SUCCESS STORY

PULP & PAPER

CORELEX SHIN-EI PAPER

FUJI CITY TM1 & TM2, JAPAN

ANDRITZ

ENGINEERED SUCCESS

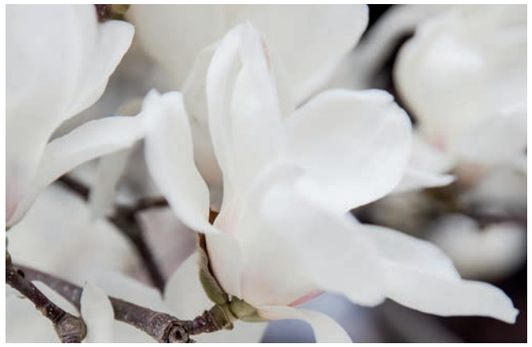
Gathering impressions – Fuji City, Shizuoka Prefecture

View of Fuji City's port of Tagonoura, with Mount Fuji in the background. © Hiroshi Ookura

Fuji City is located in the eastern part of Shizuoka Prefecture, between Tokyo and Osaka. It is the third largest city (in terms of population) in the Prefecture.

Shizuoka Prefecture is located approximately in the center of Japan on the Pacific Coast. It extends over 155 km from east to west and 118 km from north to south, with an area of 7,779 km . Boasting a variety of natural environs such as beaches, mountains, and lakes, Shizuoka is representative of Japan's rich beauty.

Despite its location on the southern side of Mount Fuji, Fuji City is not considered a tourist attraction, but rather a rapidly developing industrial city.



The region around Fuji City is famous for its nature and agriculture.

FUJI CITY – KEY FACTS:

- **Inhabitants: approx. 249,535**
- **Size: 245 km²**
- **Main industries:**
  - **various types of machinery**
  - **agriculture**

View of the Mount Fuji, Japan's highest mountain at 3,776 m. It is an active volcano that last erupted in 1707. © seejapan.co.uk

MOUNT FUJI

Mount Fuji, located on Honshu Island, is the highest mountain peak in Japan. The active stratovolcano lies approx. 100 km south-west of Tokyo and can be seen from there on a clear day. Mount Fuji's exceptionally symmetrical cone, which is snow-capped for several months a year, is a well-known symbol of Japan and is frequently depicted in art and photographs, as well as visited by sightseers and climbers.

Mount Fuji is one of Japan's "Three Holy Mountains" along with Mount Tate and Mount Haku. It was added to the World Heritage list as a cultural site in 2013.

RICH IN TEE

Shizuoka is the largest major tea-producing region in Japan. It produces about 40% of the country's tea. The region mainly produces sencha tea, the most typical Japanese green tea with whole leaves. "Sencha" can be translated as "roasted tea". This term refers to an older style of processing Japanese green tea. Today, most sencha is steamed instead of pan-roasted in its initial stage to prevent oxidation of the leaf. The quality of sencha will vary depending on origin, time of harvest, and leaf processing techniques. The early spring harvests, or first picking of the tea bush, are considered to produce the highest quality sencha.

The region is famous for its tea plantations. © Craig Hansen, shutterstock.com

Paper and tissue production
In harmony with the environment

State-of-the-art production with the maximum possible reduction of waste and a quasi-zero emission system.

Main entrance to Corelex Shin-Ei in Fuji City, Shizuoka prefecture

At the new mill in Fuji City, Corelex Shin-Ei produces light and heavy-weight toilet tissue and facial tissue.

THE CORELEX GROUP

The Corelex Group started as a machinery company, San-Ei Regulator, known today as Corelex San-Ei. In 1969, the decision was made to go into papermaking, and this was the beginning of Corelex Shin-Ei.

The Corelex Group today, headquartered in Shizuoka prefecture, has domestic operations in the Shizuoka, Kanagawa, and Hokkaido prefectures, as well as an overseas manufacturing site in Vietnam, and is involved in a variety of business activities, including the manufacture and sale of household paper products, like recycled toilet and tissue papers. In the toilet paper sector in particular, the Corelex Group boasts a large share of the domestic market due to its superior wastepaper recycling technologies and product development activities that have spawned original products such as its coreless range of toilet paper rolls.

CORELEX SHIN-EI

Today, the company makes toilet and facial tissue from recycled paper in Japan. There are also mills in Vietnam that sell toilet and facial tissue products to the local market.

"Our first product was Kurochiri, known as black tissue (although it was gray in color), because it was the simplest and the least expensive kind to produce," says Satoshi Kurosaki, President of Corelex Shin-Ei. "It was produced from recycled newspapers and magazines. No deinking, just a pulper and a tissue machine."

This machine was removed and a new tissue machine with a suction former was installed, with a maximum speed of 1,050 m/min and Yankee diameter of 12 feet (3.66 m).

"In 2014, we made the decision to consolidate our production into one greenfield tissue mill. There were financial incentives, as we were paying rent for the location of the old mill and we paid taxes for a location in Fuji City center. The new mill will work in conjunction with our Group's San-Ei mill in Tokyo to achieve the maximum possible reduction of waste and create a quasi-zero emission system."

Satoshi Kurosaki
President and CEO
Corelex Shin-Ei

The COMPACT twins Robust, efficient, environmentally friendly

Corelex Shin-Ei recently started up two identical ANDRITZ tissue machines at its greenfield mill near the base of Mount Fuji, 95 km from Tokyo. According to the President of Corelex Shin-Ei, the machines are "Robust. Efficient. Environmentally friendly. Easy-to-use."

THE BEGINNING

Corelex Shin-Ei's new greenfield mill is in Fuji City (eastern Shizuoka Prefecture), nearly at the base of Mount Fuji. It was constructed with three factors in mind: efficient production, the environment, and disaster management for the local region.

STRICT NOISE CONTROL

"We make every effort to adhere to all environmental requirements, and this mill has virtually zero emissions" Mr. Kurosaki explains. "The most challenging for us are the noise regulations. There is a residential district right next to our mill. We are not allowed to make more than 45 decibels of noise during night-time. For comparison, this is equivalent to the noise of a Toyota Prius hybrid car at idle." Due to the modern facility and practically zero emissions, the mill looks and operates like a modern office building. In addition, trees have been planted to maintain the aesthetic beauty of the area, where Mount Fuji dominates in the background with its snow-capped top.

The two identical *Prime*LineCOMPACT machines are designed for a speed of 1,800 m/min and for a paper width of 2.8 m.

"Steel Yankees are considered safer than cast iron due to the elasticity of the steel. We use state-of-the-art manufacturing methods to ensure safety and quality."

Toshio Okunishi
Group Manager
ANDRITZ Japan

OPEN FOR EMERGENCY RELIEF

The Pacific Ocean is only four kilometers away from the mill gate. Since Japan is vulnerable to earthquakes and tsunamis, the mill is purpose-built to sustain such forces.

Multiple steel stairwells provide access to the terrace surrounding offices upstairs. "The evacuation space is 28 m above sea level and is easily accessed," Mr. Kurosaki says. Corelex Shin-Ei signed a disaster management agreement with other entities, including the city of Fuji, so that the mill can serve as a refuge shelter for local residents if something happens. The offices can be quickly transformed into a civilian crisis center with sustainable reserves of food and water.

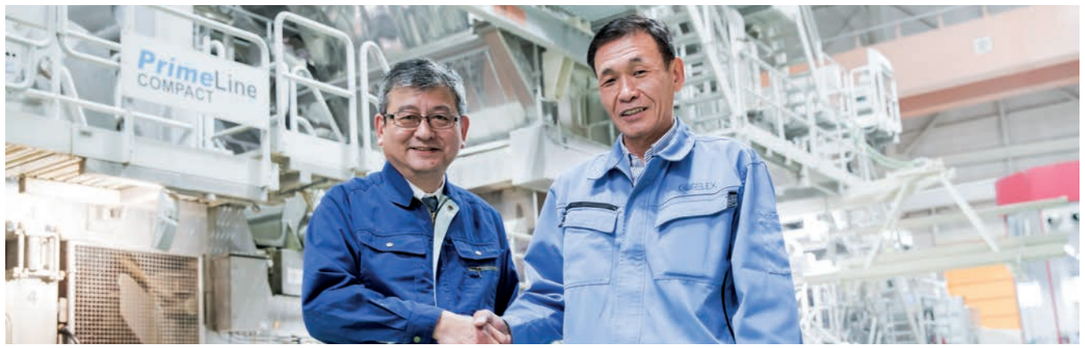
YANKEE – THE HEART OF A TISSUE MACHINE

"Before making the decision about the tissue machines, we visited several suppliers," says Takemi Tanaka, General Plant Manager. "We got a good reference for the ANDRITZ Steel Yankee delivered to Corelex Doh-Ei Paper, one of our group's companies, in 2012."

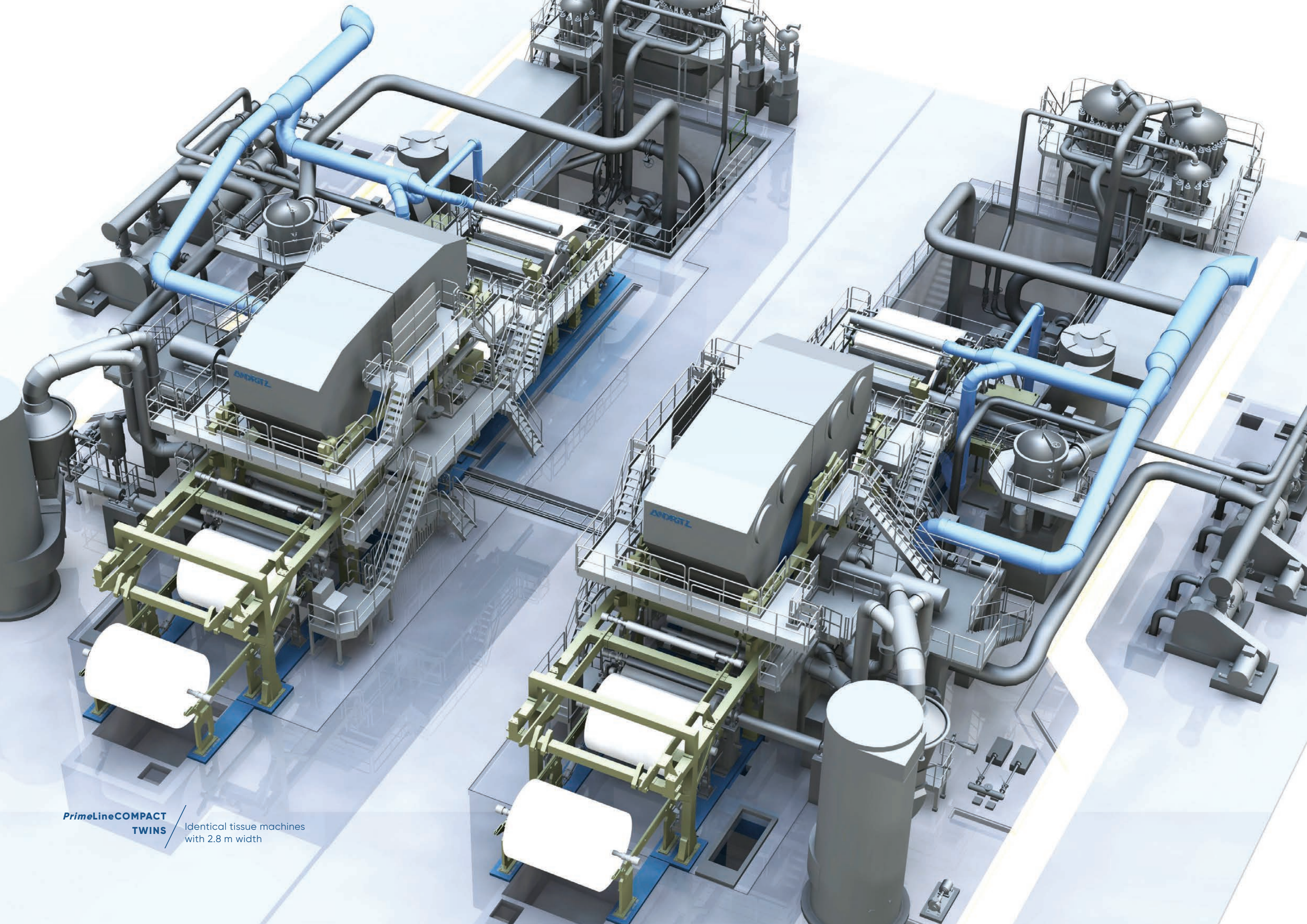
Doh-Ei Paper replaced a cast iron Yankee with an ANDRITZ Steel Yankee in order to get higher drying capacity and energy savings. According to Toshio Okunishi, Group Manager for ANDRITZ in Japan, the performance of an ANDRITZ *Prime*Dry Steel Yankee is better than the performance of a cast iron Yankee of the same size. "Steel Yankees have an evaporation rate 10-15% higher than cast iron, which results in 8-10% better throughput," Mr. Okunishi says.

DRYING UPGRADE AT DOH-EI

In 2011 ANDRITZ upgraded the drying line at Doh-Ei's Hokkaido mill. This included the installation of a Steel Yankee (3.7 m diameter, 4.3 m shell length) to help produce its 19,000 t/y of high-quality output. Mr. Kobayashi, Doh-Ei CEO, says: "The installation went smoothly and without any problems, and it took us only an hour or two after start-up until we had a quality product.



(l-r) Toshio Okunishi of ANDRITZ and Takemi Tanaka of Corelex



***Prime*LineCOMPACT TWINS**

Identical tissue machines with 2.8 m width

COMPACT solution – Cost efficiency with proven quality

ANDRITZ supplied two identical *Prime*LineCOMPACT tissue machines with Steel Yankees. For the new recycled fiberline, ANDRITZ also delivered two Speed Washer units and a CompaDis disperser.

The 2.8 m trim ANDRITZ machines have maximum design speeds of 1,800 m/min. They are equipped with *Prime*Dry Steel Yankees with 15 ft. (4.57 m) diameters. The machines produce high-quality tissue from recycled fiber for the production of core and coreless toilet paper rolls and facial tissue paper. The coreless tissue roll is a unique patent developed by Shin-Ei Paper.

"Our tissue machines have reached speeds up to 1,900 m/min (1,800 m/min design) on 100% recycled fiber. We can be proud of this, the fastest in Japan!"

Satoshi Kurosaki
President and CEO
Corelex Shin-Ei

According to Mr. Okunishi of ANDRITZ, the *Prime*LineCOMPACT machine design is ideal for customers who appreciate a standardized, modular approach. "The idea behind COMPACT is to combine cost efficiency with proven quality," he says. "The key to its cost efficiency is the level of standardization, which reduces engineering hours, manufacturing hours, installation time, and even transport costs. COMPACT ensures a certain production quantity and high quality in a streamlined, cost-effective package."

The highlights of the *Prime*LineCOMPACT machines at Shin-Ei Paper are the fully automated raw material handling and the Steel Yankees with head insulation to conserve energy. For each machine, a singlelayer headbox feeds stock to a *Prime*Form CrescentFormer which has a very high dewatering capacity. Whitewater flow from the former is controlled by special guide vanes so that the energy of the water jet is broken outside the machine. This improves the web section's housekeeping.

The press section consists of a single suction press to dewater while maintaining high product quality. Beginning at the creping doctors, the sheet run is equipped with threading and sheet support equipment.

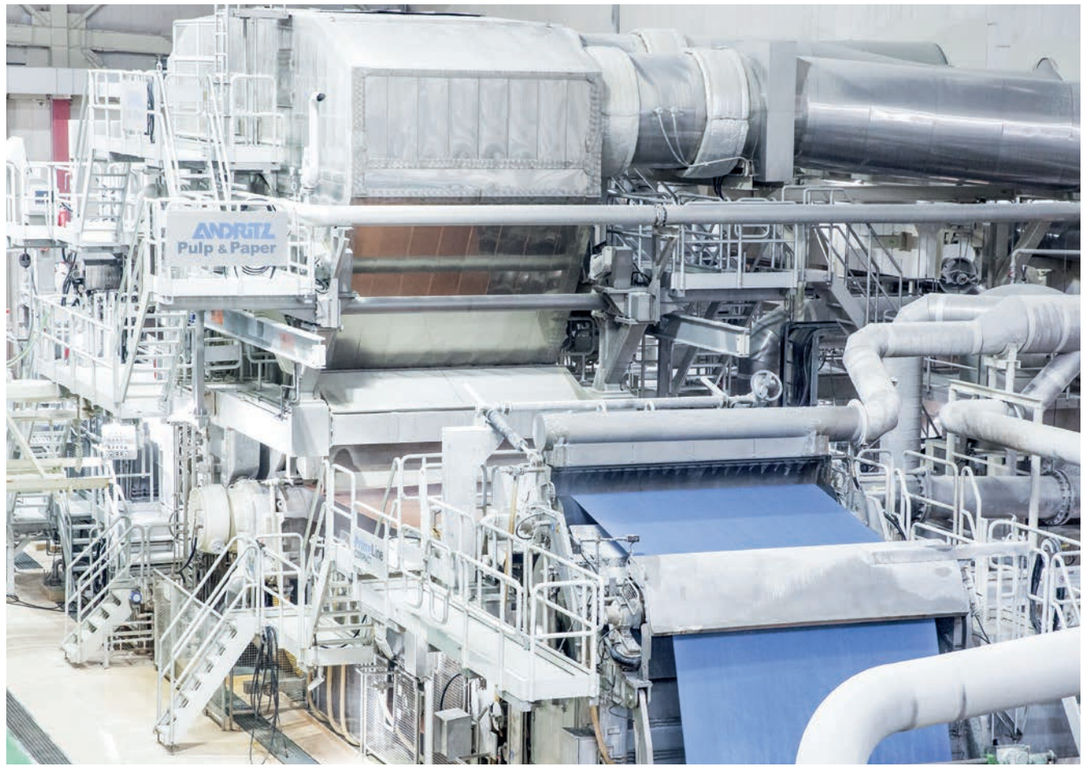
Head insulation around the Steel Yankee conserves thermal energy during the production process. Potential steam savings is in the range of 2-5%. In addition to energy savings, the insulation produces less contamination due to its even surface.

A NEW KIND OF "CONVERTING"

The raw material for the greenfield mill comes from areas within 150 km from Fuji (e.g. Tokyo, Nagoya, and Niigata). "Of course, we prioritize neighboring areas when collecting waste paper," Mr. Kurosaki explains. "These are mainly collected by third-party companies, but we pick up papers containing potentially sensitive information ourselves from local governments, because we have the clearance to do this work. Technically speaking, we are converting discarded government documents into disposable tissue!"

_Prime_LineCOMPACT: POSSIBLE ENERGY-SAVING FEATURES

- ShortFlow and approach flow with double dilution
- *Prime*Press XT Evo shoe press with 20% less drying energy
- *Prime*Dry Steel Yankee with head insulation with up to 8% less steam required
- Steam hood to reduce energy costs



Both machines are equipped with *Prime*Dry Steel Yankees for energy-efficient drying.

Every project has challenges. "There were some delays during erection, but I appreciated ANDRITZ's effort to resolve the issues thoroughly," Mr. Tanaka says. "We put our heads together and arrived at the right solutions, and worked cooperatively through the issues." "Every problem is an improvement opportunity," Mr. Kurosaki says. "Sometimes we feel that European suppliers could be more flexible with some details. Their approach – which is maybe a cultural difference – might be a reflection of the confidence they have in their excellent technologies."

When the new mill went into operation, several old tissue machines were shut down and their production has been integrated into the two high-performance tissue machines.

SUCCESSFUL START-UP

Start-up of the twin ANDRITZ machines took place in spring 2015. Since then, the machines have reached speeds up to 1,900 m/min (1,800 m/min design) on 100% recycled fiber. "We can be proud of this, the fastest in Japan," Mr. Kurosaki says. "The machine in San-Ei's Kawasaki mill runs up to 1,600 m/min, and machines producing toilet tissue with virgin pulp in Japan are also running at 1,600 m/min." The grade mix for the two machines is split such that TM1 produces heavier weight toilet tissue, while TM2 produces lighter weight toilet and facial tissue products. "In addition to the speed, we are producing high-quality products from lower quality raw materials," says Mr. Tanaka. "With ANDRITZ tissue machines, we are running at the highest speed level in Japan, even utilizing recovered fiber. It is amazing. I say with pride that we are the most vibrant company of our size, and we will keep developing." Mr. Tanaka has a very high opinion of the user-friendliness of the *Prime*LineCOMPACT machines. "The functionality of the automation systems is excellent," he says. "Everything is digitized and PLC controlled. The line is very easy to operate, even for new or inexperienced employees. We have only three operators per shift, thanks to the advanced ANDRITZ automation."

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