

**RUBBER COMPOUND FLOW ANALYSIS AND
DEVELOPMENT OF AN EFFICIENT BLANK
DESIGN FOR TIE DOWN STRAPS PRODUCTION**

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ABSTRACT

Rubber Tie Down Strap (TDS) is a compression moulded product used for the cargo supporting in the transportation. It takes considerably longer time to feed compound into the mould due to the existing preform. Therefore suitable preform is required for TDS production. This research was conducted to develop a suitable preform for TDS production. When designing suitable preformed compound, flow behaviour of the compound inside the mould needed to be considered. Therefore rubber compound flow analysis was conducted as the first stage of the research and according to its results suitable preform was selected as the second stage of the research. Two experiments were conducted under the rubber compound flow analysis using flow direction inside the mould and calendered direction as the experimental factors. Weights of the flash in the four directions were taken as observations. The collected data from the experiments were analysed by Analysis of Variance (ANOVA) technique and Turkey's analysis in Minitab statistical software. Using the results from the rubber compound flow analysis preforms were designed and tested in a CRD experiment for feeding efficiency and defects, and the collected data were analysed by ANOVA and Turkey's Analysis in Minitab software. Results show that rubber compound tends to flow in the longitudinal direction than the lateral direction inside the mould and also the flow direction was not affected by the calendered direction. Even though the feeding time was higher current preform design has the highest material use efficiency. Using a single calendered sheet as a preform can reduce the feeding time, but with a very low material use efficiency.

Key words: Rubber Tie Down Strap, preform, compound, mould, flow behaviour