**ساخت سطوح ورزشی SBR از ضایعات لاستیک با استفاده از امولسیون پلیمری**

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**Abstract:**

Given the economic and environmental significance of recycling polymer waste, this research aims to establish a technique for producing SBR-based sports surfaces by utilizing rubber waste through polymer emulsification. Multiple formulations consisting of styrene-butadiene rubber and polystyrene in weight distributions of 30/70, 50/50, and 70/30, combined with various percentages (20%, 25%, and 30%) of bitumen emulsion enriched with bentonite nanoclay, were evaluated. Findings indicated that the 30/70 SBR/PS composition exhibited optimal characteristics for sports surface applications. Furthermore, the effects of loading ratios and mixture compositions on mechanical properties such as tensile strength, hardness, and abrasion resistance were thoroughly analyzed.

**Keywords:** SBR, recycled rubber, polymer emulsion, tensile resistance, hardness, abrasion resilience.

**مقدمه:**

مواد مرکب از ترکیب چند ماده‌ مختلف با ویژگی‌های فیزیکی و شیمیایی متفاوت شکل می‌گیرند تا مواد جدیدی با خصوصیات بهبودیافته تولید شوند. در صنایع مختلف، به‌ویژه مهندسی لاستیک، این مواد به دلیل مزایای منحصربه‌فرد خود به شکل گسترده ای مورد استفاده قرار می‌گیرند.

**Methodology:**

This study investigates different formulations of shredded rubber and polystyrene blended with bitumen emulsion reinforced with bentonite nanoclay. The materials were mixed in controlled weight ratios and assessed for their mechanical attributes. The key stages in the study included:

1. Sourcing raw materials such as polystyrene, shredded rubber, and bitumen emulsion.
2. Homogenizing the materials through precision mixing and extrusion techniques.
3. Molding and processing the rubber surfaces to standard specifications.
4. Conducting comprehensive tests measuring tensile strength, hardness, and abrasion resistance.

**نتایج و بحث:**

نتایج به‌دست آمده نشان می‌دهد که نسبت 30/70 از SBR/PS در قیاس با سایر فرمولها تعادل خوبی بین سختی، مقاومت سایشی و انعطاف‌پذیری دارد. ضمنا، افزودن نانو رس به امولسیون قیری منجر به ثبات بهتر مخلوط و افزایش دوام محصول نهایی شد.

**Conclusion:**

This research highlights that the strategic use of an optimal blend of recycled rubber and polymer emulsion results in durable, safe, and cost-effective sports surfaces. By implementing this method, waste reduction and environmental sustainability can be significantly improved while providing a high-quality alternative to conventional solutions.