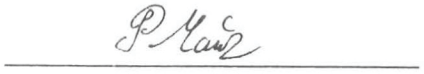
Marisa Poolploub 2007: A Study of Rubber Sheet Tiles using Egyptian Payrus or Vertiver Grass as Mixture Components for Children's Playground. Master of Engineering (Safety Engineering), Major Field: Safety Engineering, Interdisciplinary Graduate Program. Thesis Advisor: Assistant Professor Chavalek Vanichavatin, Ph.D. 108 pages.

The objective of this research is to study the manufacturing process and certain engineering properties of rubber sheet tiles for children's playground from mixtures of natural rubber and Egyptian Payrus or Vertiver Grass. The research comprised the following 3 steps: 1) The Egyptian Payrus and Vertiver Grass moisture content determinations. 2) The preparations of Egyptian Payrus, Vertiver Grass and natural rubber sheets samples and the determination of the most appropriate method of prototype rubber sheets forming. 3) The determination of certain engineering properties of prototype rubber sheets, imported rubber sheets and sample rubber sheets from the rubber institute. Average moisture content of Egyptian Payrus and Vertiver were found to be 72.92% (s.d. 0.74) and 71.47% (s.d. 1.98) respectively. The steps in forming prototype sheet tiles involved drying of 1-2 millimeter pieces of Egyptian Payrus and Vertiver Grass and mixed into natural rubber sheets with some chemicals added to improve the quality of safety sheet tiles. The ratio of natural rubber to Egyptian Payrus or Vertiver Grass were 1:0 1:1 1:2 and 1:3 by weight. It was found that the deviation from square shape of all samples was insignificant (less than 0.02 millimeter at s.d. 0.01). The prototype sheet tiles made from a mixture of 1:1 ratio (natural rubber: Egyptian Payrus) exhibited the best engineering properties with specific gravity of 0.99 (s.d. 0), tensile strength of 1.507 megapascal (s.d. 0.06), elongation at break of 191.99% (s.d. 8.29), hardness of 59.49 Shore A (s.d. 3.69) and the reductions of tensile strength and elongation at break of 14.83% (s.d. 6.33) and 13.89% (s.d. 6.41) respectively after ageing tests which compared favourably with the samples from imported tiles and those from the rubber institute. Moreover, the material cost of the 1:1 prototype sheet tile is about 9% of the sale price of the imported tile.



Student's signature

Thesis Advisor's signature

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