

issue 55
June 2022

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**HOW CAN CEOs
NAVIGATE THROUGH
TRANSFORMATIONAL
CHANGE?**

**BEYOND COVID-19:
THE NEW CONSUMER
BEHAVIOR IN THE
TISSUE INDUSTRY**

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02 Around the world

06 In the Spotlight

Perspectives on paper and forest products in 2022: How can CEOs navigate today's era of transformational change?

12 Industry Issues

Beyond COVID-19: The new consumer behavior is sticking in the tissue industry

16 Technical Solutions

16 Matching your packaging needs for the Disposable Hygiene market: Efficiency, packed!

20 A.Celli EvoLock® the innovative solution to improve the performance and reduce the inspections of a Yankee Dryer

24 The growth of the ANDRITZ steel Yankee

30 100% Carbon-Fiber expanding shaft allows both faster max speeds and acceleration/ deceleration

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BELGIUM

EDANA celebrates 50th Anniversary amid praise for sustainability efforts and consumer protection

EDANA celebrated its 50th anniversary as the voice of the nonwovens industry with a major event in Brussels on 28 April, the Nonwovens Get-Together attended by over 280 EDANA members, policy makers and other stakeholders.

“The event was not only an opportunity to celebrate 50 years of relentlessly advocating the many benefits nonwovens bring to society, as shown in the last two years during the pandemic. It was also a chance to further emphasise how this dynamic industry continues to innovate and drive sustainable development,” said Mikael Staal Axelsen from Fibertex Personal Care and current chair of EDANA.

“We were delighted to receive a clear acknowledgement and endorsement by the European Commission of EDANA’s past efforts in supporting its member companies’ compliance with product safety requirements through Codes of Practice that establish state of the art guidelines for consumer information, such as our 2001 code for tampons for instance,” said Luminita Barbu, Regulatory Affairs Director at EDANA. The event was an opportunity to honour both EDANA’s long history of successful collaboration with its members and to highlight how the industry has evolved over the course of the past half century.

It included an immersive exhibition highlighting the many ways by which innovation in the nonwovens industry has enhanced citizens’ lives by ensuring safety, protection, hygiene, convenience and comfort.

The exhibition also showcased the industry’s commitment to sustainability and included numerous examples of how nonwoven products and solutions are raising the bar on sustainability. It highlighted how nonwovens can play an important role in the circular economy by, for example, facilitating the uptake of circular raw materials across the entire value chain.

The Nonwovens Get-Together also served as the official closing of EDANA’s Nonwovens You Say? Campaign, a 19-month initiative that successfully raised awareness about the everyday uses of nonwovens and highlighted the industry’s commitment to sustainability.

Ontex supports Woosh to make diaper recycling a reality in Belgium

Ontex Group NV continues to provide recyclable diapers to support Woosh, a Belgian startup that aims to make diaper recycling a reality in Ontex’ home country. Ontex helped launch the startup and continues to support the company with products and expertise as it grows.

Woosh now delivers recyclable, disposable diapers and collects 7 tons of used diapers per week from more than 200 day care centres in Belgium with more than 5,200 children and plans to expand the service to more than 1,000 day care centres by 2024. Together with waste companies Woosh aims to set up the first diaper recycling facility in Belgium. “At Ontex, we aim to reduce our environmental footprint throughout our value chain. Diaper waste is the critical point in the value chain that we need to address, including in our home country Belgium. That is why we helped to launch Woosh and support it”, said Joel Santos, Vice President, Strategy, Ontex.

The collection of used diapers is the first critical step in establishing the process for large-scale diaper recycling. Together with waste management partners willing to invest, Woosh wants to set up the first diaper recycling plant in Belgium. The diaper waste will be recycled into new raw materials. Until critical mass is reached the diapers will be collected and incinerated. “We want to move from incineration to diaper recycling as quickly as possible and are working with several partners, including the government, to make this happen”, said Jeff Stubbe.

“This project contributes to the ambitions to make Belgium and the Flanders region a recycling hub on a European and global level. In addition to asbestos waste and plastics, diaper waste is a priority for the Flanders Region,” said Jeff Stubbe.

Ontex collaborates with Woosh and other recycling companies to make its diapers more recyclable. Ontex supplies recyclable diapers from its Little Big Change subscription brand to Woosh, which handles distribution. Through the project Ontex also aims to reduce its Scope 3 emissions by replacing incineration of used diapers with the reuse of raw materials. The company aims to be carbon-neutral (scope 1&2) by 2030 and has reduced its Scope 1 & 2 emissions by more than 40% between 2020 and last year.

ITALY

Microline and Renova partner for the installation of a roll and tissue product packaging plant

Renova chose Microline to develop a complete roll conveyance, flow wrapping and case packing system. Installed at the headquarters of the Portuguese company, the line boasts a high level of productivity and great flexibility. The project is the latest step of a partnership between the companies established almost twenty years ago.

Microline products were first installed on Renova premises in 2007, from a design perspective the partnership between the two countries is already two decades old. Over the years, 16 machines have been installed in the Portuguese factories, in addition to a number of auxiliary systems such as conveyor belts, unscramblers and orienters.

The most recent installation in Renova's factories was carried out at the start of this year and regarded a line consisting in a Fast Wrap 1250 bundler – Microline's top model - and a ROM600Maxi case packer. The line also includes a stacker, an upender, a summator and a divider, as well as a complete product handling system, all designed and manufactured by Microline. The line is characterised by high performance and flexibility: in addition to the various product sorting and machine use options, the individual units are able to handle a variety of different collation patterns. The conveyors are provided with a synoptic supervision system for the control and optimisation of the entire line.



Microline and Renova machines

SWEDEN

Sofidel tissue machines to use bio-syngas in drying – a first in the tissue industry

ANDRITZ has signed an agreement with the Sofidel Group to upgrade hood technology at its Kisa tissue mill in Sweden. The ANDRITZ equipment will enable Sofidel to use renewable gas (bio-syngas) to dry tissue or any other type of paper. This is the first-time that bio-syngas will be used in the paper industry for paper drying. Start-up is planned for the first half of 2023.

In order to be able to switch the heating process from the LPG (Liquefied Petroleum Gas) currently used to burn bio-syngas instead, the burners at PM3 and PM4 in the Kisa mill will be replaced and the combustion chamber in the hood of PM3 will be upgraded by ANDRITZ Novimpianti. This will ensure a uniform flow of gas and thus enable effective and consistent tissue drying. Once the upgrade has been completed, PM3 will use 100 percent bio-syngas for paper drying, while the PM4 burner will be partially fueled by bio-syngas.

This investment is part of Sofidel's goal to reduce CO₂ emissions by 8,500 tons annually. The bio-syngas used for the heating process will be generated in a thermochemical conversion plant on the Kisa site, using locally-sourced woodchips as biofuel.

ANDRITZ Novimpianti's role at Kisa is based on its many years of experience with air and energy systems for tissue, paper and board. ANDRITZ Novimpianti Managing Director Luca Linari says: "This is the first time that bio-syngas will be used to dry paper and represents a significant step towards the entire paper industry becoming more sustainable. And ANDRITZ is very proud to support Sofidel in its initiative to reduce CO₂ emissions."

Sofidel Chief Technical Officer Davide Mainardi says: "The adoption of bio-syngas at Kisa is a major feature on our sustainability roadmap. This initiative with ANDRITZ Novimpianti, Meva Energy and the University of Pisa brings concrete benefits that will yield results within a relatively short time frame. It will also help give us confidence that our interim goal of a 40 percent reduction in CO₂ emissions by 2030 compared with the base year 2018 is achievable with technology already available."

SWEDEN

Södra invests SEK 200 million in innovative companies

Södra is launching a major initiative to develop family forestry. Södra will invest in innovative companies that introduce new technologies for forest estates and enable a more multifaceted approach to family forestry.

Södra's mission is to create markets for the products of its members' forest estates – today and in the future. Södra will harness the opportunities created by technological advances and bring new know-how closer to forest estates. Södra has formed a new subsidiary, Södra Ädla, to strengthen these efforts – an investment partner focused on the future of family forestry.

Södra Ädla will invest in innovative companies whose business concepts provide direct support for the development and profitability of forest estates and enable a more multifaceted approach to family forestry.

“Development is part of family forestry's DNA and forest estates have long been an innovation arena. With this initiative we are continuing to build on this history. By investing in innovative companies, we will attract new technologies to forest estates and create more business opportunities for Södra's 52,000 members. With Södra Ädla, we will lead the development of small-scale forest ownership, provide opportunities for members to broaden their activities and strengthen the value of forest estates,” said Lotta Lyrå, President of Södra.

Södra Ädla will invest SEK 200 million in a range of innovative companies that are facilitating or broadening forest ownership through new products and services. The areas of interest range from new products and services to digital solutions – provided they develop or facilitate small-scale forest ownership.

“Family forestry is diverse and new technologies have a huge potential to unleash new opportunities. We are looking into new biodiversity services, improved forest management methods and various financial services. We will spend a lot of time evaluating business models and the potential for impacting our members' forest estates. We have an exciting time ahead of us,” said Erik Bengtson, Investment Manager for Södra Ädla.

Over the next few years, Södra Ädla is aiming to make 20 company investments and contribute to the commercial development of these companies. As an investor, Södra Ädla will play an active role and contribute expertise in family forest ownership that has been accumulated over many years.

“We want to be an active investor by contributing to the development of these companies through our connection with 52,000 family forest owners in Götaland, a world-class industrial structure and more than 80 years of experience in small-scale forest ownership,” said Bengtson.

USA

PFNonwovens chose A.Celli technology for its new investment in North America

PFNonwovens has commissioned a new nonwovens specialty line at its center of excellence in Hazleton, Pennsylvania. This line includes multiple A.Celli nonwovens equipment components.

The production line, developed with Reicofil R5 technology, is equipped with A.Celli solutions like:

- E-WIND® WAVE Master Roll winders
- E-WIND® SUPER SONIC slitter rewinders with COREMATIC EVO technology

All this enhanced by A.Celli R-WAY® solution for automatic roll handling and packaging equipped with A.Celli's Label Verification System, an upgrade for packaging systems with the objective to verify, by reading the labels applied to the reels and bundles, the consistency between the processes carried out by the packaging line and the actual end result of the process in terms of correct composition of each bundle.

“We are the first to invest in the latest R5 machinery in the US. This investment, in combination with our unique proprietary technology, allows us to produce consumer-preferred ultra-high loft, soft and textured nonwoven fabrics. This solidifies PFN's position as a global leader in the production of innovative spunmelt nonwoven fabrics.” said Shane Vincent, PFN Chief Commercial Officer.

PFNonwovens is a leading global producer of customized nonwoven fabrics for innovative products across multiple key markets (Baby Care, Medical, Adult Incontinence and Fem Care). The company is headquartered in Prague, Czech Republic, and operates five production plants worldwide: two in the Czech Republic, and one each in the United States, Egypt, and South Africa.



PFNonwovens chose A.Celli technology for its new investment in North America

VISION

Winding and unwinding
perfect reels with
maximum efficiency

MISSION

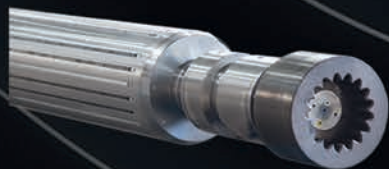
Create user friendly,
innovative and highly
customizable winding
and unwinding systems:
expanding shafts,
chucks, safety chucks
and handling systems

VALUES

Honesty and integrity
Constant work for
customer satisfaction
Respect and recognition
of people's value

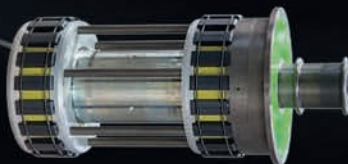
MOD. 640 PQL POPE

Pneumatic expanding
shaft with ledges
for non-stop machines



MOD. 714 MZ-L

Pneumehanical
chuck with leaves



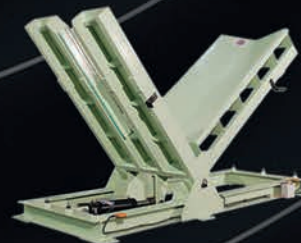
MOD. 200

Single column
shaft puller



MOD. 700

Tilting table



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They're in our DNA.
Which is why, even in the face of uncertainty,
we will be there. We'll be there with a safe edition,
designed to help you concretely experience the best
technologies displayed by the Tissue Italy Network.
We look forward to seeing you there!



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NOW!**

it's tissue!

THE CONVERGENCE
OF TISSUE
EXCELLENCE

NETWORK MEMBERS



GLOBAL PARTNER



MEDIA PARTNER



MAIN PARTNER



SUPPORTING PARTNER



PERSPECTIVES ON PAPER AND FOREST PRODUCTS IN 2022:

How can CEOs navigate today's era of transformational change?

David Feber, senior partner, McKinsey, Detroit

Felix Gruenewald, associate partner, McKinsey, Zurich

Oskar Lingqvist, senior partner, McKinsey, Stockholm

Daniel Nordigaarden, partner, McKinsey, Toronto

Gregory Vainberg, senior partner, McKinsey, Montreal

Three eras of disruption have been reshaping the paper and forest products sector. In this latest era of profound change, CEOs must focus on the imperatives of digital and global sustainability.

Major, rapid change in the paper and forest products industry is nothing new. A hundred years ago, wood for fuel was the main product from forests; over time this transitioned into pulpwood and sawtimber. Today, forest products play a key strategic role for customers across a range of areas, and consumers are surrounded by products that are fully or partially from the forest industry, from wood for housing to packaging products to newspapers and magazines. Forest products have played a crucial role for customers during the COVID-19 pandemic (for example, as tissue products for the health and hygiene sector, as raw materials in the production of facemasks, and as corrugated board for e-commerce packaging as consumers transitioned to work from home). Going forward, forest products are emerging as real alternatives to help address sustainability challenges in textiles, building materials, and packaging.

In recent decades, however, the pace of change in the industry has accelerated, with more and more frequent disruption outpacing development. To help CEOs navigate the ongoing changes over the next decade, we have identified three eras of substantial change since 2000, with the current period emerging as the most transformative (Exhibit 1).

Era 1: Global moves (2000–10)

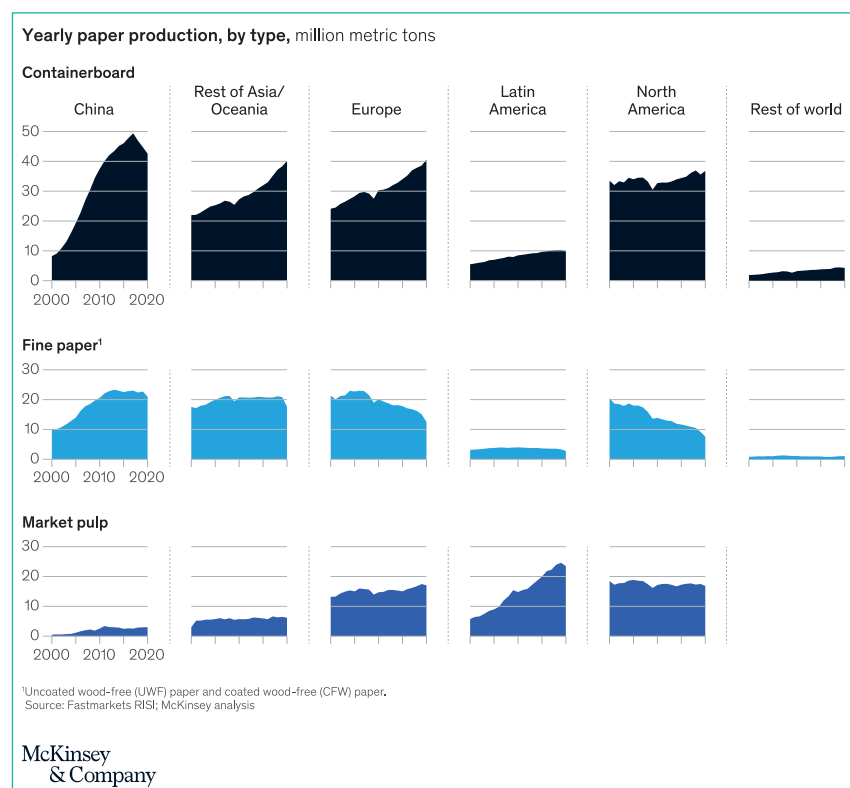
The first era of change in the paper and forest products industry was characterized by global shifts, with several megamergers and production changes, as well as the rise of large Asian corporations. This period was also characterized by geographic shifts in pulp and paper production, with scale-up of greenfield capacity in new regions: in the east for paper (particularly in China) and south for pulp (Exhibit 2). As a result, the industry experienced strong growth among Chinese, other Asian, and South American market participants, which went on to develop into major players. As a counterbalance, several megamergers occurred in Europe and North America, with an ambition to create truly global corporations.

Exhibit 1: Three eras of disruption have reshaped the paper and forest products industry.

Recent eras, approximate time periods		
Global moves: 2000–10	Forced restructuring: 2010–20	Transformational change: 2020–30
<ul style="list-style-type: none"> Geographic shifts in pulp and paper production: <ul style="list-style-type: none"> East for paper and packaging (China) South for pulp (Latin America) Subsequent growth among Chinese, other Asian, and South American market participants Megamergers in Europe and North America in bid to create truly global corporations 	<ul style="list-style-type: none"> Demise of graphic paper Closures and conversions Focusing on core businesses China's influence on world markets (eg, recovered paper, pulp) Innovation agenda (but little commercialization) 	<ul style="list-style-type: none"> Extraordinary disruption amid sustainability, e-commerce, and COVID-19 pandemic New products coming of age (commercial stage) Sustainability in construction Climate change and biodiversity affecting forest usage and regulation Climate risk in operations and sourcing Digital acceleration

McKinsey & Company

Exhibit 2: Since 2000, the paper and forest products industry has witnessed major shifts in production focus across regions.



Era 2: Forced restructuring (2010–20)

The second era of change witnessed the demise of graphic paper, accompanied by a heavy focus on a forced restructuring of the pulp and paper industry, with asset closures and mill conversions. This was a challenging era for the industry: substantial decline in demand for graphic paper prompted companies to shift their assets into packaging and tissue capacity, but the period was also characterized by mill closures. To manage this market phase of forced restructuring, several global diversified pulp and paper corporations were also

engaged in divesting adjacent business areas and exiting some geographies to focus back on their core businesses.

During this period, China strongly influenced the industry: for example, environmental concerns and trade policy led China to intensify restrictions on imported recovered paper, resulting in increased demand for virgin pulp globally, with large capacity additions. In this era, we witnessed a growing appetite for innovation in the industry but very little successful, large-scale commercialization. Despite a shift in the economic center of the industry, the

same European and North American companies remained within the industry top ten, albeit with continued focus on consolidation (for example, in the containerboard market).

Era 3: Looking ahead— transformational change (2020–30)

The 2020s, however, are ushering in a very different type of change. This third era of transformational change will be characterized by the next wave of industry disruption—digital and analytics—coupled with increasing efforts in sustainability. Unlike other industries, such as energy, demand for current paper and forest products is structurally increasing (for instance, as a substitute for packaging and construction materials)—hence the next level of disruption will involve an increase in productivity and output combined with a sustainability-led transformation.

In addition, some permanent behavioral changes (such as the increase in online shopping) and new environmental regulations—especially post-COVID-19—are likely to accelerate during this period, causing further disruption. This will make it harder for pulp and paper companies to plan reliably without taking preemptive action. To preserve value and capture growth in this revolutionary era, we recommend four priority areas for any leading pulp and paper company to address, regardless of region or focus.

How should CEOs think about the transformational change in this decade?

The immediate future of the paper and forest products industry will be characterized by two principal dimensions of change: sustainability and digital and analytics. Although these are overarching dimensions, several specific megatrends are also influencing them (see sidebar, “Transformational change unlike any other”). In addition, three key external forces are directly affecting this scenario: the repercussions of the COVID-19 pandemic, new value-chain dynamics (for example, the shortage of wood products such as timber has resulted in stronger regional trade and more protectionism), and the regulatory environment (such as packaging- waste

regulations). These external factors are likely to have a greater influence on the industry than ever before. As the implications of these factors unfold, it will be vital for CEOs to understand them and respond proactively.

Sustainability

As in nearly every global industry, there is a significant sustainability revolution under way in the paper and forest products sector, with the rapid emergence of new regulations and global consumer concerns.¹ This phenomenon is creating growth opportunities for the industry to serve as a substitute for other substrates such as plastics. Notably, our global consumer surveys indicate that paper-based packaging ranks quite high for sustainability both in the United States and among surveyed European countries.² Similarly, wood-based textile and building materials are the focus of increased interest and growing demand. Meanwhile, more products are competing for forest raw materials (for example, textiles based on alternatives to cotton and other materials, which are boosting demand for dissolving wood pulp).

Simultaneously, the industry is faced with critical questions about its core resource, as climate change and biodiversity concerns affect forest usage and spur regulations. Forest biomass has traditionally been seen as a net-zero asset in terms of CO₂ emissions because the source is biogenic; however, in relation to forests, this interpretation is increasingly being questioned. Regulatory policies that are expected to be implemented within the next few years are likely to favor forest products that enjoy extended usage: for example, wood construction over pulp and paper, which in turn is preferred over biofuels. It is clear that the role of forests is critical, with reforestation being a crucial component of meeting overall decarbonization targets.

Another challenge is climate risk related to sourcing and operations. Supply of recovered paper is approaching practical limits in many regions, which is leading to higher costs and lower-quality fiber for papermaking. Today’s transformational era is setting up significant dynamic tension: at

a time when the industry is under increasing pressure to produce more “green materials” for its downstream industries, limited supplies will create challenges for the sector to maintain its sustainability efforts.

Digital and analytics

The other dimension of change in this third era relates to digital and analytics. Although digital and analytics have been priorities within the industry for the past five or more years, throughout this decade their full implications will become apparent. Companies looking to distance themselves from laggards should focus on three key areas:

- **Productivity optimization.** Winning in this industry—as in many industries—has always been about productivity and cost differentiation. In the past, success on the cost curve meant coupling the most modern and sizable machine with the right fiber source. Going forward, digital and analytics can provide the next step change: for example, by applying already-proven digital and analytics applications, companies can improve productivity and throughput by 10 to 15 percent—representing significant gains on traditional cost-curve differences between many players or individual machines and mills. This opportunity can be further extended by using digital and analytics to optimize the end-to-end value chain—from fiber (forest or recycled) to end product—in order to harness the full value of the data along the supply chain.
- **E-commerce.** Across paper and forest-based products, e-commerce will fundamentally change how consumers demand the industry’s output—both as end products (such as tissue paper) and as crucial enablers (such as packaging). This demand will accelerate key product-development and innovation trends, such as lightweighting and new, cheaper materials (for instance, hybrids of virgin and recycled paperboard grades), as well as format changes (such as packaging). Broader innovations will include the use of new materials, such as with the production of tissue paper (an area of experimentation for many leading players today), as well as more extensive advances in

packaging (like combining primary and secondary packaging to help reduce overall packaging materials³).

- **New commercial models.** In parallel with the considerations discussed above, the industry is also in dire need of an upgraded commercial model. Similar to other basic-materials industries, this industry can expect to encounter several years of extraordinary volatility and likely inflation. Having a robust, data-driven understanding of costs—by machine, product, and customer—and therefore pricing and margin volatility, will be crucial. The historical revenue model of an annual contract with price levels negotiated for the entire period could now be outmoded. Many products will likely see a more considered mix of spot and contracted business, as well as a more deliberate and analytically driven view on the optimal contract length, rather than being driven by legacy approaches. Direct and online-driven sales models will likely increase, both to optimize and reduce costs and also to move toward the customer-interaction model increasingly preferred by many customers in this and similar B2B industries.

Transformational change unlike any other

The immediate future of the paper and forest products industry will be characterized by large changes centered around sustainability and digital. Additionally, various external forces, such as the repercussions of the COVID19-pandemic, new regulations, and new value-chain dynamics, will further disrupt the landscape.

Decarbonization (including biogenic)

“Greenwashing” does not cut it
Capital allocation based on carbon
Rapid decarbonization of entire value chain

Digital operations

Digital and analytics to drive productivity
Improved working-capital management — End-to-end supply chain optimization

Industry as a net-positive emitter

Secure global reforestation
Positive product substitution
New products
New markets for biogenic CO2

New channels and customer interfaces

E-commerce
Managing customer insights across entire product portfolio
Smart pricing

New value chain dynamics

Multiregion, not global
Virgin versus recycled

Post-COVID19- implications

E-commerce
Hygiene focus
Long-term home consumption (eg, wood)

Regulatory dynamics

Fiber restrictions
Substitution legislation

“The paper and forest products industry is faced with critical questions about its core resource, as climate change and biodiversity concerns affect forest usage and spur regulations.”

CEO priorities: How to lead proactively

The continued evolution of these trends will require pulp and paper CEOs to think through their strategy for navigating the current era. Companies should consider the following four priorities:

- **Future-proof your company.** Proactively manage future risks in relation to regulations and the changing physical climate. Carefully think through forestry regulatory scenarios and the potential to implement “precision forestry”—for example, to increase digital usage in harvesting.⁴ Consider if your wood or fiber supply is resilient enough to support production and if there are any opportunities to create a competitive advantage by proactively moving to new forest-management standards.
- **Lead on environmental, sustainability, and governance (ESG) issues.** Embrace this once-in-a-lifetime transformation. It starts with being clear on “this will happen” not “it might happen.” This will undoubtedly create opportunities for many companies, with a premium over the short term for companies that take action and make those actions clear internally and externally. The entire ESG spectrum (not only the E) is increasingly crucial—today, banks and investors are already using various ESG teardowns to assess where and with whom to place their investments.

- **Invest in productivity 2.0.** Harness digital and analytics to strengthen the competitiveness of your value chain. Actions to consider include full Industry 4.0 implementation in your operations, employing data and analytics to make a step change in commercial excellence, and implementing digital processes and analytics to improve sourcing practices and reduce costs. This transformation will require new investments in people, systems, and processes.
- **Win the big bets.** Carefully think through the positioning of the product portfolio against these fast-moving trends, leveraging both organic and inorganic (M&A) options to move ahead. Focus on opportunities across the full value chain, from novel pulps (for instance, textiles) and capturing growth from megatrends (such as e-commerce) to pursuing targeted paper and packaging innovation (for instance, functional papers to substitute plastics).

The current pace of change within the paper and forest products sector is unprecedented. The speed and scale of action will undoubtedly create a significant performance divide between those that understand the nature of the transformation and act accordingly and those that don't.

“This industry can expect to encounter several years of extraordinary volatility and likely inflation.”

¹ “Sustainability in packaging: Global regulatory development across 30 countries,” McKinsey, February 7, 2022.

² “Sustainability in packaging: Inside the minds of global consumers,” McKinsey, December 16, 2020.

³ For more, see David Feber, Lea Kobeli, Oskar Lingqvist, and Daniel Nordinigården, “Beyond COVID-19: The next normal for packaging design,” McKinsey, July 15, 2020.

⁴ Harsh Choudhry and Glen O’Kelly, “Precision forestry: A revolution in the woods,” McKinsey, June 25, 2018.

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BEYOND COVID-19: THE NEW CONSUMER BEHAVIOR IS STICKING IN THE TISSUE INDUSTRY

THE CHANGES THAT EMERGED DURING THE LOCKDOWN ARE PERSISTING. POSTPANDEMIC TRENDS HAVE FIVE STRATEGIC RAMIFICATIONS.

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McKinsey, Stockholm

Daniel Nordigården, partner,
McKinsey, Detroit

Emily Roeper, analyst,
McKinsey, Waltham

Gregory Vainberg, senior partner,
McKinsey, Montréal

COVID-19's impact on consumers around the world has dramatically changed both their behavior and their demand. Many of these changes—for instance, the unprecedented growth of online shopping over the past year and shifts in brand loyalty—have critical implications for the tissue industry. Meanwhile, supply-side adjustments have limited new-product introductions. As the industry starts to emerge from the pandemic, the big questions now are which behavioral changes will stick and how tissue players should accommodate the new customer requirements. To succeed in the next normal, the tissue industry must respond proactively in five strategic areas. First, ensure that your products are ready for e-commerce (for example, with optimized pack sizes and ship-ready packaging). Second, embrace sustainability, looking beyond materials and packaging to encompass the entire value chain: supply chain and production. Third, strengthen your customer relationships to maintain shelf space: retailers are designing future retail-store layouts, and brands must adjust to widening aisles, decluttered shelves for efficient browsing, and click-and-collect models. Fourth, ensure that the organization is more flexible, responsive, and entrepreneurial—capable both of adapting quickly and efficiently to market changes and customer demands before its peers do and of maintaining a competitive advantage. Fifth, develop new partnerships where needed to balance the consumer's evolving channel preferences, including direct-to-consumer sales.

COVID-19's impact on consumer behavior

COVID-19 jolted consumer demand in a way that sets it apart from past downturns because of the decline's speed and scale, as well as rapidly changing market behavior:

Strongly accelerating online shopping for tissue products. In the United States, online spending has grown to an unprecedented degree: a 35 percent overall year-on-year rise over the 12 months to January 2021 through credit- and debit-card spending.¹ Demand for tissues reflected this transformation: a dramatic shift toward at-home consumption at the expense of away-from-home consumption (Exhibit 1), along with the strong expansion of online shopping. Among distribution channels for retail toilet paper and paper towels, e-commerce levels rose by 47 and 34 percent, respectively (Exhibit 2).

Exhibit 1: COVID-19 caused tissue demand to shift dramatically from away-from-home to at-home consumption across all categories.

Change in global paper-product consumption, by consumption type, 2019–20,¹ %

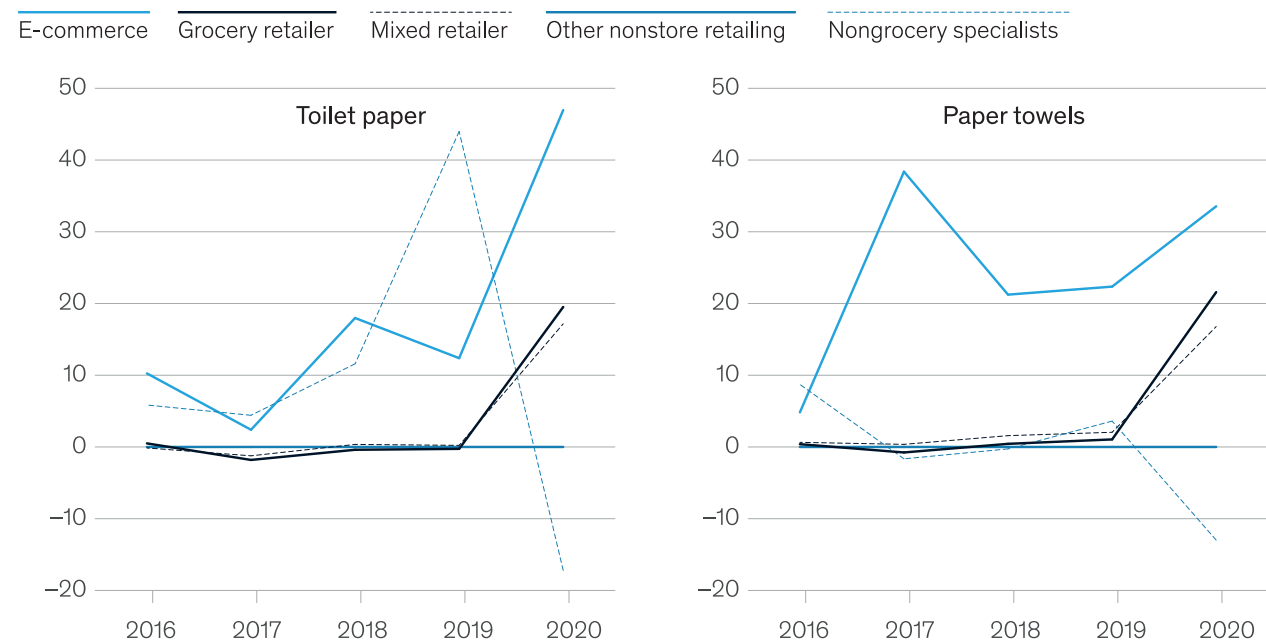


¹Away-from-home tissue measured as manufacturing selling price, does not include away-from-home wipes; retail tissue measured as retail selling price. Source: Euromonitor International, Tissues & Hygiene February 2021 Edition; McKinsey analysis

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& Company

Exhibit 2: The strong expansion of e-commerce has driven the dramatic shift from away-from-home to at-home consumption.

Distribution of US retail paper-product sales by outlet type,¹ year-over-year % change



¹Measured as retail value. Source: Euromonitor International, Tissues & Hygiene February 2021 Edition; McKinsey analysis

Shifts in brand loyalty. Three-quarters of Americans claim to have changed their shopping behavior since the COVID-19 pandemic began. Of these, around 40 percent say they have switched brands.² Similar changes have played out in Europe.³ Value is the main driver for switching. In keeping with this trend, consumers have turned to smaller tissue brands: in 2020, their sales rose by 102 percent over 2019 levels in retail sales prices, while retail sales of paper towels from smaller brands rose by 38 percent.⁴

A slowdown of new-product introductions. The pandemic made global brands pause new-product launches in several large tissue categories, such as health and hygiene products and household products. Meanwhile, the industry's concerns moved toward assuring the availability of products for consumers.⁵ Companies shifted their priorities for the products they did launch to ensure that those products stood out on shelves and were more relevant to changing

consumer preferences. In the US paper-products market, the number of new packaging launches rose by about 11 percent as the industry moved to address the rising consumer preference for sustainable and premium products.⁶

Consumer behavior in a postpandemic world

As the tissue industry begins to emerge from the pandemic, behavioral trends that first appeared during the lockdown are combining with some preexisting

trends that are now accelerating as well (Exhibit 3).⁷ These trends are shaping the global tissue industry in five key ways:

The spending recovery. Although consumers are opening their wallets,⁸ the beneficiaries have tended to be purveyors of discretionary items, such as travel and cars—things consumers went without during the pandemic. Spending behavior for nondiscretionary, lower-priced products will therefore stick, especially with rising inflation. These developments are expected to fuel further demand for private-label tissue products and for lower-cost products in general.

The online-shopping boom. After the pandemic, the increase in levels of online shopping for tissue (and other) products is expected to be extremely persistent. Going forward, we expect this trend to affect pack sizes and packaging profiles for tissues—such as more ship-ready packaging to ensure that tissue products can be sent with no need for secondary packaging.

An uneven recovery. Despite growth in overall consumer spending, different sectors are performing on different levels. A spectrum of winners and losers has clearly emerged, ranging from sectors of continued decline (for instance, theaters and amusement

parks) to sectors experiencing sustained elevated growth (such as products for the home). As the market readjusts to a more normal state, and leisure travel, in-person dining, and entertainment return, some of this disruption will fade. Demand for away-from-home tissue products will start to rise. But will it ever return to prepandemic levels?

The loyalty shake-up continues.

During the pandemic, consumers have switched brands at an unprecedented rate, and these shifts—including those in tissue markets—are expected to continue. In addition, consumers are increasingly concerned about the environmental impact of the products they buy, including the circularity of those products. These concerns apply to tissue products as well. Younger consumers (such as Gen Z and millennials) in particular have high expectations and therefore continue to seek new brands that emphasize values, organic products, and quality.⁹

The homebody economy persists. As the pandemic led many consumers to work remotely, homes became the new coffee shop, restaurant, and entertainment venue. For the tissue sector, the direct consequence has of course been a strong shift to at-home consumption. After the pandemic,

this trend of home nesting is likely to stick and to go on bolstering at-home demand. However, the policies of employers will influence its degree of persistence.

“Demand for tissues reflected a dramatic shift toward at-home consumption at the expense of away-from-home consumption along with the strong expansion of online shopping.”

Five strategic areas for tissue players to address

To navigate successfully through an immediate future characterized by changing consumer behavior, tissue players will have to deal with its implications:

Exhibit 3: In 2021, five consumer trends are driving change for tissue players.



Set up products to fit online. It will be important for tissue players to address the key trend: the shift to online sales. Responses should include adapting product offerings with optimized pack sizes and ship-ready packaging.

Proactively drive sustainability.

Consumers demand that retailers and brand owners become more focused on creating and supporting sustainable products. That will drive behavioral shifts by brands. Tissue players need to think about their entire footprint, including the supply chain, recycled materials, and packaging.

Strengthen customer relationships

to maintain shelf space. New groups of consumers guided by their values are buying different brands just as retailers face increasing demand for shelf space. Tissue companies need to ensure that they remain a top choice for their retail partners. It will be important to anchor brand building around relevance to consumers while ensuring

that operating models are geared toward understanding and adapting to changing local consumer sentiment.

Further enhance productivity. To address the changing market promptly and stay ahead of competitors, tissue players will have to be agile: accelerating and increasing their innovations, investing in next-generation designs, using data and analytics to improve operating performance, and building smart, resilient supply chains. These investments will be crucial to safeguard value in the event of unexpected margin compression. Core capabilities should include the ability to speed up the pace of innovation by managing agile sprints, to develop next-generation designs, to use data and analytics to improve operating performance, and to build intelligent, resilient supply chains. These processes and skills will be required to safeguard value in the event of pricing and inflation adjustments.

Develop new partnerships where needed. With the increase in the popularity of e-commerce and changing customer preferences, tissue players must consider the range of partners they need. In particular, they should think about how to work with large e-commerce retailers as consumers move online and how to balance online demand with potential direct-to-consumer sales and marketing.

Tissue players need to think about their entire footprint, including the supply chain, recycled materials, and packaging.

Changing consumer behavior will have significant ramifications for tissue players. The time is right to address the trends head on by becoming a strategic partner for customers. The reward of these moves will be significant opportunities to capture value.

¹ “Special collection: Global surveys of consumer sentiment during the coronavirus crisis,” McKinsey.com.

² “US consumer sentiment and behaviors during the coronavirus crisis,” August 19, 2021, McKinsey.com.

³ Richard Herbert, Jean-Albert Nyssens, Rickard Vallöf, and Tobias Wachinger, “State of the industry,” McKinsey.com.

⁴ Euromonitor International, Tissue & Hygiene, February 2021, euromonitor.com.

⁵ David Feber, Oskar Lingqvist, Daniel Nordigården, and Matthew Seidner, “Preparing for the flood: How packaging companies can catch the postpandemic wave of new product launches,” August 18, 2021, McKinsey.com.

⁶ Mintel GNPD, September 2021, mintel.com.

⁷ Tamara Charm, Janette Hwang, Andrea Leon, Nancy Lu, Anirvan Maiti, Daniela Sancho Mazzara, Jonathan Medalsy, Kelsey Robinson, Jason Rico Saavedra, and Tom Skiles, “US consumer sentiment and behaviors during the coronavirus crisis,” August 19, 2021, McKinsey.com.

⁸ Ibid.

⁹ Ibid.

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**Matching your packaging needs
for the Disposable Hygiene market**

EFFICIENCY, PACKED!

Disposable Hygiene market's consumers are increasingly paying more attention to packing characteristics: manufacturers attract them not only with specific product features, but also making bags more inviting. Packages are the easiest way to communicate with the target: appearance, differentiated counts for daily or night use, family packs and daily packs are all elements assigned to captivate customers.

KEEPING THIS
IN MIND, GDM
PACKAGING
PORTFOLIO HAS BEEN
DEVELOPED ON 4
MAIN PILLARS:

AUTOMATION

FLEXIBILITY

CONVENIENCE

TURNKEY
SOLUTIONS

In particular, thanks to the company's **turnkey solutions**, GDM maximizes manufacturers' competitive capability through technology integration, commissioning time minimization and prompt service support.

By coupling converting and packaging technologies into a **turnkey solution**, GDM could provide significant savings for customers: thanks to the **Extra Thin Core process**, that optimizes Fluff and SAP mix of the absorbent core, and the **compression potential up to 5 tons**, products are thinner and final dimensions of the bag are reduced.

From a logistic point of view, this translates into a reduction up to -25% of the space inside the container[1], and more bags displayed on the stores' shelves.

GDM is indeed a one-step partner, capable of meeting the most varied customer needs, from converting to End of Line, always granting the best Total Cost of Ownership of the investment. **All their designs are made in Italy** and are therefore synonymous with quality all over the world.

GDM Packaging solutions: efficiency, packed!

GDM portfolio includes fully automated packaging solutions for all Disposable Hygiene products, from Baby to Adult Incontinence segment.

In particular GDM Packaging solution matching perfectly with GDM Protective Underwear machine AP3 and AP5, running at 300 or 500 ppm, are:

SB40 Red Series AP3

Stacker&Bagger for 300 ppm
infeed speed (40 bags/min)
Or

SB60 Red Series AP5

Stacker&Bagger for 500 ppm
infeed speed (60 bags/min)

SB40 and SB60 Red mount a full servo integrated system capable to count, stack, compress and pack disposable diapers into pre-made bags. These machines support a wide range of counts and a **size change in less than 25 minutes**. Thanks to its **5-ton compression**, it also ensures a significant decrease in **bags' width** and a **double cost reduction**, as both transport and bags cost money.

Both AP3 and SB40 machines will be on live show at GDM plant in Italy, from 19th to 23rd September. Check it out and grab your front-row seat!

Discover how AP3 machine can meet your needs offering the following features:

- **Ease of use and intuitive processes** thanks to the linear layout of the machine
- **Superior core quality**: thinner, more absorbent and discreet product enabling logistic and raw material savings
- **Improved process control** on key product features (i.e. side seam welding and core formation) and relevant production steps (i.e. pad application) for higher quality
- **Lower Total Cost of Ownership (TCO)** through the highest level of OEE and reduction of material waste

Embracing sustainability: efficiency, packed!

GDM approach to sustainable development is rooted in continuous innovation not only in Disposable Hygiene products manufacturing, but also in their packaging.

As in the converting technology, GDM is bringing sustainability into the packaging one, thanks to its capability to offer **complete turnkey solutions**.

Over the years, GDM has introduced a wealth of green packaging alternatives, driving innovation in both materials and technology.



With the global industrial sector more and more oriented towards sustainability, the focus is on Polyethylene (PE) and Polyphenylene Ether (PPE) alternatives. In line with these expectations, GDM solutions are set-up to handle bags made of bio-based or paper materials, minimizing carbon footprint and reducing therefore the impact on the environment.

Paper based material

GDM packaging machines are able to handle different kinds of bag material: the last initiative led by GDM, in order to reduce the use of plastic and meet the Gen. Z demand, is the option for mono material solutions, such as **paper bags**, enabling an even easier and faster recycling.

This solution consists of using only monomaterial structures instead of material mix, enabling an easier and more efficient recycling process, as there is no need to separate the materials from each other.

Recycled plastic and Low Density Polyethylene

GDM is exploring the use of Low Density Polyethylene (LDPE) and recycled plastic.

In the first case, we realize bags for disposable hygiene products with a lower thickness compared to the standard - **35 microns versus 50 microns**.

This has powerful implications as far as saving is concerned:

- Reduction of virgin PE used: up to -30% grams per bag
- Reduction in the material cost: up to -25% [2]

Recycled plastic, on the other hand, goes in the direction of a low-carbon circular economy, where waste is eliminated through the continual reuse of resources. This option is very promising for its potential to turn the traditional linear economy of plastic into a **zero-waste business model**, all without impacting quality.

Green polymers

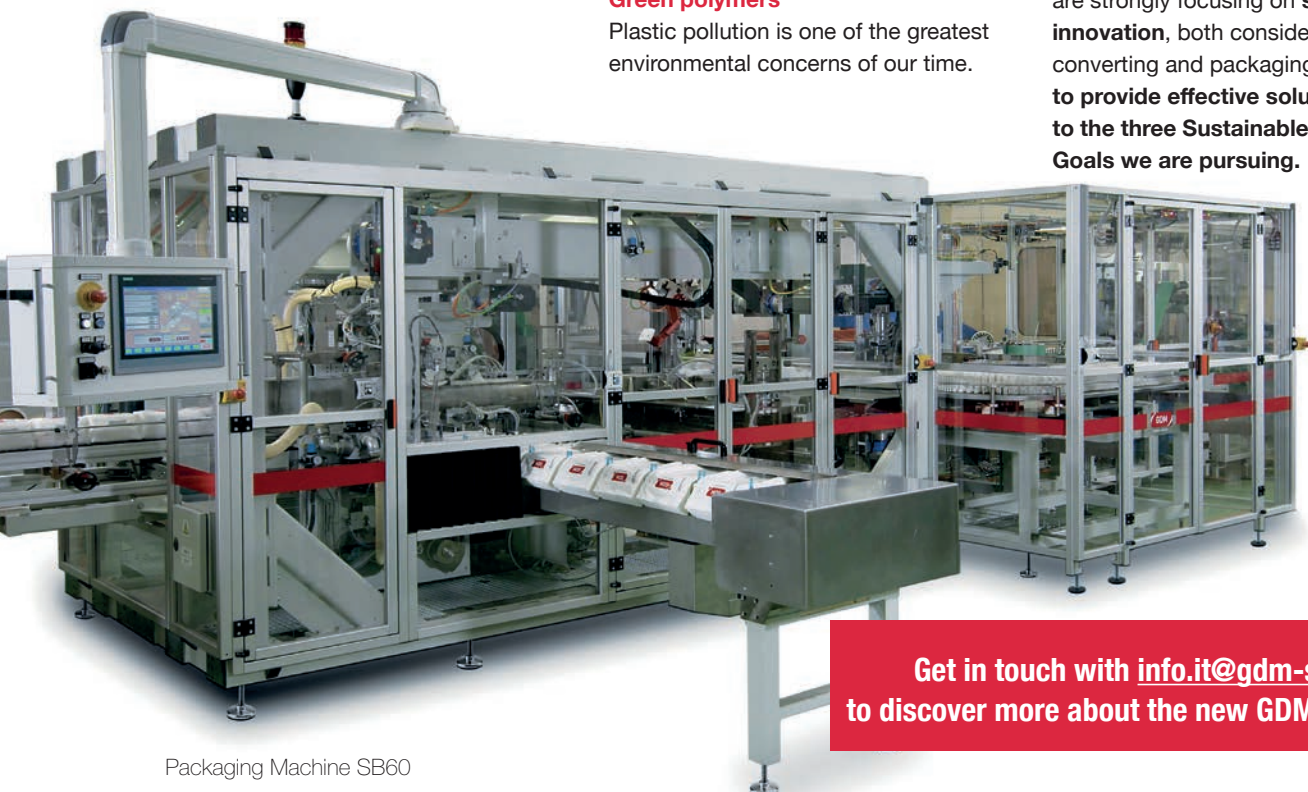
Plastic pollution is one of the greatest environmental concerns of our time.

This is largely due to two primary factors: its manufacturing process, which involves burning fossil fuels, and its cheapness. It is estimated that 79% of all the plastic waste produced since the 1950s - approximately 6.3 billion tonnes - has neither been recycled nor incinerated[3].

To move away from plastic, we are testing new packaging options built on **100% non-oil-based green polymers, with only renewable resources deployed in its manufacturing phase**. One example is starch, a polymeric carbohydrate consisting of numerous glucose units joined by glycosidic bonds.

GDM is supported along the path to sustainability by **considerable investments programmed by Coesia Group**. In December 2018, it has been established the **Centre of Expertise Sustainability**, supporting “green strategy setting” and accelerating existing initiatives.

With the support of the Centre, we are strongly focusing on **sustainable innovation**, both considering converting and packaging technologies, **to provide effective solutions relevant to the three Sustainable Development Goals we are pursuing**.



Packaging Machine SB60

Get in touch with info.it@gdm-spa.it to discover more about the new GDM machine!

- 1 GDM internal elaboration based on: yearly production of 100 mn baby open diapers with Extra Thin Core process, size 4 - 40" dry freight container
- 2 Assuming a bag capacity of 10 Baby products and a production of 500,000 bags
- 3 <https://www.economist.com/international/2018/03/03/the-known-unknowns-of-plastic-pollution>



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A.CELLI EVOLOCK® the innovative solution to improve the performance and reduce the inspections of a Yankee Dryer

Thanks to the continuous development and improvement of our Yankee Dryers, in A.Celli we have achieved a further evolution of our Yankee Dryer with forged shell, conceiving the innovative iDEAL® EvoLock®.

Our new solution is able to minimize the costs related to inspection operations and is equipped with technological solutions never seen before on a Yankee Dryer. Let's find out the details of this unique engineering masterpiece.



iDEAL® EvoLock® Yankee Dryer

Our new Yankee Dryer EvoLock® is built with all the technologies already known and appreciated by A.Celli, including the shell forged from a single steel ingot, with the novelty of a unique and highly innovative head-to-shell connection system, which does not require the use of structural welds or bolts.

This solution allows, from an engineering point of view, to minimize the deformation of the shell edges induced by the deformation of the heads, which in itself is caused by the internal steam pressure. This important feature improves the runnability on sheet edges, and consequently the efficiency of the machine.

The special design also allows to reduce the overall width of the shell, giving you the capability of drying a larger format sheet with the same existing machine gauge, and, as we will analyze in the next paragraphs, to reduce the necessary inspection interventions.

Required inspections: comparison between EvoLock® and other Steel Yankee Dryers

For our analysis, we will consider three types of steel Yankee Dryer on the market:

1. A traditional Yankee Dryer with welded shell and shell connected to the heads by means of full penetration structural welds;
2. A.Celli iDEAL® Forged YD, with forged shell and head-to-shell connection by means of bolts;
3. The new A.Celli iDEAL® EvoLock® solution, with forged shell and a new head-to-shell connection system who does not require bolts nor welds.

The following table compares the timings and types of the required checks for the aforementioned types of Yankee Dryers during the first 12 years of life:

Year	Welded shell and head/shell connection with structural welds	A.Celli iDEAL® Forged YD	New A.Celli iDEAL® EvoLock®
1	Visual Inspection (Welds)		
2	Internal + Internal/External Ultrasonic Testing Inspections	Internal Inspection	Internal Inspection
3	Visual Inspection (Welds)		
4	Internal + Visual Inspection (Weld)	Internal Inspection	Internal Inspection
5	Visual (Weld) + Bolt Ultrasonic Testing Inspection	Bolt Ultrasonic Testing Inspection	Bolt Ultrasonic Testing Inspection
6	Internal + Visual Inspection (Welds)	Internal Inspection	Internal Inspection
7	Internal/External Ultrasonic Testing Inspection		
8	Internal + Visual Inspections (Welds)	Internal Inspection	Internal Inspection
9	Visual Inspection (Welds)		
10	Internal + Visual (Weld) + Bolt Ultrasonic Testing Inspections	Internal + Bolt Ultrasonic Testing Inspections	Internal + Bolt Ultrasonic Testing Inspections
11	Visual Inspection (Welds)		
12	Internal + Internal/External Ultrasonic Testing Inspections	Internal Inspection	Internal Inspection

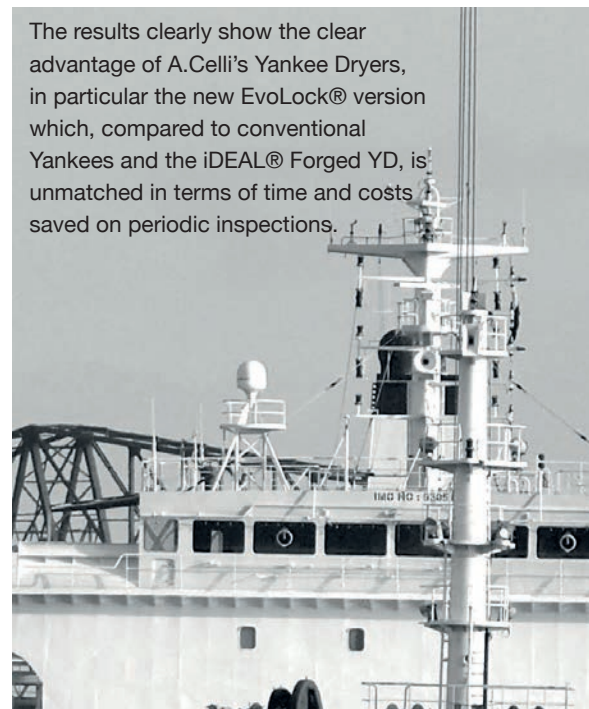
From the table we can see how, for typical welded Yankees, the combination of periodic weld inspections and regular internal inspections recommended every 2 years leads to a tight schedule of invasive, expensive and prolonged checks compared to those required for the A.Celli iDEAL® Forged Yankee Dryers. The greatest impact of these interventions is due to the need to completely cool the cylinders for the inspection of the internal welds.

As for the Yankee Dryers of the iDEAL® product family, the staff will have to access them only for the biennial visual inspections typical of all Yankees, while the ultrasound tests are prescribed only for the structural screws which are all located on the outside, and therefore do not require the complete cooling of the cylinder.

Starting from these premises, A.Celli has developed the new generation of iDEAL® EvoLock® Yankee Dryers to take a further important evolutionary step also from the point of view of reducing periodic inspections.

In the following table we will associate the different types of inspection and their respective intervals with the typical times necessary for their execution to calculate the total downtime of the Yankee cylinders during the first 12 years of life.

The results clearly show the clear advantage of A.Celli's Yankee Dryers, in particular the new EvoLock® version which, compared to conventional Yankees and the iDEAL® Forged YD, is unmatched in terms of time and costs saved on periodic inspections.



Additional downtime over 12 years	Welded shell and head/ shell coupling with structural welds	A.Celli iDEAL® Forged YD	New A.Celli iDEAL® EvoLock®
No. of internal inspections	6	6	6
No. of Internal visual weld inspections	9	-	-
No. of Internal / external UT weld inspections	3	-	-
No. of external UT weld inspections (head/shell)	-	-	1
No. of external UT bolt inspections	2	2	2
No. of Yankee Dryer cool downs	12	6	6
Time for internal inspections	6 hours	6 hours	6 hours
Time for internal visual welds inspections	4 hours	-	-
Time for internal / external UT welds inspections	48 hours	-	-
Time for UT bolts inspections	2 hours	6 hours	2 hours
Time to cool / heat the Yankee Dryer	18 hours	18 hours	18 hours
Required time for internal inspections in 12 years	6 hours x 36 = 6 hours	6 hours x 6 = 36 hours	6 hours x 6 = 36 hours
Required time for internal visual weld inspections in 12 years	4 hours x 36 = 9 hours	-	-
Required time for internal / external UT welds inspections in 12 years	48 hours x 144 = 3 hours	-	-
Required time for UT bolts inspections in 12 years	2 hours x 4 = 2 hours	6 hours x 2 = 12 hours	2 hours x 2 = 4 hours
Required time for YD cooling in 12 years	18 hours x 216 = 12 hours	18 hours x 6 = 108 hours	18 hours x 6 = 108 hours
Total time required for inspections in 12 years	436 hours	156 hours	148 hours



Contact us for more information

If you are looking
for a new Yankee
Dryer contact us:
you will find trained
technicians at your
disposal to help
you choose the
best solution for
your needs.



Yankee service: when analysing measurement results, the ability to see the bigger picture, meaning the production system and mill as a whole, is of utmost importance



THE GROWTH OF THE **ANDRITZ STEEL YANKEE**

ANDRITZ has developed a world-wide reputation as a leader in the production of steel Yankees for a variety of paper grades and even tobacco machines. The utilization of Yankees generally offers paper producers greater drying performance, and in the case of steel Yankees, even better heat transfer as well as increased safety due to the properties of the fine-grained pressure vessel steel.

ANDRITZ first started investigations into the viability of making steel Yankees in 2007. By 2009 it had already manufactured its first one, a small, 12 ft. diameter Yankee which was sold to Saigon My Xuan Paper, Vietnam. Next was a delivery to APP's mill in Perawang, Indonesia which was also 12 ft. in diameter.

By 2010, interest was gathering in the installation of ANDRITZ steel Yankees based on the success of the first installations, and the company began manufacturing double wide and larger Yankees, moving up to 16 ft. and then 18ft. in diameter, and by 2012 it had produced a 22 ft. version.

Fast forward to 2021 and ANDRITZ has now supplied more than 90 steel Yankees around the globe, including the installation of the world's largest steel Yankee – 24 ft. in diameter – at Zellstoff Pöls in Austria. Since the first delivery in 2009, not one of the installed Yankees as has had to be replaced, illustrating the durability and reliability of ANDRITZ steel Yankees.

EXPERTS INTERVIEW

Following is an interview with ANDRITZ Yankee experts, explaining the advantages of the technology for various applications in the papermaking industry. ANDRITZ experts interviewed are: Franz Harrer, Head of Technology Tissue, Riccardo Pierini, Steel Yankee Product and Customer Care Manager, and Robert Schloffer, Director Paper Machine Service.



“Because of the unique and patented logistic concept ANDRITZ is able to provide Yankees up to 26 ft. diameter and with a length up to 8.4 m.”
 Franz Harrer, Head of Technology Tissue, ANDRITZ

What paper products are Yankees ideally suited for?

Harrer: In general steel Yankees are mostly used for new tissue machines and rebuilds including dry-crepe tissue but also advanced technologies such as textured and structured (TAD). The reason for that is that the Yankee is not only the heart of the tissue machine but one of the main cost drivers of the tissue production process.

Step by step, steel Yankee technology has entered other business areas, for instance ANDRITZ is an established supplier for Yankees for MG (machine glazed) machines and tobacco machines. And this is not the end of the story: drying cylinders of the pre- and after dryer section of paper and board machines can be fully made of steel as well – delivering the same benefits like the larger, single steel Yankees. Additionally, ANDRITZ supplies Yankees to other industries, including the food manufacturing industry for specialist drying purposes.

Is the installation of steel Yankees a growing trend?

Harrer: As a Yankee is still a mandatory component for conventional tissue machines, the number of installations is growing. We believe that steel Yankees, in particular, are showing even more significant growth as cast Yankees have their disadvantages and as sustainable, energy-efficient, and safe production is nowadays of utmost importance.

What are the main advantages of steel Yankees, either in new machines or in retrofitting one on an existing machine?

Harrer: For new machines, steel Yankees are state-of-the-art technologies based on a number of advantages for example, better drying performance and more sustainable production than cast-iron models: Steel Yankees with their higher efficiency and steam pressure, together with a shoe press that operates at high press loads offer a remarkable potential for energy reduction. Up to 24% compared to other machine configurations are possible! In combination with steam-heated hoods the saving potential is even higher.

For Yankee replacements, steel Yankees are the technology of choice. Multiple cast Yankees have a limited lifetime expectancy and therefore must be replaced. When doing such a replacement (steel instead of cast iron) one big advantage is that the new Yankee can be operated at higher pressure, thus providing enhanced performance. This performance increase can be achieved without any changes in the length of the existing dryer section.

However, one of the biggest advantages of steel Yankees is the safety aspects. The ductile material is safer in case of imperfections in the material than the brittle cast iron. Cast iron has the big disadvantage that it could explode without any indications beforehand. And there is less need for maintenance (grinding and polishing).

Are there any limitations when it comes to size of Yankee ANDRITZ can produce, either width or diameter?

Harrer: Up to now, ANDRITZ holds the world record for the largest installed steel Yankee worldwide. Because of the unique and patented logistic concept ANDRITZ is able to provide Yankees up to 26 ft. diameter and with a length up to 8.4 m.

ANDRITZ's aim in sizing and dimensioning is to find the most efficient solution for our customers. Depending on the customers demand taking economic and ecological factors into consideration the best Yankee size and design is chosen. To guarantee best performance, every Yankee is customized.

manage static pressure vessels. As the steel Yankee is dynamically loaded, more strict acceptance criteria have been introduced by ANDRITZ also considering the fatigue cycles (mechanic fracture mechanism) and not only the static loads.

ANDRITZ is proud to be the leading supplier for steel Yankees having all technologies, manufacturing and metallizing, and of course services in house. The huge benefit for the customer is to get everything from one supplier and having a partner they can trust by their side with a comprehensive understanding of papermaking, designing, sizing, manufacturing, inspection, service and operation.

What is special about ANDRITZ Yankees and the way they are manufactured?

Pierini: ANDRITZ has all technologies around steel Yankees and their whole lifecycle in house, including:

- Full understanding of the papermaking process and technologies
- Dimensioning and sizing of Yankees
- Design, mechanical and fracture mechanic calculation
- Manufacturing technology
- Metallizing technologies
- NDT (Non-destructive testing) inspections at workshop and on site
- Yankee service, audit and optimization
- Yankee repairs
- Yankee replacements with the new ANDRITZ PrimeDry Steel Yankee
- OTR (on-the-run measurement) and troubleshooting
- Full understanding of steam and condensate system

Can you tell us about the service and maintenance ANDRITZ offers to Yankee customers?

Schloffer: A well-maintained Yankee offers a high potential for improved runnability and efficient production — a remarkable competitive advantage for the customer. With our Yankee lifecycle management, we focus on the overall added value of Yankees: from calculation, to manufacturing, metallizing (PrimeCoat Stratos), operation, and optimization; no matter if the Yankee is used for tissue, paper, or tobacco production.



“With a steel Yankee consumption will be reduced, or the production increased, which finally ends up in lower CO2 emissions per ton of paper.”
Riccardo Pierini, Steel Yankee Product and Customer Care Manager, ANDRITZ

How about final quality of the Yankee, how is its performance assessed?

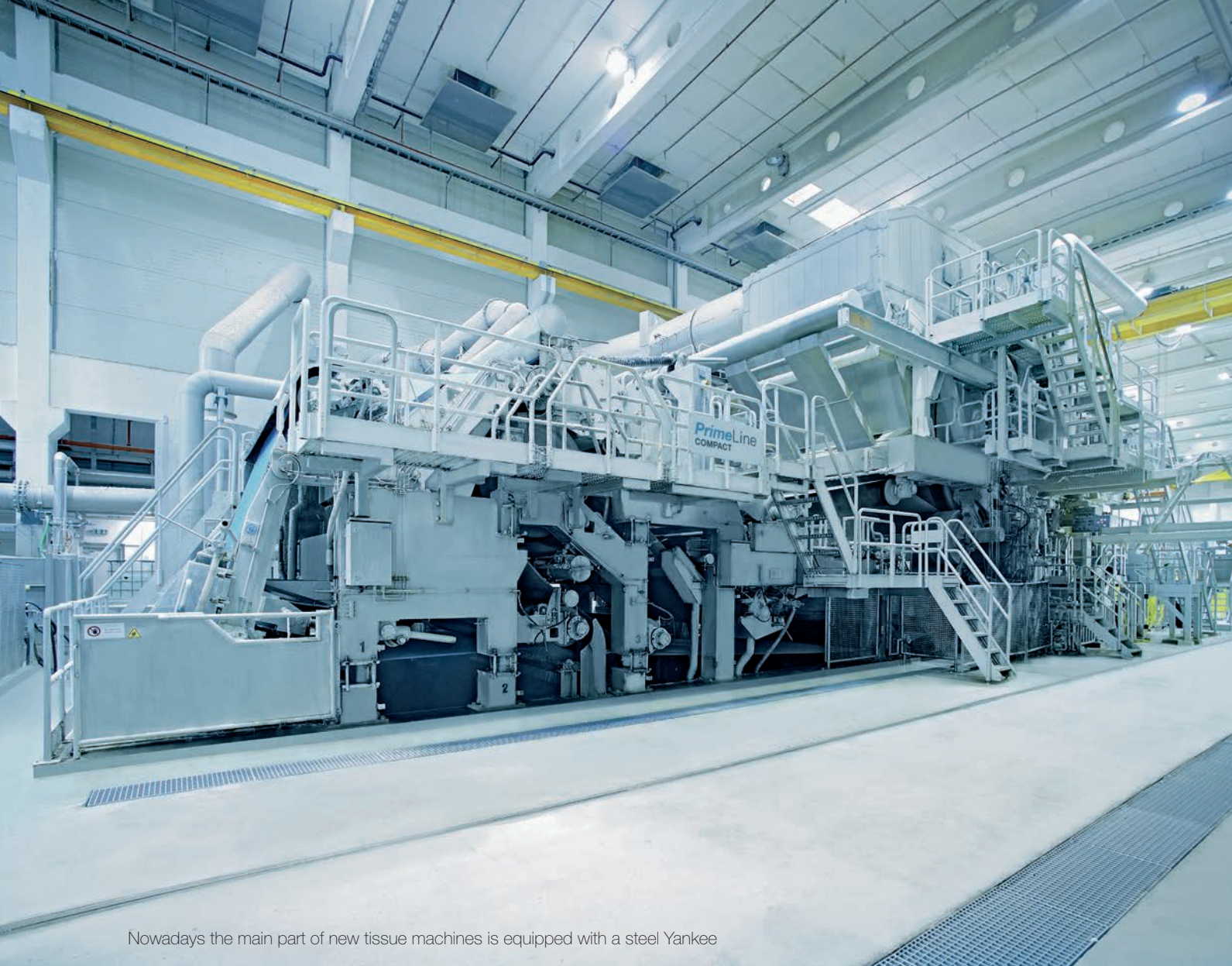
Pierini: In terms of quality ANDRITZ focuses on the whole lifecycle. At the beginning a full understanding of the material, operating conditions and inspections through the whole lifecycle was necessary. Because of this ANDRITZ collaborated with industrial partners and universities performing detailed studies to get an overall understanding of the materials' behaviour at high temperatures and in tough operating conditions. The outcome of this study was a comprehensive product quality and inspection plan. Actual valid pressure vessel regulations

How do Yankees stack up when it comes to environmental footprint and CO2 emissions?

Pierini: Compared to cast Yankees, steel Yankees can be manufactured with lower wall thickness thanks to the material properties of steel compared to cast iron. This provides a better heat transfer and more economic use of the steam. All in all, the consumption will be reduced, or the production increased, which finally ends up in lower CO2 emissions per ton of paper.



“A well-maintained Yankee offers a high potential for improved runnability and efficient production — a remarkable competitive advantage for the customer.”
Robert Schloffer, Director Paper Machine Service, ANDRITZ



Nowadays the main part of new tissue machines is equipped with a steel Yankee

ANDRITZ Steel Yankee Manufacturing

Hungary

ANDRITZ steel Yankee manufacturing workshop is located in Tiszaújváros on a 150,000 m² site. Where welded structures are concerned, the company numbers among Hungary's largest manufacturing companies. The site is equipped with the most modern manufacturing technologies for sandblasting, welding, CNC machining, surface treatment, and assembly. Over 90% of the products are exported to the European Union and the United States. The activities of ANDRITZ cover all stages from flame cutting to final assembly, for pieces weighing up to 150 tons. The company is thus capable of producing complete, fully assembled, insulated components ready for connection to other units at erection sites.

China:

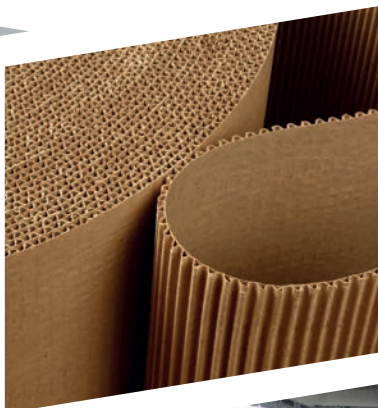
ANDRITZ Yankee Business Center

More than 50 references and record installations in Asia confirm that ANDRITZ is one of the leading suppliers of tissue machines, components and local services for this key market. In 2014 ANDRITZ brought the local support to another level: at ANDRITZ China, the new steel Yankee Business Center opened its doors to enable state-of-the-art steel Yankee manufacturing, local field service and quality management. With an area of 4,200 m² the business center features the latest machinery to enable steel Yankee production and service at the highest quality level.



The first steps: steel Yankees at the ANDRITZ workshop in Austria

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100% CARBON-FIBER EXPANDING SHAFT *ALLOWS BOTH FASTER MAX SPEEDS AND ACCELERATION/DECELERATION*



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New expanding, multi-bladder shaft for counter-roller tissue rewinding machines delivers better energy efficiency, tissue production and operator control precision

The Italian technology company Svecom-P.E. has introduced a new patented expanding shaft made entirely of carbon fiber, CF. The new multi-bladder expanding shaft has three ledges and offers mechanical properties which are unique in the market. A major benefit of the new CF shaft is that it now lets operators exceed the usual speed limits for 3" core diameters on tissue rewinders, thus allowing them to run at mechanical speeds of over 1200 m/min.

Reach operating speeds four times faster

The new 100% CF multi-bladder expanding shaft has been specifically designed to meet today's higher technical requirements on counter-roller rewinding machines. This makes it possible to get very fast acceleration and deceleration times and also reach the operating speed much earlier than traditional shafts. Operating speeds are reached four times faster compared to traditional shafts, consequently increasing the overall productivity.

The light nature of carbon fiber also allows much higher maximum operating and peak speeds, with no vibrations from the shaft while achieving them. Critical speeds increase significantly: +98% compared to steel shaft, +119% compared to aluminium shaft, +35% compared to aluminium shaft with carbon inserts (Fig. 1).

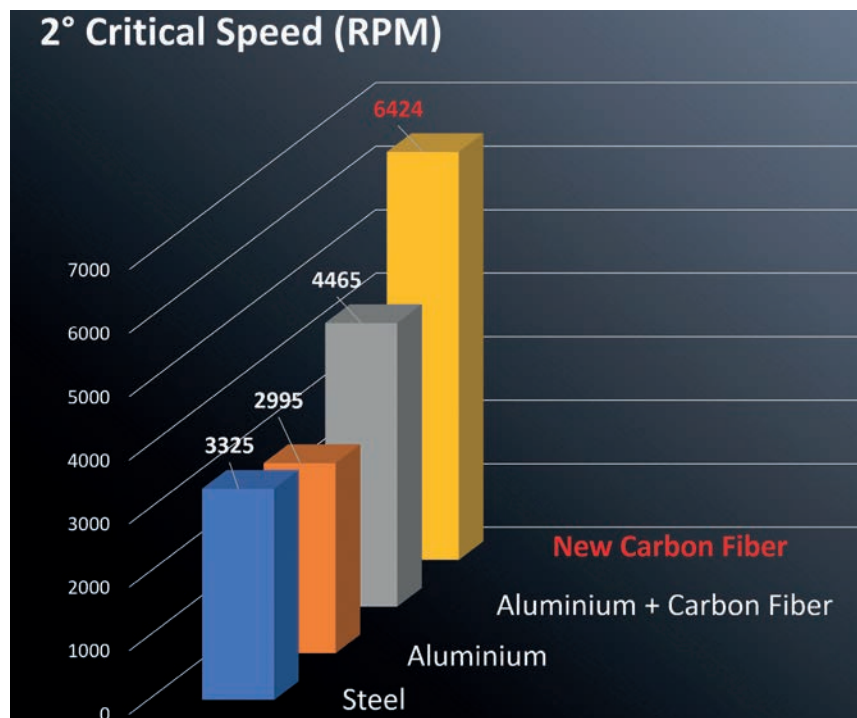


Figure 1: Carbon fiber offers much higher critical speeds, compared to traditional and hybrid shafts

Lower weight gives benefits too

As a further benefit, carbon fiber shafts have a lower specific weight, thus reducing the energy required to operate them in the machine. The specific weight is 65% lower than steel shaft, 20% lower than aluminum shaft and 32% lower than a carbon shaft with aluminium inserts (Fig. 2)

A higher elastic module also gives greater stiffness and consequently, upon application of a high load, it will undergo minimal deformations.

The 100% CF expanding shaft represents a real revolution for such expandable systems and is an innovation based upon Svecom's lengthy experience with these materials, as well as close collaboration with a leading company in the carbon sector for military and sports applications. The 100% CF solution allows a wide range concerning the geometry of shafts, and therefore the ability to satisfy the customer's needs.

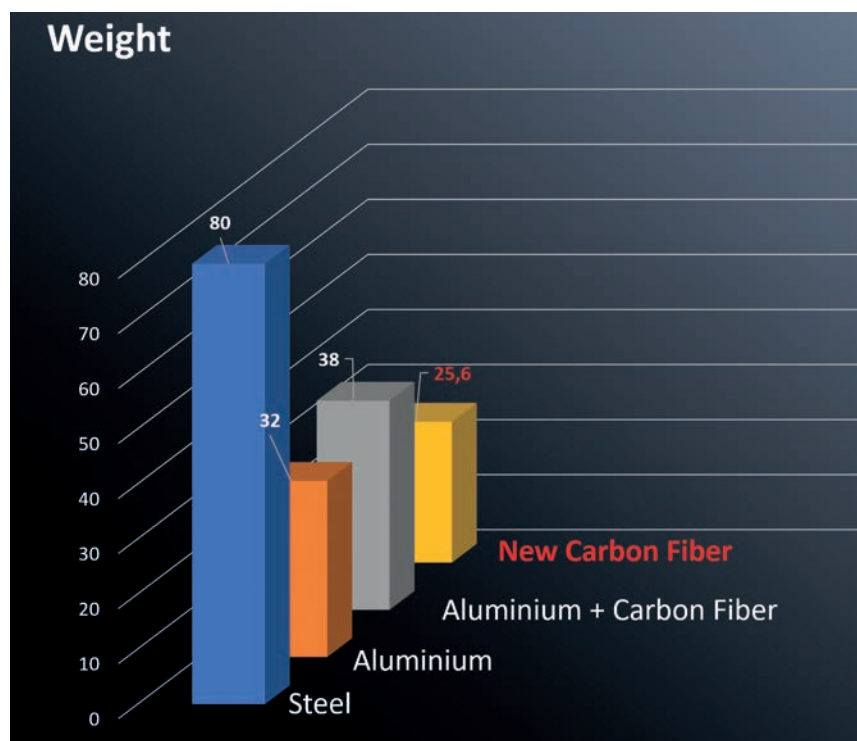


Figure 2: Weight is greatly reduced as well, giving numerous benefits.

Material	Bearing Ø	Expansion	UTS (N/mm2)	E.M. (GPa)	Inertia (cm4)
Solid steel (Fe510)	74 mm	3 centering ledges + 3 gripping ledges	510	210	88.87
Aluminium	74 mm	3 centering ledges + 3 gripping ledges	310	70	88.87
Aluminium + carbon	75 mm	3 gripping ledges	310	165	110.84
New carbon	75,2 mm	3 gripping ledges	1521	250	90.66

Figure 3: Specs and mechanical advantages of 100% carbon fiber shaft compared to the other types. In particular, CF has a better UTS (Ultimate tensile strength) and a higher EM (elastic module).



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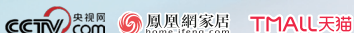
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