E2-03: Depolymerized natural rubber as a viscosity modifier for miscellaneous applications

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Chemical modification of natural rubber(NR) has been an interesting method for the production of new polymeric materials. Depolymerized NR was an important derivative which can be produced by degradation of NR by different processes.

The development of commercially viable, lighter coloured, non toxic grade (proprietary) depolymerized rubbber by the RRISL, led to research and development work on potential industrial applications of this material as a viscosity modifier suitable for a range of raw rubber blend formulations used mainly in the tyre industry.

Although the processability of NR cannot be predicted by any single parameter, viscosity still remained the most widely used measure of processing quality. During mixing, good control of compound within fairly narrow limits was essential to ensure smooth operation during subsequent processing such as extrusion and injection moulding. Thus, at intermediate levels, viscosity was a useful guide to the processing behaviour of masticated rubber.

Like other elastomers, the physical properties of NR vulcanizates were dependent on several variables such as compound viscosity, type and amount of fillers, degree of dispersion and type of crosslinking.

The results showed that incorporation of depolymerized rubber into the formulations to replace processing oils can significantly reduce the viscosity of the raw blends, whilst the vulcanizates showed improvement in abrasion resistance. Further, the use of depolymerized rubber as a speciality rubber in raw rubber blends improved other properties due to its vulcanizable characteristics.