

## Bekaert solutions in Energy & Mining Newsletter

Utilities – Green Energy & Clean Solutions – Mining – Petroleum & Gas

Dear Reader,

Energy and mining markets are clearly growing in importance. That is why Bekaert, too, is fully committed to developing innovative technologies and solutions that will enable customers in various energy sectors to extract, transmit, produce, and distribute energy and other resources in an efficient and safe way. Each issue of this newsletter covers a selection of products and solutions that Bekaert provides. Consider it an invitation to contact us at any time with any questions you may have.

### Fueling your business - Bekaert & Shell: Pushing pressure limits to maximize oil input



The days of 'easy oil' are over. As conventional oil reserves are running dry, oil companies need to invest in new technology that enables them to operate in seemingly inaccessible environments. Shell and Bekaert partnered to test Bekaert's steel-cord based pipe reinforcement solution which would allow Shell to push pressure limits and go farther...

#### Pushing the boundaries: exploring new materials

Shell was looking for an alternative pipe solution that could withstand pressures of up to 300 bar while offering excellent corrosion protection. This type of pipe was needed for subtracting oil by water injection, whereby water is injected under high pressure into the reservoir to sweep the remaining oil from the well. Existing solutions like traditional steel pipes or aramid-reinforced thermoplastic pipes fell short of meeting these needs. When Frans Janssen, senior researcher and polymer and composite specialist at Shell Global Solutions, found out about Bekaert's steel cord reinforced composite strips(SC-RTP), he was interested to test it. Bekaert's solution combines the advantages of a light-weight material which enables flexible design and easy installment with high corrosion resistance. In addition it offers the high pressure performance Shell needed thanks to the particular performance of steel cords.

#### Teaming up for better (together) results

As Shell learnt that Bekaert was an expert in steel cord corrosion protection research, the Shell team decided to set up a joint development project. Purpose of the project was to test the corrosion protection mechanism of the steel cord reinforced thermoplastic tapes based on a zinc coating, a combination which is new to the oil industry and for which there are no standard test results available. The research results had to reveal the amount of zinc needed to make sure that the solution warrants a lifespan of 20 years, which is critical to oil field operators.

Frans Janssen: "Shell was actively involved in defining the parameters of the test environment as these had to correspond with field conditions (temperature, pressure, exposure to CO<sub>2</sub>, O<sub>2</sub>, H<sub>2</sub> S,...), whereas

*Bekaert designed the experimental set-up, provided the required measurement techniques and developed the strip samples. Bringing in these complementary competencies really speeded up the process. Based on the research results Bekaert developed an SC-RTP corrosion model. This cleared the way for a first onshore field trial which was executed in Oman in March 2010. Given its success, opportunities for offshore testing are now being explored."*

Encouraged by the results of the first research project, Shell asked Bekaert to take the lead in an additional test – which started off mid 2009 and is currently ongoing – with modified parameters in order to expand the application range of the SC-RTP tape.

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### **Powering your performance - Bekaert takes home 2 awards for paper in support of the Electrical Transmission Industry**



The trend in the Electrical Transmission Industry is to operate transmission lines with higher emergency loadings resulting in high conductor temperatures. Although the industry had theories on the maximum zinc exposure temperature, nobody had ever conducted a study to determine the temperature with actual exposure testing.

In support of the need of the industry and the conductor manufacturer community for research findings on the matter, Bekaert conducted a 9 month temperature exposure study. The study revealed that the industry had for many years assumed a maximum temperature that was too high for zinc coatings by approximately 50 °C. The study found that temperatures above approximately 200°C can have a negative impact on the zinc coating. Test results indicated that ZnAl coatings (such as Bezinal, which is safe up to 350°C), can be exposed to higher temperatures and are thus more fit for high temperature transmission lines.

The Bekaert paper, titled Evaluation of high temperature behavior of Zn and ZnAl coatings on core wires and strands for ACSR, ACSS and alike overhead power conductors also caught the attention of the International Wire and Machinery Association (IWMA), who awarded the paper with the Ferrous Trophy at the occasion of the Wire Düsseldorf Exhibition in April 2010. A month later The Wire Association International granted Bekaert the award for the Best Ferrous technical paper in 2009 at the Wire Expo Breakfast Meeting in Milwaukee (Wisconsin, USA). A full copy of the paper can be requested through the contact module.

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### **Renewing your energy - Backsheets: harnessing the power of the sun**



Bekaert Specialty Films used its expertise in flexible films to make laminate backsheets for photovoltaic (PV) modules, a critical component in solar systems. Backsheets are essential in the overall design of crystalline silicon PV modules. Their job is to insulate electronics and protect photovoltaic cells from the environment by preventing moisture and UV rays from damaging sensitive electrical components.

**Solar Gard® PV Backsheet: a viable solution**

The Solar Gard® PV T series gives crystalline silicon PV module manufacturers a new source for backsheets. This is critical because as demand increases solar panel manufacturers and integrators will need more suppliers and Solar Gard® has the immediate capacity to manufacture more than 4 million square meters -- 400 MW -- per year. For US manufacturers the Bekaert Specialty Films Southern California location is another advantage bringing additional economies in shipping and logistics.

In recent years nearly 30% of the crystalline silicon PV modules in the world have been produced in China. Solar Gard® PV T series has already gained recognition in the Chinese market as a quality product and exhibiting at the May SNEC PV show in Shanghai helped raise that profile even further. The performance of the interlayer adhesion couple with the superior adhesion to the encapsulated EVA (ethylene vinyl acetate) have impressed the Chinese module manufacturers and the first commercial sales of the new series are now underway.

You might want to visit our booth at the 25th European Photovoltaic Solar Energy Conference PVSEC2010 in Valencia, Spain, from 6 to 9 September 2010.

**Digging into innovation - Prolonging the lifespan of conveyor belts**



The transportation of minerals from the loading to the disposal point is a critical activity and one of the most vital cost components of mining operations. Most times mining sites employ the use of a conveyor belt to transport mining ore as its maintenance cost compares favorably against the maintenance cost for trucks.

Still, the weak point in conveyor belts remains their poor resistance against cuts, rips and impact, which significantly reduces their lifetime. Especially longitudinal tears are a problem and are 90% of the time caused by objects that become stuck in the conveyor system. To keep these belt rips to a minimum Bekaert has been working with several conveyor belt manufacturers to develop and integrate a 'self protecting conveyor belt': a belt which is reinforced from its inside core, using steel cord.

**The right reinforcement solution for the right application**

By embedding high-strength steel cords in the carcass of the conveyor belt, in either or both the longitudinal and transversal direction of the belt, solid protection can be provided against impact and rip damage. When excellent performance in elongation behavior and/or impact resistance is required, steel cords used in longitudinal direction are the preferred option. Steel cords used in transversal direction offer optimal cutting resistance. In some cases the transversal cord will avoid that an object penetrates the conveyor belt. Should however a heavy or sharp object get stuck in the installation, damage is reduced as - thanks to the transversal protection - the forces are deviated towards the outside of the belt, reducing the cut to a relatively short length.

Bekaert Belt Cord – a steel cord reinforcement solution which combines very low elongation with high breaking strengths of up to more than 200 kN – has proven to be an ideal solution for long-haul conveyor belts. These belts require higher nominal strength qualities as they are subject to more tensions

determined by the length and inclination of the belt. This is why Bekaert Belt Cord? was selected for the downhill 12 km-long tunnel conveyor system implemented for the Los Pelambres project in Chile.

Short-haul conveyor belts are subject to 'continuous' impact due to intensive loading of the ores and are hence more vulnerable for cutting. For this type Fleximat?, a woven steel cord fabric with steel cord in transversal and/or longitudinal direction fixed together in 1 ply, is the recommended solution. The combined advantages of impact and cutting resistance makes Fleximat? a suitable solution for other industrial conveyor belt applications too where the probability of accidental damage due to obstruction of strange objects is high, such as in cokes-sinter stone quarries or for waste treatment.



Different types of steel cord can be used to design a specific tailor made solution fit for the final application. Bekaert has developed steel cords in different open construction types for excellent steel-to-rubber bonding and with the optimum quantity of zinc coating for corrosive protection. Currently we are developing a new cord for a conveyor belt strength up till 10 000 N/mm.

Bekaert's conveyor belt reinforcement solutions have been applied in several major mining projects all over the globe including RAG's Prosper Haniel Mine in Germany, Los Pelambres in the Chilean Andes, lignite mining from RWE in Germany and Sasol in South Africa.

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### Come and see us at the fairs

September 6-9, Valencia (Spain)	<b>25th European Photovoltaic Solar Energy Conference PVSEC 2010</b> (sputter hardware for PV, rotatable sputter targets, sawing wire, Solar Gard Window Films) – booth A52, hall 4, level 2
September 13-17, Munich (Germany)	<b>Ifat Entsorga 2010</b> , worlds leading fair for water, sewage, waste and raw materials management (pressure vessels – desalination - ProtecTM)
September 28, London (UK)	<b>Tunnels and Tunneling Conference 2010</b> (Dramix steel fibers for tunnel applications)
September 28 – October 1, Düsseldorf (Germany)	<b>Glasstec – Solarpeq</b> (rotatable sputter targets), hall 12, booth B29
October 3-6, Tel Aviv (Israel)	<b>Euromed 2010</b> (pressure vessels – desalination - ProtecTM)
November 17, Mechelen (Belgium)	<b>Aquarama 2010</b> (pressure vessels – desalination - ProtecTM)

Bekaert ([www.bekaert.com](http://www.bekaert.com)) is a global technological leader in its two core competences: advanced metal transformation and advanced materials and coatings, and a market leader in drawn wire products and applications. Bekaert (Euronext Brussels: BEKB) is a global company with headquarters in Belgium, employing 23 000 people worldwide. Serving customers in 120 countries, Bekaert pursues sustainable profitable growth in all its activities and generates annual combined sales of € 4 billion.

This newsletter is equally available on the Utilities industry section on Bekaert.com

**Responsible editor:**

K. Bohez, Corporate Communication Manager, President Kennedypark 18, B-8500 Kortrijk