

TOYODA TEXTILE MACHINERY BULLETIN

Vol. 7



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TOYODA AUTOMATIC LOOM WORKS, LTD.



A major currency crisis has affected a number of economies in Asia as well as companies that do business in the region. It has also caused uncertainty in the textile industry, and prospects look less than bright for fiscal 1998.

In spite of the difficult situation, we at Toyoda would like to continue to contribute to our customers' business success. To do this, we will once again refine and improve our manufacturing and service with the goal of providing superb products and after-sales care. By working with and for our customers, we would like to overcome this current economic situation.

I believe that we will start to see the economy make a recovery in the near future. In the meantime, Toyoda will devote all its energy to giving our customers satisfying products that meet the needs of the market.

The *Toyoda Textile Machinery Bulletin* has now been bringing you the latest information from Toyoda for three years. We look forward to hearing your opinions to help us make this an even better publication. I ask for your continuing patronage.

Tatsuo Matsuura
Managing Director and General Manager,
Textile Machinery Division

Weaving Preparatory Machinery Series—Part 1 Pioneering a new era in sizing **FILAMASTER EXPRESS**



Filamaster Express 610

1 Ultimate Sizing Quality at High Speeds

- The tension of the warp yarn sheet is controlled in real time by the AC vector inverter of the let-off and take-up sections. The machine's superb response with digital control provides precise operation at normal speeds as well as during machine acceleration, deceleration, and stoppage, thus assuring stable yarn tension.
- To ensure optimal stretch to the warp yarn sheet according to the yarn type—and maintain superb quality yarn during the drying process—the Filamaster Express 610 adjusts the revolution speed of the squeezing roller and drying cylinder. The machine measures the rollers' revolution speed and indicates the stretch in terms of the rollers' revolution ratio.
- With improved circulation of the sizing liquid that overflows from the front and rear of the size box, and a higher quality sizing liquid filter for the cavity box, bubbles are effectively prevented in the sizing liquid during high-speed operation, which can adversely affect the sizing quality. During high-speed operation, the sizing liquid level is lowered to prevent splattering. Two different circulation routes of sizing liquid remove impurities from the bottom to ensure a constant flow of pure, high-quality sizing liquid to the size boxes.
- A water-cooled wet dividing rod divides the warp yarn sheet immediately after sizing. The moisture on the rod surface prevents size waste from accumulating on it.
- Hot air is applied in and against the warp yarn sheet's running direction, and there are two continuous drying chambers, resulting in much higher drying capacity for the warp yarn sheet.
- The automatic temperature control system using motor valves adjusts the volume of steam and maintains a fixed temperature in the hot air chamber to ensure uniform drying of the warp yarn sheet regardless of operation speed.
- The heat in the hot air chamber is generated by a conventional steam

610

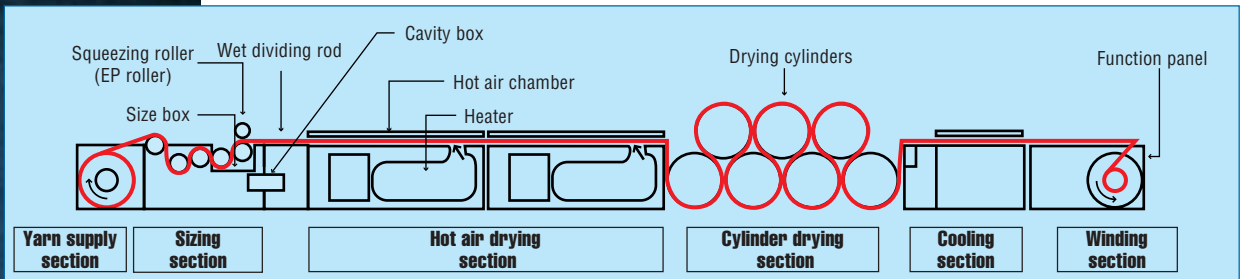


The weaving preparation process determines loom efficiency and fabric quality. And with loom speeds becoming faster, users are also demanding higher productivity in a sizer.

To answer our customers' requests for both higher productivity and better sizing quality, Toyoda has teamed up with Kawamoto System Corporation, a company with many years of experience in weaving preparatory machines. By combining the technological expertise of both companies, we've developed new weaving preparatory machines.

These new technologically advanced weaving preparatory machines boast superb response, digital control via AC vector inverter and, above all, high-quality sizing even at high speeds. In addition, these machines are operator-friendly, employing the same touch-screen function panels as our air jet looms and ring spinning frames.

We'd like to introduce the products in our new weaving preparatory machines lineup. This issue, meet the Filamaster Express 610, a single-end sizer from our filament yarn preparatory machinery series.



Mechanical structure of the Filamaster Express 610

heater as well as an electric heater. With this high drying ability, the temperature can be quickly increased as soon as the machine starts and during ultra high-speed operation.

- Per-block temperature control inside the cylinders maintains the quality of the warp yarn sheet.
- A specially designed EP Roller (Equal Pressure Roller) squeezes the center and edges of the warp yarn sheet uniformly, preventing irregular sizing of the warp yarn sheet, even during high-pressure squeezing.
- Synchronized control of the machine speed and the squeezing pressure enables the squeezing pressure to adjust according to any changes in operation speed, meaning stable sizing even during machine acceleration and deceleration.

2 Easy Operation

- The Filamaster Express 610 is equipped with a user-friendly touch-screen function panel. With the touch of a finger, the screen displays operating conditions such as take-up length, speed, and tension, allowing the operator to quickly confirm and adjust the settings.



Function panel display

- The machine stops automatically if a problem occurs during operation and shows the exact location of the problem on the monitoring display.



Monitoring display

- The temperature indicator records the temperature of six different points from among the size box, hot air chamber, and drying cylinder sections in a graph, giving the operator complete control over the quality of sizing.
- The circulation fan inside the chambers uses an inverter control system, which can automatically set the fan speed to match the operating conditions, to provide consistent, efficient drying and reduced energy consumption.
- The Filamaster Express 610 includes various safety features for the operator: covers over the high-pressure cylinders, which can become very hot during operation, as well as covers over the drive section and rollers, and an emergency stop button on the main unit.
- The Filamaster Express 610—the result of the same Toyoda technological prowess that built the JAT610, the world's best selling air jet loom, and Kawamoto's expertise in sizing machines. Our combined forces have developed a sizing machine that gives high-quality, highly productive sizing.

TOYODA FILAMASTER SERIES

Send for a Filamaster Series Catalog

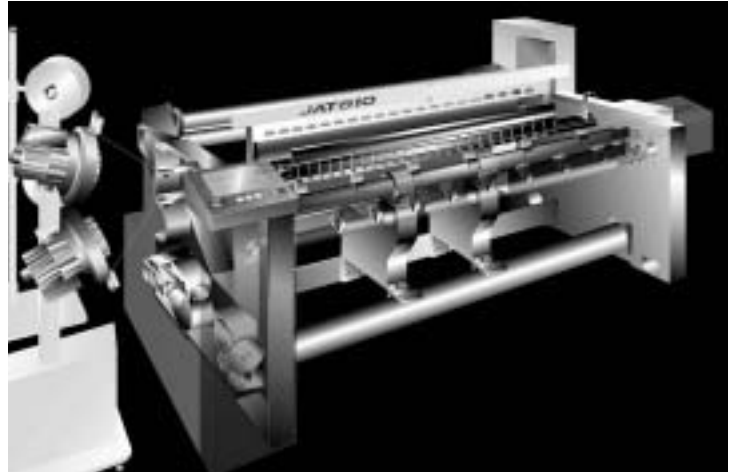
If you would like to know more about the TOYODA Filamaster Series, we would be happy to send you a detailed catalog about these superb products. The catalog also includes information on the FW1000 Warper, the FB300 Beamer, and creels which support high-quality sizing.

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JAT610 Air Jet Loom

User-friendly operation thanks to advanced electronics

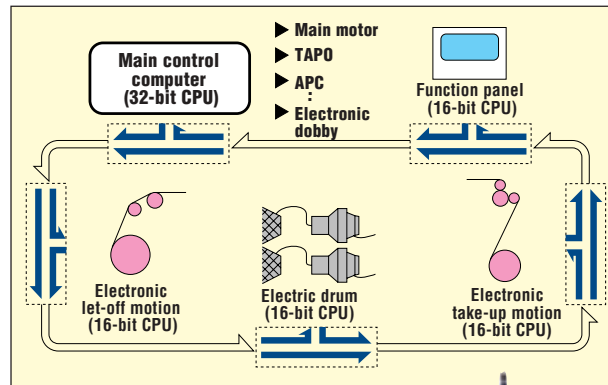
The versatile JAT610 Air Jet Loom is renowned for its energy efficiency and smooth, low vibration operation even at high speeds. It's also a machine that delivers superior operation in response to customer's requests for user-friendliness. In this issue, we introduce the JAT610's user-friendly operation system which is backed by leading-edge electronics.



(1) Reliable high-speed optical communication network

The JAT610 features a distributed control system centered around a 32-bit main CPU which controls 16-bit CPUs embedded in the loom's let-off, function panel take-up and weft insertion systems. Communication and data transfer between the CPUs is carried out by reliable optical communications which minimize electrical interference. Toyoda began using this system ten years before any other manufacturer.

Loom operating status and setting conditions input into the JAT610 are rapidly processed by the main 32-bit CPU. Instructions are then dispatched via fiber-optic links to the 16-bit CPUs embedded in each functional unit. Equipping a control CPU in each sub-unit also makes it simple and easy to add new devices and upgrade each function.



JAT610's Distributed Control System connecting respective functions



JAT610 Air Jet Loom

(2) Easy operation through a Touch-Screen Function Panel

The JAT610's condition settings, production monitoring and maintenance operations are all possible with the touch of a finger via the function panel.

1 Automatic Initial Condition Setting System (ICS) for easy preference setting

Simply input the fabric construction, and machine speed, etc., and the JAT610 automatically sets complex weft insertion conditions, warp tension and other important machine conditions.



Initial Condition Setting (ICS)

2 Trouble-shooting function for smoother operation

In the unlikely event of a problem, the function panel displays a simple explanation of the cause and location forwarded from each sub-unit over fiber-optic links, as well as recommended recovery procedures. The Function Panel display messages are available in eleven different languages.



Trouble-shooting

3 Weekly Efficiency Graph for a clear view of loom efficiency

The function panel can clearly display the loom's weekly operating efficiency in a graph. In addition, weekly operating data can be shown on a per-shift or per-day basis.

The function panel is also equipped with a wide range of additional functions, including a timing checker that displays information such as weft insertion timing, beam and cloth roll change estimation, fully automated centralized lubrication setting, and dobbie pattern setting.

Optical communications built on advanced electronics make the JAT610 Air Jet Loom user friendly with superb operability.

FL100 Roving Frame The Clearer Waste Collector (CWC)

The FL100 is now equipped with the Clearer Waste Collector (CWC), a new pneuma-less type fly cleaning device.

The CWC's Superior Features

1 Great power savings

While the conventional pneumatic suction cleaning device required a 3kW pneumatic motor, the CWC requires only a 25W motor to drive the belt. Users can save up to 18,360kWh per machine a year.

2 Easier operation and maintenance

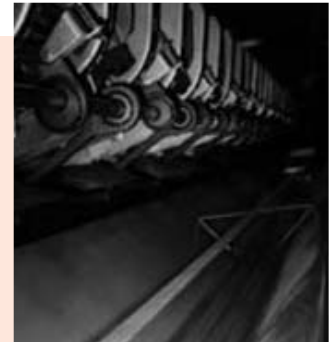
Without the suction duct, there is more space behind the roller part. This allows the operator to change the bottom clearer from the rear of the machine without breaking the roving yarn. It is also easier to operate and carry out inspections from the back of the machine.

3 High-quality roving

The CWC eliminates mixing fibers which get scattered throughout the plant by pneumatic exhaust air. Now, you can produce specialty materials such as new synthetic fiber without impurities getting mixed in.

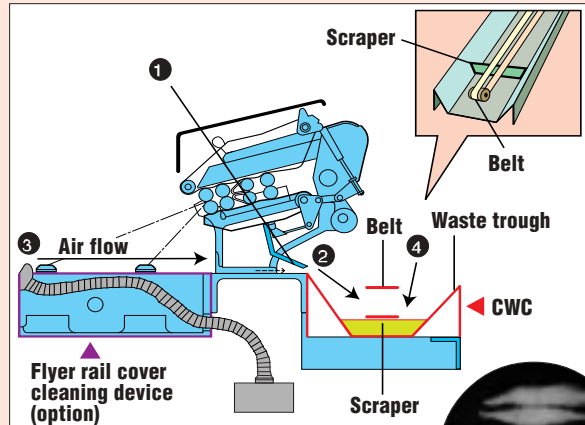
4 Superior factory environment

No pneumatic exhaust means no microscopic dust to get through filters and no exhaust noise.



Waste trough

How the CWC Works



- 1 Waste cotton collected on the roller part is sliced off by a sheet on the lower part of the comb, and is left as a long lump of fly.
- 2 Without being scattered by blowers or other air currents, these lumps of fly are deposited into a waste trough that runs from the gear end to the out end on the machine's back side.
- 3 The flyer rail cover cleaning device sends the fly on the flyer rail cover and roller beam into the waste trough.
- 4 From the trough, a positive drive waste conveyor belt carries the fly to the out end and into a waste container.



Waste cotton

Newly developed β 35 and β 42 Cradles for Ring Spinning Frames

To give our customers the very best ring spinning frames, we've followed up the original α 100 Weighting Arm with the β 35 Cradle (short cradle) and β 42 Cradle (medium cradle) for ring spinning frames. Both the β 35 and β 42 were released in March 1998.



β 35 (short cradle)

Main Features of the β 35 and β 42 Cradles

Smooth apron running

To improve the running of the aprons, we fitted the end of the cradle with a resin clip. This resin clip employs durable engineered plastics that reduce the friction coefficient. The smooth "R" shape of the cradle end allows improved running of the aprons and stable spinning.

Superb durability

We carried out repeated trials using precision measuring equipment to come up with a reliable construction giving a stronger cradle. A hardened steel plate on the body of the cradle further improves durability.



The β Cradle, with its reliable construction

β 35/ β 42 Specifications

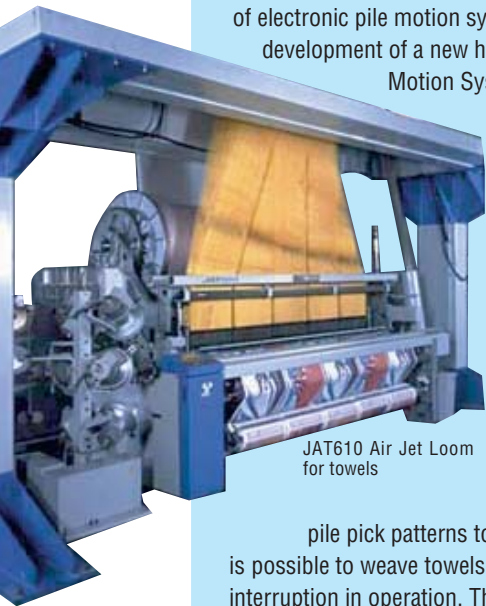
	β 35 short cradle	β 42 medium cradle
Applicable fibers	Cotton, mixed fiber (up to 40 mm in length)	Synthetic fiber (up to 51 mm in length)
Applicable arm	Toyoda α 100 SKF PK series	Toyoda α 100 SKF PK series
Arbor	SKF LP303	SKF LP303
Top apron	37.0 mm (inside diameter) 27.8 mm (width)	41.5 mm (inside diameter) 27.8 mm (width)
Spindle gauge	70 mm/75 mm	70 mm/75 mm

Technical Information

JAT610 Air Jet Loom for Towels New Electronic Pile Motion System



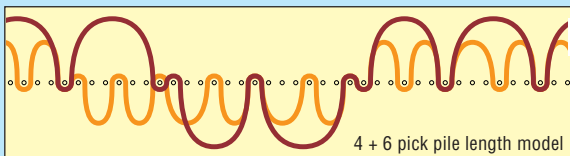
In today's textile industry, consumer needs change on a daily basis. This includes towels, for which the needs and desires of consumers are becoming increasingly diverse. Customers desire more ability to quickly adapt to the changing needs in a tough market and want to produce towels that stand out from competitors' products. In response, Toyoda devoted extensive R&D effort to the idea of electronic pile motion systems. The result is the development of a new high-performance Electronic Pile Motion System.



JAT610 Air Jet Loom for towels

This Electronic Pile Motion System made its debut at ITMA '95, in Milan. With ordinary mechanical motion, changing the pile length meant bringing the loom to a halt and making complex and time-consuming adjustments. This can now be done directly from the touch-screen of the function panel with the touch of a finger.

In addition, by inputting pile pick patterns to dobby or jacquard patterns, it is possible to weave towels with different pile picks with no interruption in operation. These features have led to a significant reduction in production losses resulting from the time required to halt the loom and swap pile motion cams, and so on. But it now also becomes possible to weave high-



4 + 6 pick pile length model

value-added towels with complex patterns that combine a variety of pile lengths and pile picks, and provide the ability to quickly respond to changing market needs.

The Electronic Pile Motion System freely changes pile length and pile pick by using a servo motor to vary the terry motion timing and amount. This servo motor responds to changing pile motions while bearing heavy loads from the terry pile motion. Toyoda applied its experience and technology resources on this challenge, and developed a smooth terry motion that puts a minimal load on the servo motor. The servo pile motion system can make changes in the pile length and pile pick freely and easily.

The Electronic Pile Motion System allows the operator to use the function panel to make minute adjustments directly to pile length to match towel specifications. Pile lengths can be adjusted over a range of up to 18 mm. Up to six pile pick changes are possible according to jacquard or dobby patterns. The JAT610 allows input of combined patterns containing up to 4 + 6 picks (total of 10 picks) in response to the input pattern during operation. These features simplify weaving new towel fabric such as those that have shearing and pile areas, or those in which a jacquard design floats through the pile.



Function Panel—"Pile Length" settings screen

In response to the rapidly diversifying textile market, Toyoda will continue to offer next-generation textile machinery designed to be welcomed by our customers around the world.

CUSTOMER SUPPORT & SERVICE

A Look at Toyoda's Global Service Centers

— Part 2: Turkey —

Istanbul Service Center

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To quickly respond to customer service needs, Toyoda's seven global service centers offer supplies and spare parts and carry out after-sales service. Each issue of the *Bulletin* will introduce one of these global service centers. In this issue, we'll take a look at the Istanbul Service Center in Turkey.



View of the Süleymaniye Mosque in Istanbul's Old City area

Turkey is one of the world's major textile producers. Its main production areas are located in three areas—the Gap/Marmara, Aegean Sea, and Anatolia regions. The Toyoda Istanbul Service Center is located close to the heart of the textile industry in Istanbul, which is in the Gap/Marmara region.

User Report

– Part 6 –

Kabool Uzbek Textiles

Republic of Uzbekistan

Uzbekistan, which in ancient times encompassed a strategic region on the Silk Road, is a country known for its harsh natural environment. It has a desert climate with snow in winter, but it becomes intensely hot with temperatures as high as 50°C in summer. Tashkent, the capital, has a population of 2.2 million and was the third-largest city in the former Soviet Union.

Kabool Uzbek Textiles, a joint venture of Kabool Spinning & Textiles Co. Ltd., a Korean company, and Uzbekegprom, the state-run industrial organization of the Uzbek Republic, has two mills, one in the city of Tashkent and one on its outskirts. The Toytepa Mill was the first to begin production in December 1996, and has installed a wide variety of Toyoda textile machinery, including 50 Toyoda RX-Series Ring Spinning Frames and 21 FL16 Roving Frames.



Exterior view of the Toytepa Mill



We interviewed Mr. Suh, the president of this venture project, and Mr. Kwon, the president of Kabool Uzbek Textiles and manager of the Toytepa Mill. This facility boasts spinning frames with over 100,000 spindles, and an annual production of 21,600 tons of cotton yarn and 14 million meters of cotton fabrics.



Mr. Suh

Interviewer:

What do you think of Toyoda textile machinery?

Mr. Kwon:

We are extremely satisfied with the technical level of Toyoda products.

Interviewer:

What are your plans for the future?

Mr. Suh:

We have been reinvesting the profits made at the Toytepa Mill, our first plant, and have now begun construction of our second plant, the Kukcha Mill. This new plant will be similar in capacity to the Toytepa Mill with about 100,000 spindles. We have already decided to purchase Toyoda spinning and roving frames for this new plant.

Interviewer:

Do you have any comments or requests for Toyoda?

Mr. Kwon:

Once the spinning frames are up and running, I would like to ask questions to the Toyoda technicians, including how to make adjustments to the programming using the control panel. I would also like to request that you provide on-going after-sales service on a regular basis.



Mr. Kwon with RX240 Ring Spinning Frames running in the mill

Istanbul is a prosperous city of 12 million people which in historic times was known as Constantinople, the capital of the Eastern Roman Empire. Touching the Sea of Marmara on the south and the Black Sea on the north, Istanbul is split across the middle by the Bosphorus Strait, which divides the city between Europe and Asia.

Our Istanbul Service Center has a staff of six—a resident representative, two local office workers, two local spinning service technicians and one local loom technician. The three service technicians make direct calls to customer facilities to provide guidance on installation and operation of Toyoda Textile Machinery. The Istanbul Service Center makes it possible to quickly respond to service requests by immediately visiting the customer's facility; a big reason our Turkish customers give us high ratings for service.

Loom Service Technician

Mr. Sedat



I joined Toyoda in November of 1996 with the goal of becoming an outstanding service technician who could solve a wide range of problems. I was accepted for training at the Toyoda Training Center in Japan where I learned advanced techniques from the experienced engineers I worked with. At present, I help our customers weave the highest quality products while maintaining high productivity. I'm close to our customers, and since I always provide service in a timely manner, I think they feel confident and secure in my hands.

The Istanbul Service Center plans to recruit and train talented new local service technicians. In addition, the Center supplies emergency spare parts and is setting up a system for rapid response to questions and problems that arise at customer facilities.

The “Toyota Production System”—Imbued with Resourcefulness ②

The current disarray in the currency and financial markets of various Asian countries began with the plunge in the value of the Thai Bhat in July of last year. This turmoil is having a profound economic impact on day-to-day business activities domestically as well as on trade internationally throughout Asia. Even to this day, the situation seems confused with no signs of recovery on the horizon. Nonetheless, even in such an environment, there are actually companies who have been steadily increasing their profits. Even in business sectors dealing in the same products, the differences between companies are becoming even more striking. What could the reason for this be?

Lectured by **Rikizo Naruse**

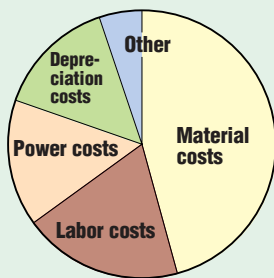
Rikizo Naruse joined Toyoda Automatic Loom Works, Ltd. in 1968. Based on concepts derived from the Toyota Production System, he constructed an innovative production control system for the Vehicle Division and Textile Machinery Division. He is currently the Sales Planning Office General Manager in the Textile Machinery Division's Sales Department.

In the last issue, I indicated that the goal of the Toyoda Production System was to “ensure profits.” We explained this using the formula **Price – Cost = Profit** and saw that businesses were able to grow by putting emphasis on “reducing costs.” Accordingly, this time we’ll discuss “Cost.”

First, I think it’s important to correctly grasp the concept of cost. Haven’t you ever had the experience that costs, which you initially thought were appropriate, got smaller when you re-evaluated materials or improved work. In fact, haven’t you ever questioned how much you could reduce costs, and also how much would be reasonable?

Basically, cost is structured for most companies as shown on the left diagram.

【Cost Structure】



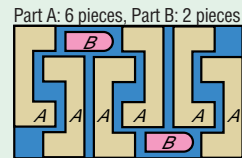
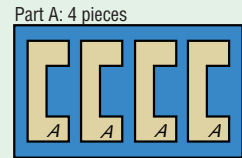
But why then do some companies make a profit and other companies do not? The reason is that there are major differences in what makes up these costs. For example, if the motor of a milling machine continues to run when it’s not cutting, power cost naturally goes up. For material costs, if you have enough material for today’s use, you can expect today’s operations to go smoothly without stopping. But there are some

companies that keep one or two month’s worth of materials in stock, and in extreme cases, a half-year’s worth. Naturally, they are paying money for storing that inventory in addition to the cost of the material. They must also consider deterioration and contamination of the materials, lost inventory, and even changes in designs that might render the materials useless. Plus, maintaining such an inventory creates the burden of inventory control and, if the volume increases, warehouse clearances. The number of transport operators, forklifts, staff and expeditors also increase. Naturally, basic costs such as materials, labor, and plant and equipment depreciation steadily rise.



Mr. Naruse pointing out the “waste”

The same situation can be seen in everyday routine work. As the examples at the right show, significant differences arise depending on whether one designs for yield, how one handles materials in terms of waste, and how one utilizes parts. Thus, these should all be considered production costs and figured into the selling price.



In this way, we calculate costs by including what may not necessarily be required. This is the true nature of cost.

There should be no difference between companies if they use the same materials, the same equipment, and the same methods.

Nevertheless, even when they purchase the same equipment, significant differences in costs arise between a company that concerns itself only with productive and economic lot sizes, resulting in inventory expansion and a huge product line versus a company that plans for changes in equipment programs and processing methods, minimizes lots sizes, and tailors their products to the market. In times of rapid economic growth, inventories deplete and loss is not an issue, but periods of low growth generate loss and expose corporate fundamentals. Of course, no manager wants to raise costs, but he simply thinks it’s necessary and does so without being aware of losses. However, that ignorance is having a major impact on how man labor is considered and how products and materials are handled, and almost imperceptibly, costs rise and the company is undermined. The Toyota Production System is a technique to uncover loss hidden under the mantle of cost, and by aggressively eliminating it, bring one closer to the true cost. Therefore, it’s important to know that:

Cost varies in diverse ways according to how it is understood and viewed. The Toyota Production System enables you to reduce costs.

If you want to reduce costs, you must have an eye for uncovering loss (which Toyota calls “waste”) and the wisdom to eliminate it.

So what is it that we call waste? How can we begin to uncover waste hidden in costs? Is there a dividing line between work and waste?

These are questions I’ll answer in the next issue.

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Please send your comments or questions regarding the *Toyoda Textile Machinery Bulletin* to any of the above addresses.

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About the Cover

Hydrangeas bear elegant blossoms during the rainy season in early summer. Amidst the gentle rain, the ever-changing color of the flowers and the rich green of the leaves provide a breathtaking scenery. The beauty of this plant is beloved by many, most notably Dr. Philip Franz von Siebold, a German physician who introduced modern Western medicine to Japan and gave the plant its botanical name *Hydrangea Otaksa* after his wife’s name.

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