MERCURIO
NEWS
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APPLICATION ENGINEERING AND TECHNICAL ASSISTANCE WITH UNIQUE **STRUCTURE AND UNIQUE DIFFERENTIALS**

Being a leading provider of conveyor belt solutions requires a high degree of knowledge, responsibility and commitment. It is with this commitment that Mercurio maintains the largest and best structure of Application Engineering and Technical Assistance of the sector in Brazil. An exclusive differential, both for its local presence and fast service, as well as for its efficiency in solving requests and occurrences.

With a highly qualified team, Mercurio's technical team offers a range of exclusive solutions and services, such as specification and sizing of conveyor belts, project analysis, technical field visits, workshops, belt and splice training, service life monitoring, monitoring services such as ultrasound and scanners, among others.

In addition, Mercurio is the only manufacturer of conveyor belts in Brazil that has two laboratories, located in the Jundiaí and Marabá Units, with equipment structure, capacity and efficiency to perform various tests, parameters and product developments, in line with the best international practices. "The combination of this complete structure with an experienced, committed and qualified team, with national coverage, makes all the difference to meet the needs of our customers", says Dalton Clermont, Mercurio's Technical Director.

The company is also looking to the future and continuously invests in innovation and platforms for knowledge sharing and facilitating management and decision making. With Mercurio Smart, a tool available in the Mercurio APP, it is possible to track the entire life history of the belt through information that customers themselves feed into the application. "Mercurio Smart is an example of how our application and technology in general can help and further improve the quality of our service", concludes Clermont.

SERVICES OFFERED BY THE MERCURIO **TECHNICAL ASSISTANCE TEAM**:

- PROJECT ANALYSES
- THERMOGRAPHIC ANALYSIS
- APPLICATION ENGINEERING
- SPECIFICATION OF CONVEYOR BELTS
- ITEM STANDARDIZATION AND OPTIMIZATION
- MAPPING AND FIELD SURVEYING
- APPLIED TRAINING
- ULTRASOUND AND SCANNERS
- TECHNICAL FIELD VISITS
- WORKSHOPS

INFORMATION, TRANSPARENCY **AND RESPONSIBILITY**

In recent years, the world economy has experienced a period of transition, forcing countries to reassess the current business scenario, with the objective of seeking new exits, inside and outside the commercial blocks constituted.

These movements further transform the already complex chessboard of international trade. An environment in which large national and foreign companies, references in their sectors, need to reaffirm their protagonism and their leadership role in society.

Throughout its 74-year history, Mercurio has experienced different scenarios and, in all of them, has always sought to act responsibly, aiming at the development of the market, local communities and the country as a whole. Thus, we became the largest manufacturer of conveyor belts in Latin America. In this way, we continued to seek to conquer new markets and make significant investments in our industrial park.

Many are the recipes to follow the path of evolution and growth, but we highlight one in particular: continuously investing in a Technical Assistance tuned to the requirements and needs of our customers. This subject, among other equally important topics, you will find in this new edition of Mercúrio em Notícia [Mercurio News].

Once again, we reaffirm our mission to continue on the path of sustainable and continuous development. Acting with transparency, responsibility and sharing relevant information with the market and the whole society.

Good reading!
IVAN ZANOVELLO CIRUELOS

EXPEDIENTE

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APP

TECHNICAL MODULE: NEW PRACTICAL AND EASY TOOL HELPS IN THE SPECIFICATION OF THE BELTS

Mercurio APP is constantly evolving to offer more and more facilities to its customers. And it was thinking about speeding up its routine that Mercurio is developing a new tool: The Technical Module.

When you access the new Technical Module in the Mercurio APP, you just need to enter the following data and, very quickly, important references of technical parameters that helps in the management of the belts in the day to day, such as: total weight of the belt, weight per meter, rupture tension, maximum length per part, among others, will be shared.

All this in an interactive and practical way, with direct action by the user.

The parameters provided by the Technical Module are references based on the database and the extensive experience and field experience of Mercurio's Application Engineering and Technical Assistance team.

The Technical Module will soon be available, free of charge, on the Mercurio APP.

Download the application now and get to know this and other solutions that only Mercurio offers for you.

Download on the App Store
GET IT ON Google play

MERCURIO

ON THE WAY TO **MANAGEMENT 4.0**

In a scenario of growth and expansion, Mauro Luiz Barbato, Mercurio's Industrial Director, talks about the main challenges of the Industrial Management area and its strategic importance to support the company's growth.

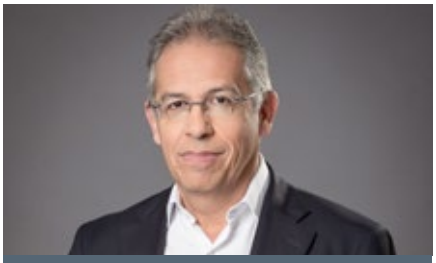
Industry 4.0 and the evolution of management in the industrial sector; the implementation of new methodologies and the current structure of the company; the challenges in the area of industrial management to help consolidate the company as a leader in Brazil and Latin America, are subjects of this interview.

Based on your professional background, could you talk a little bit about the main changes in the industrial sector?

The main change in industrial management is the evolution to so-called Industry 4.0. The term is recent and refers to the Fourth Industrial Revolution, another stage that the industry is going through all over the world. With it, innovative technologies are able to connect almost everything to computer systems and control as many equipment, spaces and resources as possible, with simple commands in a software. In this way, communication is faster and the information obtained is fundamental in the resolution of errors. This performance is based on some pillars, such as the Internet of Things, Big Data Analytics (use of data for analysis and information management) and the security of information systems.

How does Mercurio find itself in this scenario?

Like most industries in Brazil, and around the world, we are entering this new era, implementing and organizing management systems with efficient and consolidated methodologies. In a second phase, we will introduce more systems and control devices in the machines so that, in a more advanced stage, we will have a database managed by computers. With this information, we will be able to make more automatic



> "Conciliate invested capital with the return time ensures a strong and healthy company."
>
> **Mauro Barbato**

corrections in the eventual deviations of processes, besides making combinations that will bring solutions by means of the so-called "artificial intelligence".

What are the main challenges in the area of industrial management?

I believe that the main challenge is to combine this implementation of methodologies and current management tools with the capacity and knowledge of our products, processes and employees.

What is the importance of industrial management in this scenario of expansion of the company?

It is very important, especially with the production of the Marabá Unit and the Chile Operation. In this expansion phase, the area is responsible for creating the best solutions in terms of industrial efficiency, in order to offer quality products at compatible costs. We are studying alternatives for increasing production capacity, such as improving processes, making greater use of machinery, reviewing production flows and even purchasing new equipment. There are many possibilities, but it is important to reconcile the invested capital with the return time, always guaranteeing a solid and financially healthy company.

What is the size of the structure involving industrial management?

Today, there are about 480 employees directly involved, distributed in the areas of Production, Quality, Maintenance and Project Engineering, in the Jundiaí, Marabá Units and in the Distribution Center.

What is the importance of labor management and what are the main challenges in this area?

The great differential of a winning company is always its human capital, that is people! The main challenge is to keep the team motivated, cohesive and engaged in our purposes. In addition, the safety of our employees is a priority factor and has been a constant agenda in the meetings of the Board of Directors. To this end, we work with transparency, coherence and observing the good conduct that results from our company's values.

Could you talk about future projects?

In the Industrial area we can mention the introduction of the Total Productive Maintenance (TPM) methodology, making management and processes more efficient. The optimization of industrial processes in Jundiaí, the participation in expansion projects in the Chilean market and other Latin American countries, and the new perspectives for the Marabá plant are important projects that will take the company to an even higher level of growth and excellence.

THE CHALENGES IN MAINTENANCE

José Fernandes de Miranda Júnior, Manager of Engineering and Maintenance of Mercurio, talks about the day to day in the sector.

What are the main challenges in the area?

As in any large plant, the main challenge is to keep the machines running on a daily basis. In addition, in emergency situations we have to be prepared to carry out repairs in the shortest possible time.

Could you say a little about the structure of the sector?

Currently, we are more than 65 employees among the areas of Mechanical and Electrical Maintenance and Project Engineering, in the units of Jundiaí and Marabá. Our Maintenance team works in 3 shifts and we also have a fixed shift team to cover all needs. Among boiler, press, compressor and other equipment, we have more than 120 machines in Jundiaí and 45 in Marabá.

How is the relationship between the areas of the two plants, Jundiaí and Marabá?

To gain in agility and speed, the maintenance areas of the two units work independently. Each Maintenance Supervisor responds to the respective Plant Operations Manager. At the same time, we are constantly sharing information and experiences. The Mercurio Marabá Unit, being very new, demands much less maintenance. Jundiaí has a history of more than 70 years, that is, a lot of experience to be shared.

And what are the main challenges for the future?

The future projects necessarily pass through the company's growth, mainly in Marabá, where we have space to expand the plant, and also in Latin America, where we are expanding our sales substantially. Therefore, we invest in our team and in systems and tools capable of implementing our maintenance system, such as Total Productive Maintenance (TPM), Manute, ERP for Maintenance Registration, in addition to project engineering, planning and cost control systems. We are prepared to meet the growth of Mercurio.

CONVEYOR BELT ADJUSTMENTS **DOUBLE ITS SERVICE LIFE AND EXTEND CUSTOMER BENEFITS**

With alteration in the rubber compound and the inclusion of an anti-rip fabric, Mercurio's team performs adjustment on the drag conveyor belt. The result is a belt with greater resistance to cuts and rips, generating savings for the customer.

Niobium is a raw material that guarantees high resistance to metal alloys. Its name refers to the history of Queen Niobe, turned into stone by Zeus, according to Greek mythology.

The ore is widely used in the automotive, naval, petrochemical and infrastructure industries. It is used in long pipes, hot rolled steel in the manufacture of automobiles and cold rolled steel, in large constructions, among other uses. Brazil is the world's leading producer of niobium, responsible for about 75% of the world's ore production.

Much of the total niobium produced in the country is extracted from the Boa Vista mine, located in the city of Catalão, Goiás. The responsible company, which is part of a Chinese group, is the second largest producer of niobium in the world and a client of Mercurio for nearly 20 years. "We have a solid relationship, built thanks to a partnership that values differentiated service and is committed to customer performance", explains David William Souza, Mercurio's Account Manager.

In its role, Souza periodically visits customers to identify new opportunities, functionalities and process improvements, as well as to propose new technologies within the conveyor belt market.

It was during one of these routine visits to the giant producer of niobium, in the second half of 2017, that there was an opportunity to propose an improvement. "The company's engineer came to inform us about a problem with a drag conveyor belt that was having a very short service life. On average, it needed to be changed every 45 days", he recalls.

Belts used in drag conveyors require specific features to withstand high material and impact.

The belt receives the full weight of the load deposited by the Feed Kick - a part of the conveyor that has the purpose of receiving the conveyed material and directing it correctly over the belt - and literally drags that load over it. When loaded, the kick reduces the high impact of the load on the conveyor belt, but requires more effort to "drag" it.

"The previous belt had Extra Abrasion (EA) cover, being a type of rubber with good resistance to abrasion and wear. However, it is a cover that does not meet the requirements for cutting and "shredding" caused by the impact of the material", recalls Souza.

"On the day of the visit, we noticed that the belt presented the typical wear of high impact situation" he recalls. Based on this situation, the Mercurio team returned home with a new challenge: to propose a belt improvement that would meet the same abrasion resistance as the EA cover, but would also have impact and tear resistance.

CHANGES THAT MAKE THE DIFFERENCE

Thus, the first step taken by Mercurio's technical team was to change the EA coverage specification to MercoRip, a type of compound that has superior characteristics than EA rubber, providing greater impact absorption and rip resistance.

Subsequently, a second measure was adopted to meet another request. According to the customer, the belt also suffered from cuts and rips, generated by the loading and material characteristics. "Many times, the ore is contaminated by rebar, pieces of iron, among other cutting materials. In addition, niobium is a very hard and very dense ore that sometimes comes in lamellar type stones (stones with so-called sharp corners) that end up cutting the belt", he explains.

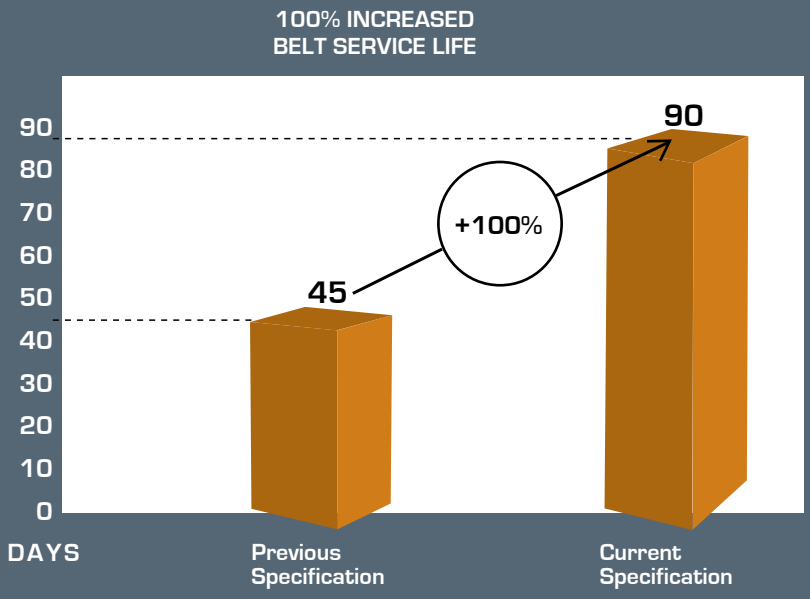
In this case, Mercurio's technicians chose to include an Aramid Rip Proof mesh that allows greater absorption and distribution of impact, preserving the carcass.

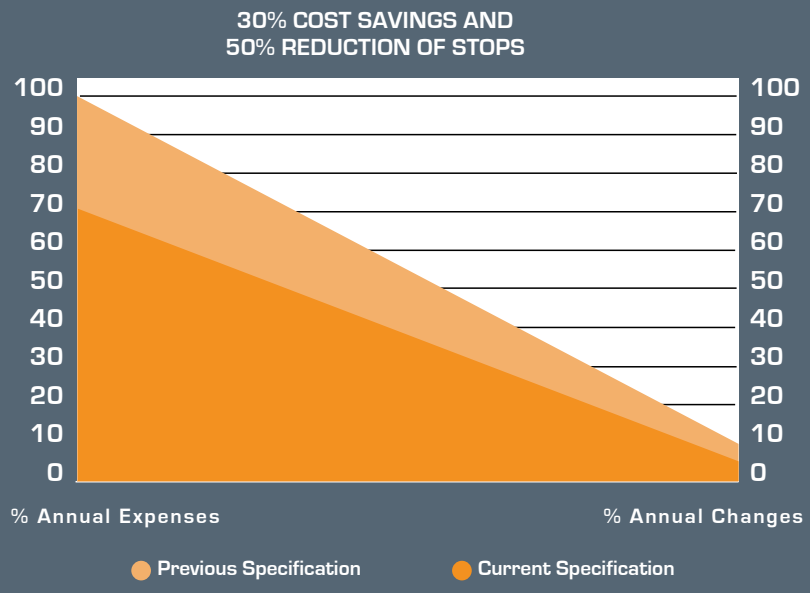
DOUBLE SERVICE LIFE AND SAVINGS OF AROUND 30%

After the changes in the belt specifications, the Mercurio team continued to monitor the performance and the result was extremely positive. "In a short time, we noticed that the change of the cover for MercoRip and the inclusion of the Aramid Rip Proof mesh was really right. We managed to double the belt's service life, going from 45 to approximately 90 days", Souza celebrates.

Taking into account the 100% increase in the belt's service life, the reduction from eight to four stops for changes per year, the lower number of repairs made and the consequent reduction in labor costs, the Mercurio team estimates that the change in the belt compound represented an annual saving of around 30% for the customer. In other words, higher productivity, reduced stops and expenses, with product reliability.

BY CHANGING THE BELT COVER FROM EA TO MERCORIP AND INCLUDING AN ARAMID RIP PROOF MESH, THE MERCURIO TECHNICAL TEAM HAS DOUBLED THE BELT'S SERVICE LIFE, PROVIDING GREATER SAVINGS AND PRODUCTIVITY TO THE CUSTOMER.





HOT VULCANIZED SPLICES **ON STEEL CORD CONVEYOR BELTS**

In order for Steel Cord Conveyor Belts to fulfil their function and provide excellent performance, they need to go through a specific Hot Vulcanized Splicing process. In this edition, we present a basic methodology of this type of splice.

Due to their specific characteristics, belts with the so-called "core" of steel cables are mostly used in long-distance equipment. For this reason, and because they are heavy, they are usually manufactured in parts and require several splices. Unlike belts with textile carcasses, in which the splices can be made by the Hot or Cold methods, in steel cable belts the only applicable splicing method is by the Hot Vulcanization process.

As we mentioned in issue 5 of Mercúrio em Notícia [Mercurio News], there are many variations in the way a splice is made on conveyor belts. Most of the time, thesevariations do not change the final result. However, incorrect procedures can compromise the work and performance of the splice and, consequently, the performance and service life of the belt.

In the last edition, we presented the Hot methodology in textile conveyor belts. Here, we will address the Hot Vulcanized Splice in Steel Cord Conveyor Belts.

We emphasize that the splicing procedure of a steel cord belt is much more complex and requires attention to many details. This article is a reference to the basic methodology of how it should be carried out. For a more comprehensive overview, Mercurio has specific manuals for Hot Splices that can be consulted on our website and on our App.

BASIC TERMINOLOGY USED IN THE SPLICE

• BASE LINE: It is the line made at an angle of 90° to the center of the belt, which determines its length and serves as the basis for all splice measurements.

• CENTER LINE: It is the line arranged in the absolute center of the belt, in angle of 90º in relation to the base line. It serves to ensure the alignment of the splice.

• BIAS: Non-removable area of the splice, an integral part of its length and which determines the angle of scaling.

• DIAGRAM OF SPLICE: Sketch with the disposition and measures of the steel cables for the accomplishment of the cut. It can be described as stages 1, 2, 3 and 4, being defined according to the belt specification.

• Note: the difference between the stages is the number of cuts that will be made in the steel cables, in order to alternate their length to adjust them in the splice area.

• NOODLE: Non-vulcanized core rubber compound cut into strips.

SPLICE ANGLE

The splices should also be made at an angle, in order to minimize the effort generated in their passage through the conveyor pulleys. For Steel Cord belts, the 22° angle is the most usual, but it should also follow the angle of the plateaus of the vulcanization press.

BIAS LENGTH

The length of the splice bias is determined by the formula:

Bias = 0.404 (22° Angle Tangent) x Belt Width

SPLICE LENGTH (CE)

The total length is described in the splice diagrams that are prepared by Mercurio and made available upon customer request.

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SPLICE EXECUTION

Before starting the execution of the splice it is important to perform a "checklist" of the equipment and tools that will be used. It is also recommended to check the condition of the workstation and make sure that it is protected against the action of bad weather.

The first step in making the splice is to make the markings on the first end of the belt: Base Line, Splice Angle (Bias), Total Splice, Chamfer and Center Line Length. Then, it is necessary to mark where the steel cables will be cut, according to the Splice Diagram.

After that, the covering rubber is cut to make the Upper Chamfer, Lower Chamfer and the Transition Area, thus being able to start the cleaning of the cables of the first end. The cleaning consists of removing the covering and core rubbers from the cables, but the cables should be rubberized. This procedure should be repeated at the other end of the belt.

With both ends already prepared, the chamfers are done and the area to be spliced is cleaned. Once again, cleaning is essential to maintain the quality of the work being done.

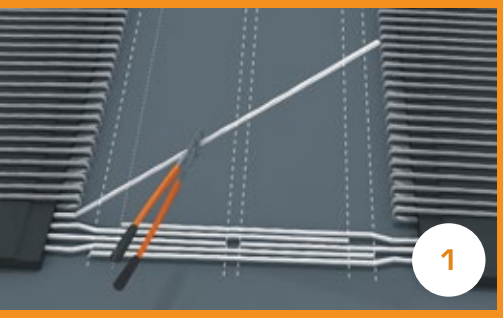
SPLICE KIT

To make the Hot Vulcanized Splice is necessary the use of the Mecurio's Hot Splice Kit, which is composed of: covering rubbers, core rubber, "Noodles", cement and solvent for cleaning. All these items are sold by Mercurio.

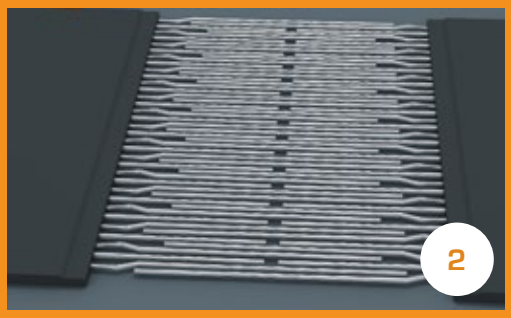
SPLICE ASSEMBLY

To make the splice assembly, first make the cuts on the steel cables, according to the splice diagram.

1. CUTTING THE STEEL CABLES



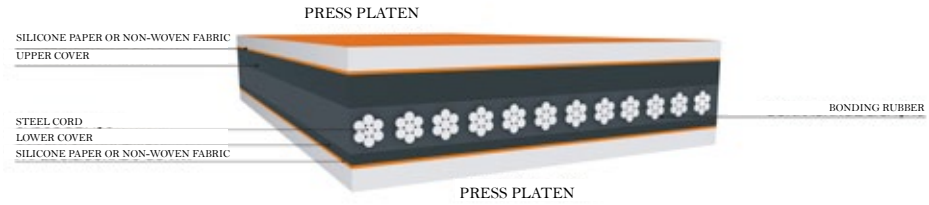
2. SLICE ASSEMBLY



The cement is then applied to the steel cables and also to the Chamfer region. After drying, start assembling the splice in the following order: insert the silicone paper, the lower covering rubber and a core rubber blanket. Then, the steel cables are transposed, which must be started from the center to the edges of the belt, ensuring their centralization and alignment. The empty space between the cables must be filled with the core rubber, the so-called

"Noodle". A core rubber blanket is inserted again to the upper cover and the silicone paper, leaving the splice in the configuration below:

VULCANIZATION BELT ASSEMBLY



VULCANIZATION

Vulcanization is the process in which rubbers acquire the properties determined in their formulation, through heat and pressure.

For the vulcanization of a Hot Vulcanized Splice in Steel Cord Conveyor Belts, it is recommended to use a temperature of 145°C, with a pressure of 12 to 14 kgf/cm². The time varies according to the total thickness of the belt and is also described in the splice diagram.

Once the vulcanization process is completed, an inspection of the splice must be made to check its alignment, thickness, presence of bubbles and finish of the closures.

FREQUENT QUESTIONS

SUBJECT: SPLICES

My belt is misaligned at a specific point during the passage through the pulleys, especially the head and tail pulleys. What can I do?

MERCURIO SPECIALIST:

First, you must identify the point of the belt that misaligns. Normally, it happens when the splice passes through the pulleys. This occurs due to the lack of alignment of the splice during its manufacture. Many vulcanizers end up closing/aligning the splices by the edges, which is not recommended due to the variations that can occur in the width of the belt during manufacture. Whether belt with textile carcass or steel cable, splice alignment should always occur through a centerline.

If you have any questions about belts or their basic components, please send them to: mercurioemnoticia@correiasmercurio.com.br

MERCURIO TEAM CARRIES OUT TRAINING ON **DIAMOND TYPE REVERSE SPLICE, IN PARÁ**

Team of employees who participated of the training and details of the diamond type reverse splice process.

At the end of August, representatives of Mercurio's technical and commercial teams were assigned to conduct a theoretical and practical diamond-type reverse splice training at Alunorte, the largest alumina refinery in the world, excluding China. Located at the city of Barcarena, Pará, Alunorte has about 70 kilometers of conveyor belts installed, according to the company's Maintenance Engineer.

Due to its special and more complex characteristics than conventional splices, diamond splices require more specific training, which must be applied by experienced and trained professionals. "We count on a team and structure to make the most different types of splices. Diamond splices, in particular, requires a higher degree of technical expertise. We are pleased to be able to share this knowledge with our customers and partners", said David Souza, Mercurio's Account Manager.

The splice is mostly done hot and is used in conveyor belts that have reversing switches, that is, that operate in both directions of movement - unlike conventional belts that move in one direction only. Diamond splices have this name because the splice is made with two cuts in the shape of vertices (V), similar to the design of a diamond, and are made on conveyor belts with more than two plies. The training was applied by Mercurio's specialized team, composed of Account Managers, Marco Tulio and David Souza, and Technical Assistant, Genival Alves. About 20 professionals participated, including Alunorte's engineers and employees, and employees of the outsourced company responsible for the splices of the unit.

Applied belt and splice training is one of the services offered by Mercurio's Application Engineering and Technical Assistance team.

Read more about the structure and services offered by the area of Application Engineering and Technical Assistance in the cover story of this issue.

FELLOWSHIP AND FUN IN THE **74 YEARS OF MERCURIO**

In 2019, Mercurio turns 74. A history of many challenges and great achievements, which began in 1945, during World War II, with the first manufacture of power transmission belts, to reach the current leadership in the manufacture of conveyor belts.

To celebrate more than seven decades of this success story, on September 28, at the Marabá Unit, and on October 5, at the Jundiaí Unit, Mercurio held special events. At that moment, the employees were invited to take their families to the plants, in an environment of total integration, fraternization and fun.

Several activities were carried out throughout the day. The guests were able to visit the units and experience a little of the day-to-day experience of their relatives in Mercurio. There was no shortage of attractions and games for the children and, at the end, employees, family members and representatives of the board and council cut the 74 th anniversary cake.

Mercurio's family members and employees celebrate the company's anniversary in the plants in Jundiaí (above) and Marabá (on the side)

As the largest conveyor belt manufacturer in Latin America, Mercurio preserves and values family relationships and seeks to promote an even closer relationship with employees, partners and society.