20%
of a vehicle's fuel efficiency is driven by its tires*

70%
of the world's Carbon Black is consumed by the tire industry*

and patent agreement and commenced a fruitful exchange of ideas, technology, samples, and test results – all culminating in a joint WTO Patent Application filed in March of 2011.

What emerged was a new composite material described as the Birla Carbon-Lanxess-Composite (BCLC); that is comprised of a unique surface-modified rubber Carbon Black, CD2125XZ and the Lanxess functionalized solution-styrene-butadiene (SSBR) elastomer, PBR4088. This powerful combination results in dramatically improved carbon-black-elastomer interaction and reduced Carbon Black networking to achieve significantly lower heat buildup and rolling resistance in summer tire tread compounds, practically matching that of silica. Additionally, this new functionalized rubber grade Carbon Black appears to have the ability to serve as a "technical platform" in its current form or with other surface modifications to optimize the Carbon Black elastomer interaction in conjunction with other specialty functionalized solution SBR elastomers, broadening its potential in a wider array of elastomers and performance ranges, not achievable with standard Carbon Blacks today.

Says Dr. Charles Herd, "Working with another company outside of the tire industry but one who supplies the tire industry in such a collaborative manner was invigorating and illuminating, bringing a fresh perspective to the daunting task of truly reaching new levels of performance in heat buildup reduction for Carbon Black. The teamwork within and between our companies simply has been fantastic. The synergy between Carbon Black and elastomer manufacturers is very obvious and will be further exploited as we continue to develop the composite technology approach to meet the ever-increasing demands placed upon us as a supplier and as a responsible manufacturing entity in global society as a whole."

The Birla Carbon-Lanxess-Composite – The Path Forward

The virtues of this product/ process were immense in not only potentially supplying a carbon-black-based solution to lowering rolling resistance, but also providing our customers with energy savings and increased tire throughput. For example, the learnings from the study showed that the BCLC:

- Lowers compound cost as the BCLC does not require expensive silane for coupling the reinforcing agent to the elastomer as is required for silica
- Provides easy dispersion for potentially shorter mixing cycles and lower energy costs

- Increases factory throughput and lowers energy costs versus silica-based compounds and does not require special equipment to handle the capture of volatile organic compounds (VOCs) that are emitted when silica-silane systems are used
- Prevents premature wear of factory rubber mixers as silica is much more abrasive than Carbon Black during mixing and extrusion
- All of these factors provide tremendous potential for cost savings for our customers, as feedback from the marketplace tells us that our customers truly prefer a simpler, better processing and higher throughput solution over silica

To introduce the product, the team followed a steady and systematic approach. Steve Crossley, Rubber Lab Manager of Birla Carbon and Judy Douglas, Technical Marketing North America of Lanxess first presented a joint paper to the Rubber Division of American Chemical Society towards the end of 2011 post optimization and validation of the process. In November 2012, Dr. Charles Herd on behalf of Birla Carbon, presented a webinar at the Rubber World Conference and invited the global tire companies. In addition, the RCB Product Technology team has been aggressively promoting the product during 2012 and 2013 to our tire customers in all regions of the world. In response there has been a very high degree of interest expressed by our customers in this product and currently samples have been sent to these global tire customers in the first and second quarter of 2013. While the validation of the performance is awaited from the customers, the set-up for large scale trial and commercialization continues by the team internally.

Says Lester Tyra, "We expect that this breakthrough product will generate additional interest across the tire industry and eventually may lead to some strategic development efforts to support commercializing a low rolling resistance solution. Our approach has been unique and has caught the interest of the major players as a possible alternative to silica."

A five-year effort, this project was a key platform to demonstrate our technological edge and truly encompasses all aspects of the vision to be the Most Respected, Most Dynamic and Most Sustainable Carbon Black business globally.

For further information about the research you may write to **charles.herd@adityabirla.com**.

Carbon Black constitutes approximately

25%
of the tire weight*

*Source: *The Future of Green Tires to 2017:* Market Reports, Smithers Rapra