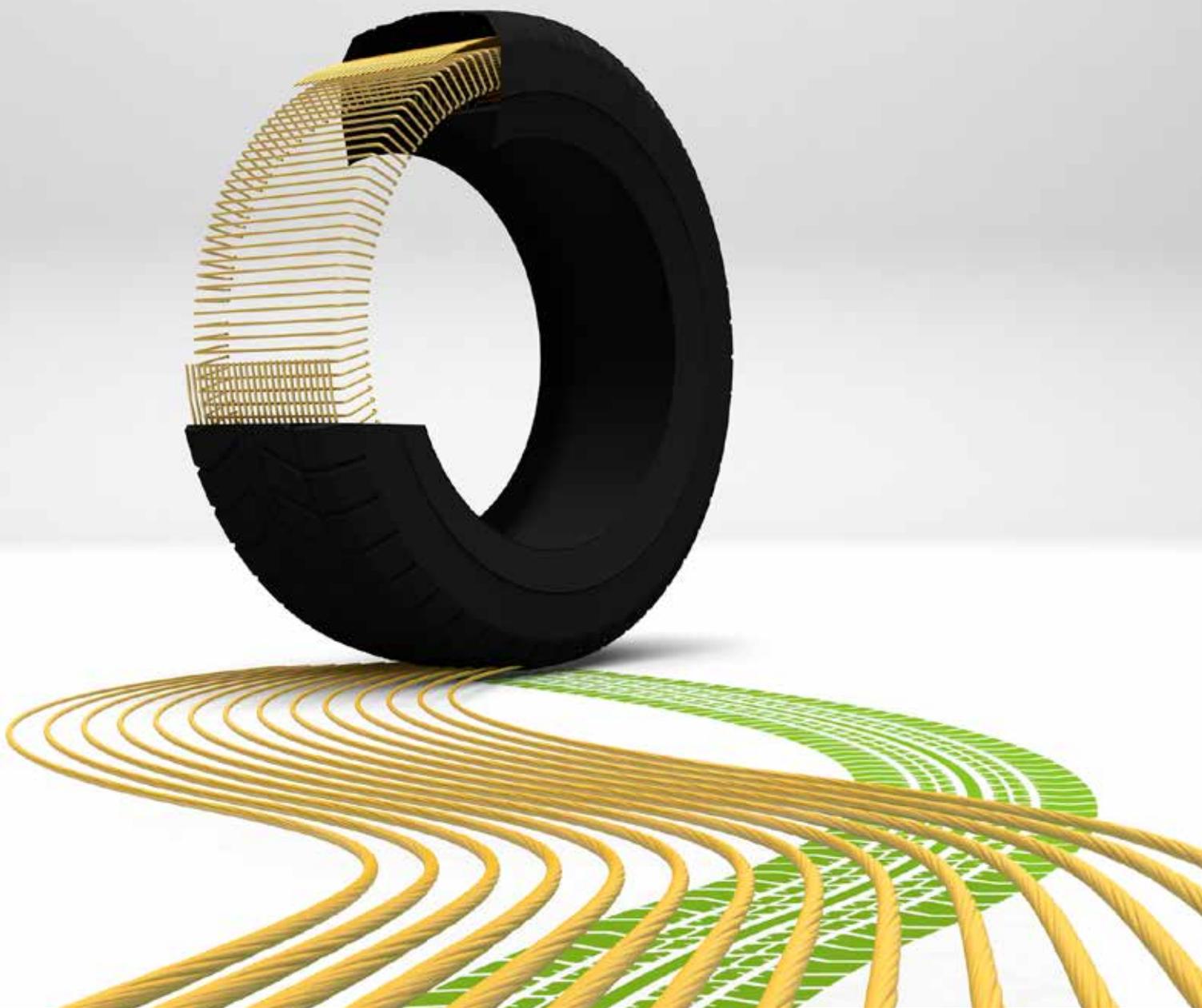


## Ternary Alloy on Wire: TAWI



Create a longer-lasting, more eco-friendly tire



## Why choose Bekaert?

### **The wire drawing and coating specialist**

Bekaert has the flexibility, the historical background, and the technical skills to create any steel wire no matter what shape, composition or mechanical characteristic. Headquartered in Belgium, we have been producing continuously for over 130 years and are available in over 120 countries.

### **Your strategic partner**

Our global footprint means that we can combine our strengths across our steel cord plants in Europe, North America, Latin America and Asia. Our local support means that we are at your service at all times. We will work closely with you to create a lasting solution that answers your needs.

### **Experience in automotive**

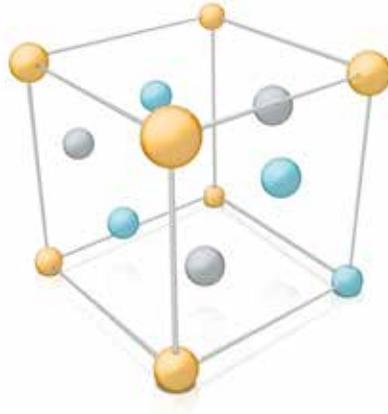
Bekaert is the global technology leader in steel wire transformation and coatings: one in every four tires in the world is reinforced with Bekaert steel cord.

Bekaert has a long history of manufacturing and developing products that drive value creation for its customers in the tire sector. Our strong focus on innovations for tire markets, and the company's firm belief in customer proximity all over the world, have made Bekaert a preferred supplier to the tire industry.

The product range for the automotive sector is extensive. In addition to tire cord, it includes: flat and shaped wire for components, wires and cable for window systems, clutch spring wire, wiper blades, etc. From the smallest spring to the strongest tire cord, we deliver safe and reliable products that allow for efficient production, fewer components, better performance, and more.

# A revolution in steel cord coatings

Bekaert introduces a breakthrough in tire reinforcement with **TAWI: Ternary Alloy Wire** coating on tire cord.



This patent-pending coating of Bekaert is comprised of copper, zinc and cobalt, and yields advancements in the performance and environmental impact of tires. TAWI uses cobalt where it is needed, at the interface between steel cord and rubber, eliminating the need for cobalt in the bulk rubber. Cobalt-free rubber compounds are more durable and exhibit less hysteresis.

Together with significantly better adhesion in hot and humid conditions, TAWI spearheads the creation of longer-lasting and more eco-friendly passenger and truck tires.

## Benefits



- outstanding adhesion in hot and humid climates



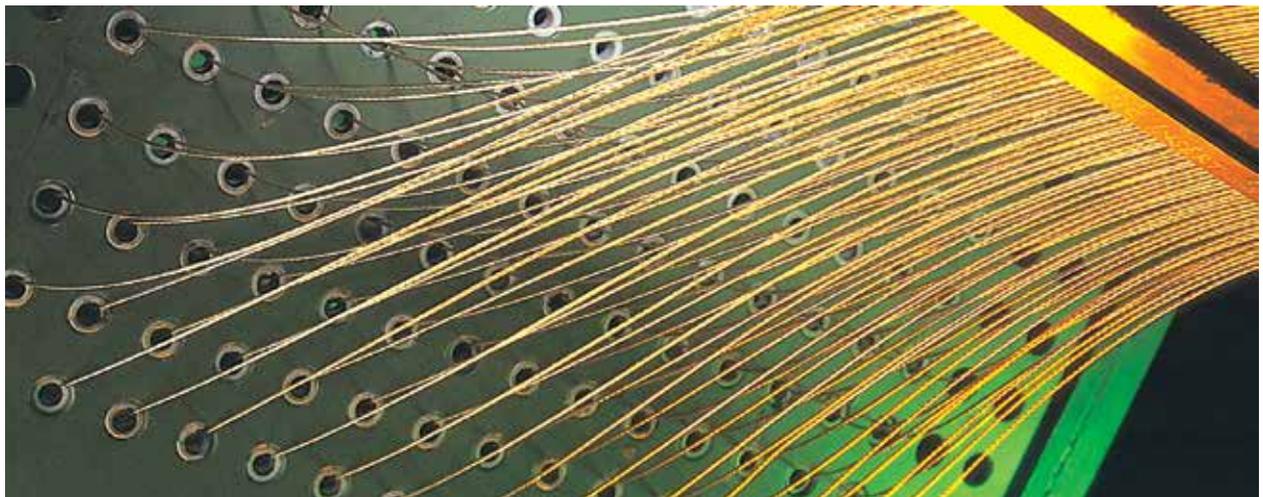
- longer lasting tires



- reduced rolling resistance



- reduced CO<sub>2</sub> emissions and fuel consumption

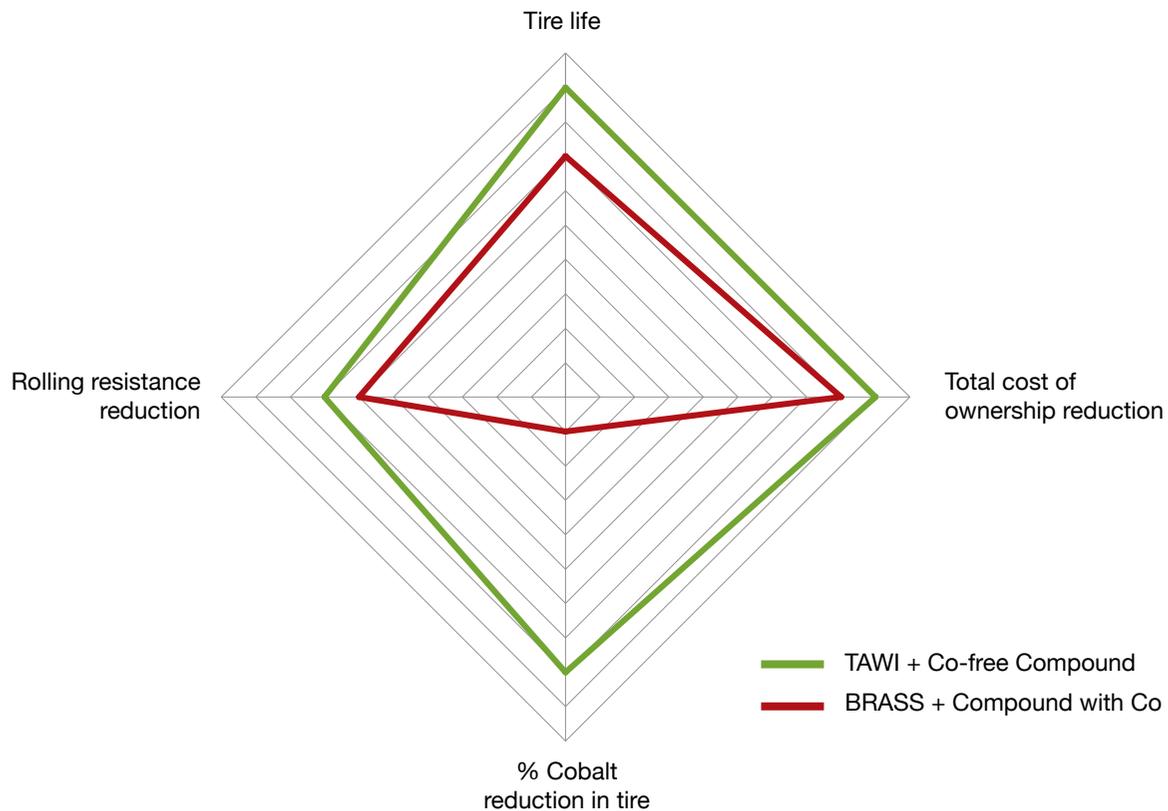


## Value creation at every step

Cobalt is an expensive strategic material. It is added to the entire rubber compound in order to promote the adhesion of the rubber compound to the steel cord.

However, cobalt also has negative side effects; namely, it increases the rubber's crack growth rate, accelerates heat aging of the rubber and does not contribute to sustainability of the tire manufacturing processes. Additionally, because cobalt is only needed at the interface between steel and rubber, more of it is used than necessary. At Bekaert, we considered an alternative: what if the cobalt was placed where it is needed - on the steel cord itself?

Not only is the adhesion comparable to brass, in hot and humid environments TAWI outperformed. Tests also indicate that by using TAWI with a cobalt-free compound, a tire's lifetime is increased and its rolling resistance is decreased.



Because cobalt is not added as a rubber ingredient, millions of euros could be saved by the tire industry. We expect that, thanks to TAWI, **1000's of tons** of cobalt will be eliminated each year in the worldwide tire market by 2020.

TAWI benefits pay off in climates where heat and humidity have negative effects on a tire's performance; we see an advantage for tires developed for emerging markets.

"In small PCR tires, this technology could remove a little more than 1g of cobalt from the skim rubber ... Larger reductions are possible in TBR tires featuring cobalt containing belt and body ply compounds."

**Joseph Walter, Tire Technology International, July 2014**

**Connect with us**

# The market's most sustainable tire cord solution

When we develop new products for the automotive market, we consider their present-day impact as well as their impact on the future. It is our aim to help tire manufacturers reach ambitious sustainability targets.

## Eco-friendly performance

Tires account for approximately 30% of a vehicle's fuel consumption as well its CO<sub>2</sub> emissions and other polluting exhaust. Without cobalt as a rubber ingredient, there is the potential for a significant **reduction in rolling resistance**. This reduction could improve fuel consumption, CO<sub>2</sub> emission levels and local air quality.

## Eco-friendly usage

A better bond with TAWI allows for **more re-treading** of tires. This reduces the amount of virgin materials needed and makes the rubber compound available for further reuse. We see tremendous value for both the truck and bus radial tire (TBR) manufacturers and end-users.

## Eco-friendly production

Cobalt is a heavy metal, and removing 80-90% of it from the current usage is a big step forward. For the cobalt plating process, developed by Bekaert, we have taken all possible environmental, health and safety requirements into account. For example, to avoid cobalt containing rinsing waters ending up in the waste water plant or in the environment, we have developed a **zero liquid discharge**, continuous plating process. We have proven that this can be done in an environmentally sustainable manner.



## Your partner in quality

As a leading provider of a comprehensive range of specialty steel wires and cords to automotive component and tire makers around the world, our products exemplify our continuous pursuit for excellence.

Your business is our business, and this includes learning about your processing challenges, quality standards and service needs. Before any product reaches you, its quality is assured.

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## Would you like to learn more about TAWI?

Let us know. We're listening.

Bekaert is a world market and technology leader in advanced solutions based on steel wire transformation and coatings.

Bekaert (Euronext Brussels: BEKB) was established in 1880 and is a global company headquartered in Belgium, employing approx. 30 000 people worldwide. Serving customers in 120 countries, Bekaert pursues sustainable profitable growth in all its activities.

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