

'Calenderless' manufacturing cell



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Historically, calendering machines with secondary offline processing operations have been used to produce steel and textile belt/breaker, steel and textile body ply, textile and steel cap strip, inner liner and other single compound components. Replacing the calendering equipment used in producing these materials with highly automated and versatile extrusion-based systems eliminates WIP and all the associated steps moving material in and out of storage. The added automation and quick-change versatility of these machines also serve to perfectly align the tyre manufacturing process with modern needs. This is the significance of the 'calenderless' solution that STEELASTIC recently introduced

TA News Bureau

STEELASTIC, US-based pioneer in extrusion-based tyre prep component equipment, has built a "Calenderless" Manufacturing Cell at its Ohio headquarters to enable tyre manufacturers to test-run their own materials to produce the full range of tyre reinforcement components. The cell is already generating interest from Top 10 tyre manufacturers who are keen to validate the new process.

STEELASTIC's extrusion-based manufacturing processes for belt/breaker, body ply, cap strip and inner liner eliminate the need for expensive and inflexible calendering and off-line processing equipment. From PCR, TBR, to OTR, as well as aircraft and race tyres, this full range of "calenderless" tyre component prep equipment is proving to be a game-changer.

The compact, single-operator machines used in this cell have been developed in response to a growing demand for more

flexible (high SKU, low volume), highly automated and lower capital outlay manufacturing systems, according to Ian Dennis, STEELASTIC President. "This dedicated manufacturing cell is a key component of our drive to help tyre makers worldwide convert to more versatile, smaller footprint systems necessary to profitably manufacture shorter runs of multiple tyre types," he said.

Lower volumes, higher profitability

"Calenderless" manufacturing processes allow tyre makers to make lower volumes, at high SKU levels, profitably. This opens up a future where the 1-to-3-million-tyre-a-year tyre plant becomes a viable reality—an enticing prospect for manufacturers who are tasked with producing a high variety of tyre sizes to satisfy an ever-changing market demand. Offering a flexible design, STEELASTIC extrusion-based machines in



STEELASTIC Calenderless Manufacturing Cell

its Akron-based “calenderless” manufacturing cell can produce up to 16 x 10 mm textile or steel cap strips, and up to 20” wide steel belt at angles from 15 to 90 degrees and 40” wide steel or textile body ply at angles from 85 to 95 degrees, with options to vary sizes for customers as needed.

The technology

With the “calenderless” solution, many of the tyre manufacturing steps associated with calendering and offline processing equipment can be replaced with just four extrusion-based solutions for a significantly lower capital outlay. Historically, calendering machines with secondary offline processing operations have been used to produce steel and textile belt/breaker, steel and textile body ply, textile and steel cap strip, inner liner and other single compound components. Replacing the calendering equipment used in producing these materials with highly automated and versatile extrusion-based systems eliminates WIP and all the associated steps moving material in and out of storage. The added automation and quick-change versatility of these machines also serve to perfectly align the tyre manufacturing process with modern needs.

It’s a process that STEELASTIC has continued to refine and hone over its long history in extruding reinforced components for tyre manufacturers.

“One of the key elements of the extrusion-based system is that the creels have better tension control and offer more precise feedback,” said Bob Irwin, STEELASTIC’s Director of Product Development. There are new demands from both the textile body ply cords as well as the higher tensile steel cords. It’s putting increasing demand on the technology in the creel.”

Automation and inspection are other key differentiators in the STEELASTIC “calenderless” cell, according to Irwin. “We continuously strive to minimize operator adjustments in our systems” he said. “Our closed loop feedback and control makes continuous adjustments to ensure the finished material stays in specification, therefore minimizing operator dependence. This not only increases productivity, but also produces a more

consistent product with less waste and downtime.

STEELASTIC’s ‘calenderless’ cell development is a story steeped in rich history for the 50-year-old manufacturing company, according to Irwin. “STEELASTIC pioneered the extruded steel belt process and have an installed base of over 700 machines. We have continued to apply those learnings to new innovations in extruded belt and body ply—both introduced by the company within the past two years after several years of development and testing.”

And Irwin feels this a revolution in the tyre-making industry whose time has come.

“The tyre industry, as a whole, is not fast-moving,” he said. “But as the need for shorter production runs of higher SKU levels increases, we are seeing our customers looking down different avenues to meet their diverse demand. That’s where we felt we could build on our years of extrusion-based expertise to fill that gap with a range of equipment to meet all reinforcement needs as well as a calenderless solution for inner liner.”

Benefits

Developing a “calenderless” manufacturing cell for the tyre manufacturing world is a natural extension of STEELASTIC’s vision from the outset, according to Dennis. “We have been engineering and building extrusion-based machines for the top tyre makers around the globe for 50 years. And our ethos has always been, ‘How can we do it better?’”

Looking at the tyre market, specific needs in a shifting global economy quickly become apparent—needs where STEELASTIC’s extrusion-based solutions fit well:

- **Increased Flexibility** – Tyre makers today need to accommodate the growth in various tyre SKUs, resulting in the need for smaller batch sizes and quick changeovers.
- **Manufacturing in Local Markets**—With increased tariffs and logistical costs, making tyres locally for the markets where they will be consumed is optimal.

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EV batteries that offer incredible range

When asked when his batteries would get ready for large scale commercial production and use in EVs, he says this will be possible in the next 18-24 months.

Explaining the range and charging parameters of Log9 metal-air battery, he asserts it can cater to a range of about 1,000 kms (minimum). "One would only need a bottle of one litre of clean water every 100-odd kms to refuel the vehicle powered by these batteries.

On his expectation when his battery would become OEM among

electric vehicle makers in India and globally, Singhal believes widespread automotive OEM integration of the metal-air battery is possible to achieve within the next 3-4 years.

He says his company is open for foreign investment for the large scale EV battery manufacturing.

"We are open to both foreign and domestic investment for large scale commercialization, manufacturing, as well as for further R&D on alternative battery mechanism for EVs," he says. ▲

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- **Reduced Factory Size**—Smaller plants mean less capital outlay, reduced operational costs and a faster return on investment.

- **Automated Manufacturing**—Offering high operator independence boosts productivity, reliability, versatility and quality.

- **Increased Traceability**—As automotive OEMs push for complete traceability for every tyre and its component materials, the STEELASTIC system can offer start-to-finish information on raw materials and processing.

This nimble, extrusion-based solution allows tyre makers to adapt quickly to a changing market and easily scale their plants as needed, Dennis said. "With intense interest surrounding this new "calenderless" solution, STEELASTIC is currently working with several top 10 tyre makers on both passenger car radials, OTR, and aircraft tyres to build, lab test and track test units built with this groundbreaking technology.

Finding the 'sweet spot'

The key to a successful "calenderless" solution, according to Dennis, is finding the "sweet spot" between mass production and smaller runs.

"We've found that greenfield plants requiring up to 3 million tyres per year find a greatly improved ROI with STEELASTIC's equipment," Dennis said. "Also, plants requiring cost-effective incremental growth for 0.5 million to 2.0 million tyres also benefit from our solution because they aren't tasked with adding

additional expensive equipment for calendering and offline processing," he said. "And our changeover time for various short-run SKUs can't be beat."

Sustainability is another key factor in STEELASTIC's vision for a "calenderless" plant, Irwin says. From a reduction in energy use to a drop in scrap and waste, STEELASTIC solutions provide a path to a sustainable future.

"Even down to the ease of use of our equipment," Irwin added. "It's designed with such precision and automation that people with entry skill levels can quickly learn to operate our machines."

Looking ahead

With the advent of the "calenderless" manufacturing cell, STEELASTIC isn't stopping there when it comes to developing more efficient ways to help tyre builders meet their diverse demands. The next push for STEELASTIC is in not just data acquisition, but also data interpretation, automation and data exchange in manufacturing technologies that can connect systems to help customers visualize their entire production lines.

"We want to continuously create disruptive innovations that give our customers reliable, proven, and creative options that shake-up the long-standing tyre industry norms," Irwin said. "Our challenge is to understand our customers limitations and then revolutionize our new technologies to push drastically past any current barriers." ▲

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