Sakichi Toyoda

Three men were especially prominent in creating the Toyota Production System: Sakichi Toyoda; his son, Kiichiro Toyoda; and a production engineer by the name of Taiichi Ohno.

Sakichi Toyoda was the inventor of automatic looms who founded the Toyota Group. He invented a loom in 1902 that would stop automatically if any of the threads snapped. His invention opened the way for automated loomworks where a single operator could handle dozens of looms.

Sakichi's invention reduced defects and raised yields, since a loom would not go on producing imperfect fabric and using up thread after a problem occurred. The principle of designing equipment to stop automatically and call attention to problems immediately is crucial to the Toyota Production System. It is evident on every production line at Toyota and at other companies that use the system.

When the Toyota Group set up an automobile-manufacturing operation in the 1930s, Sakichi's son Kiichiro headed the new venture. Kiichiro traveled to the United States to study Henry Ford's system in operation. He returned with a strong grasp of Ford's conveyor system and an even stronger determination to adapt that system to the small production volumes of the Japanese market.

Kiichiro's solution was to provide the different processes in the assembly sequence with only the kinds and quantities of items that they needed and only when they needed them. In his system, each process produced only the kinds and quantities of items that the next process in the sequence needed and only when it needed them.

Production and transport took place simultaneously and synchronously throughout the production sequence — inside and between all the processes. Kiichiro thus laid the groundwork for just-in-time production, and he gets credit for coining the term "just in time."

The man who did the most to structure the Toyota Production System as an integrated framework was Taiichi Ohno. In the late 1940s, Ohno — who later became an executive vice president at Toyota — was in charge of a machining shop. He experimented with various ways of setting up the equipment to produce needed items in a timely manner. But he got a whole new perspective on just-in-time production when he visited the United States in 1956.

Taiichi Ohno

Ohno went to the United States to visit automobile plants, but his most important U.S. discovery was the supermarket. Japan did not have many self-service stores yet, and Ohno was impressed. He marveled at the way customers chose exactly what they wanted and in the quantities that they wanted. Ohno admired the way the supermarkets supplied merchandise in a simple, efficient, and timely manner.

In later years, Ohno often described his production system in terms of the American supermarket. Each production line arrayed its diverse output for the following line to choose from, like merchandise on supermarket shelves. Each line became the customer for the preceding line. And each line became a supermarket for the following line. The following line would come and choose the items it needed and

only those items. The preceding line would produce only the replacement items for the ones that the following line had selected.

This format, then, was a pull system, driven by the needs of the following lines. It contrasted with conventional push systems, which were driven by the output of preceding lines. Ohno developed a number of tools for operating his production format in a systematic framework. The best known of those tools is the kanban system, which provides for conveying information in and between processes on instruction cards.