

## **Chances and Threats for Natural Rubber for Use in Low Rolling Resistance Tyres**

**J.W.M. Noordermeer, W.K. Dierkes, S.S. Sarkawi\*, W. Kaewsakul and K. Sahakaro,  
Universiteit Twente**

Since the upcoming of the ECO tyres, silica is on an upwards trend in passenger car tyre tread compounding. The silica-silane filler system allows for reducing the rolling resistance of tyres compared to carbon black filled material, which results in fuel savings of the car. Elastomers applied for this technology are primarily synthetic rubbers: solution - styrene butadiene rubber (sSBR) and butadiene rubber (BR). In contrast to this, truck tyres are mainly made from natural rubber (NR); being the most ecological polymer of all as it is a natural, green, sustainable product. However, this causes a problem as NR does not work with the silica/coupling agent systems, and possibilities to change the polymer are limited. Making NR compatible with silica remains a challenge, but also offers a tremendous potential for a reduction of energy consumption for transport. The main difference between NR and synthetic polymers is the presence of a considerable amount of non-rubber constituents in NR. Proteins and the coupling agent have an antagonistic effect in silica reinforcement of natural rubber. The utilization of modified NR and deproteinized NR (DPNR) is a possibility to enhance the compatibility between silica and NR, as well as to minimize protein adsorption on the silica surfaces, respectively. This enables the rubber compounder to use this natural polymer for truck tyre treads, making the DPNR/silica systems a green material in terms of composition as well as application. The presentation will give an overview of a series of studies into the problems encountered with NR/silica systems, and the feasibility of implementing silica technology in natural rubber for low rolling resistance tyres.