ABSTRACT

It is well known that the vulcanization with MBT does not give good mechanical properties, unless a fatty acid is used in addition to zinc oxide. Although valuable information have been reported, the mechanism of vulcanization still remains a subject of speculation. The vulcanization reaction is believed to proceed via a complex formed by MBT, ZnO and fatty acid. For this complex two structures have been suggested. This complex was found to be more reactive and capable of opening the octa-hedral sulphur ring.

In this study, activation of vulcanization reaction by metal stearates are discussed. Stearates of calcium, magnesium, barium, lead, nickel and ferric have been used as activators. With metal stearates higher mod values and cross-link densities were obtained. But some metal stearates were found to reduce the scorch time. They were also found to increase the efficiency of the vulcanization reaction as stearic acid does. Zinc stearates and the zinc soaps of most other straight chain fatty acids are only slightly

soluble in rubber. The solubility of metal stearates is indirectly increased by dispersing it in an aromatic rubber process oil such as dutrex R heated to about 140°C. This is used as the activator in the vulcanization reaction in place of stearic acid and rubber process oil. In the absence of antioxidant, metal stearate activated compounds were superior in ageing than stearic acid activated compound. In combination with antioxidant metal salts were found to act synergistically to retard the oxidation process of vulcanizates. The activity of metal stearate was found to be enhanced by dispersion method and the final vulcanizates obtained were of superior stability to oxidative and thermal degradation.