



Imad L. Al-Qadi

BENEFITS OF SUPER SINGLES

The trucking industry can lower its operating costs by switching to super single tyres. Fleet managers can slash fuel bills and increase cargo capacity, says Imad L Al-Qadi, a pioneer in road and tyre research

Tyre Asia News Bureau

Although some sceptics still question the relative advantages of wide-base tyres or super singles over the conventional dual-tyre system on commercial trucks, extensive research by the Illinois Center for Transportation (ICT) shows that the optimal use of the new generation 'super single' tyres would help fleet companies build healthy bottom lines. In addition to providing economic advantages, wide-base tyres would also benefit the environment by using less fossil fuel, Imad L Al-Qadi, ICT Director and Founder Professor of Engineering at the University of Illinois, told **Tyre Asia**.

Modern wide-base tyres, which are designed to carry heavy loads and distribute axle load, have a better structural design, Al-Qadi says. "A single wide-base tyre and wheel combination is lighter than two standard tyres and wheels. A lower weight results in lower rolling resistance, which accounts for almost 35% of the energy

supplied by the engine. Dropping rolling resistance helps increase fuel savings," Al-Qadi explains. Innovation in wide-base tyre designs, he points out, has reduced rolling resistance by as much as 12%.

Al-Qadi calculates that if long-haul truck companies log 150,000 miles per year, the new generation of wide-base tyres could contribute to savings of over 3,760 litres of fuel per year per truck. This would also result in reduced exhaust emission of carbon dioxide by more than four tonnes annually. "We estimate that the cost savings in terms of the environment is approximately \$500 annually per truck," Al-Qadi says. Additional benefits from using wide-base tyres include a lower punishing load impact.

Moreover, using one tyre instead of two improves the truck's stability, resulting in an increase in the wheels' centres.

Heightened interest

After receiving positive response from fleet managers, Al-Qadi and his research-

ers continued their study on wide-base tyres. Through simulation and extensive use of advanced modelling research, they were able to better quantify the damage to pavements. The researchers concluded that pavement damage due to wide-base tyres was less for interstate highways but greater for local roads. These findings will guide government agencies as they implement appropriate load regulations and road pricing of trucking operations when allowing wide-base tyres, Al-Qadi says.

Drawing from his years of research, he suggests that wide-base tyres should be used more in the steering axle because this would reduce damage to the pavement, and they offer better handling. As fleet managers learn the economic advantage of using wide-base tyres, Al-Qadi hopes that the demand for such tyres will grow, which would further reduce their costs as has happened in Europe. Recently, Canada has announced new rules allowing the use of super-singles, which indicates that a new generation of wide-base tyres is gaining acceptance. ▲

AEG'S AIRLESS TYRE

Military tyre-wheel (MTW) assembly for future tactical and combat vehicles is placing emphasis on handling, traction, and cornering tyre performance for the light trucks, write Abraham Pannikottu, Jon Gerhardt and Sunil Bandaru

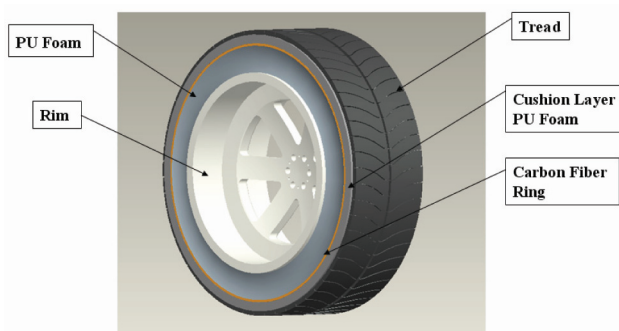
In order to meet the high performance standards of combat vehicles, solid tyre with aspect ratio lower than 0.35 have been developed by American Engineering Group (AEG), Akron, Ohio

The features of the tyres are: Tyre Size: LT225/35R19; Rim Width: 7.0 inches; Tread Width: 7.6 inches; Overall Diameter: 25.0 inches; Speed rating: 40mph

AEG aims to eliminate tyre blowouts with its remarkable integrated Carbon Fibre Ring-Wheel "MTW" assembly, a solid one-piece wheel-and-tread system that could soon enter manufacturing. The MTW's rim is bonded to soft polyurethane foam that

provides the shock-absorbing property of a traditional pneumatic tyre. The circumference of the soft polyurethane foam layer is bonded to a carbon fibre ring along with tyre tread. By varying the thickness and geometry of the polyurethane soft layer, this unique tyre-wheel assembly can generate a wide array of ride and handling performance.

MTW's vertical stiffness (ride comfort per-



formance) and lateral stiffness (handling and cornering performance) can both be optimised, pushing the performance envelope in various military applications. ▲