgency. While it has been very demanding, it has also been extremely satisfying to achieve results in an area in which G-TEKT had never set foot before, and we continue to tackle the issues.
Going forward, our objectives in preparation for the commercialization of the motor core business are to achieve the highest levels of press production speed in the industry, establish a mass production system with stable quality, and to derive competitive advantages by developing original technology. Everybody involved in this business is doing their utmost to move it forward, and to contribute to further growth for G-TEKT.

*"Trial" means a test that uses actual equipment

Production Technology Development Section, Engineering Planning Division, Engineering Operations

Satoshi Takahashi