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INFLUENCE OF ENVIRONMENTAL CONDITIONS ON ADHESIVE JOINT FAILURE

VERA KOVACEVIC
Institute of Chemical Engineering, Faculty of Technology, University of Zagreb, Yugoslavia

I MUDRI
Research Institute, Rubber and Footwear Industries, Borovo, Yugoslavia

I SMIT
"Ruder Boskovic" Institute, Zagreb, Yugoslavia

D HACE, M BRAVAR AND J AZMAN
"Peko" Footwear Industries, Trizic, Yugoslavia

1. INTRODUCTION

Neoprene contact cements have important uses in the shoe industry, particularly for attaching soles and laminating plastics to wood and other surfaces in the automobile and construction industries [1].

Polychloroprene based adhesives were able to establish themselves in many branches of industry because of their relatively high initial strength and very short press times, two factors which considerably shorten production cycles [2].
They are known for their capability of bonding together different materials, in short contact times; which is associated with the crystallisation process [3-6].

Polychloroprene is available in a variety of microstructures; the higher the trans-1,4-content the more rapidly the polymer crystalises on deposition from solvent.

The rate of crystallisation markedly affects the cohesive strength and the open time (or time permissible before the two coated surfaces must be brought into contact). Obviously the more rapid and complete the crystallisation, the shorter the open time and the greater the ultimate peel strength of the bond [1].

Highly reactive, tertiary allyic chlorine is present in neoprene as a result of 1-2 polymerization. This comprises about 1.6% of the total chlorine in neoprene and makes the rapid curing of neoprene possible [7].

Formulation characteristics of polychloroprene adhesives, primarily their resin but also other ingredients, should be adjusted according to the desired adhesive function. The request for special substances is therefore inevitable. Quite frequently ZnO and MgO in the role of vulcanising agents[8] are present [7-9].

Metal oxides are essential in vulcanising curing systems. Many metal oxides have a vulcanising affect on chloroprene, but the best system is a combination of magnesium and zinc oxides [7-9]. The linear phenolic resin first reacts with the MgO in the presence of water. Presumably, the magnesium is co-ordinately and collectively bound to the hydroxyls of the methylol and phenolic groups, resulting in a three-dimensional system [1].

Also cross-linking substances are added as well as anti-ageing agents and fillers [4,10]. Alkylphenolic and