

## Evaluation of Modified Asphalt Mixture with Hospital Spun-Bond Waste for Enhanced Crack Resistance

**Authors :** Ziba Talaeizadeh, Taghi Ebadi

**Abstract :** Hospitals and medical centers generate a wide array of infectious waste on a daily basis, leading to pressing environmental concerns associated with proper disposal. Disposable plastic items and spun-bond clothing, commonly made from polypropylene, pose a significant risk of disease transmission, necessitating specialized waste management strategies. Incorporating these materials into bituminous asphalt production offers a potential solution, as it can modify asphalt mixtures and reduce susceptibility to cracking. This study aims to assess the crack resistance of asphalt mixtures modified with hospital spun-bond waste. Asphalt mixtures were prepared using the Marshall method, with spun-bond waste added in varying proportions (5% to 20%). The Semi-Circular Bending (SCB) test was conducted to evaluate asphalt fracture behavior under Mode I loading at controlled speeds of 5, 20, and 50 millimeters per minute and an average temperature of 25°C. Parameters such as fracture energy (FE) and Crack Resistance Index (CRI) were quantified. The results indicate that the addition of 10% to 15% spun-bond polypropylene polymer enhances the performance of the modified mixture, resulting in an 18% increase in fracture energy and an 11% reduction in cracking stiffness compared to the control sample. Further investigations involving factors like compaction level, bitumen type, and aggregate grading are recommended to address medical waste management and mitigate asphalt pavement cracking issues.

**Keywords :** asphalt cracking, hospital waste, semi-circular bending test, spun-bond

**Conference Title :** ICWMRE 2023 : International Conference on Waste Management, Recycling and Environment

**Conference Location :** Vancouver, Canada

**Conference Dates :** September 25-26, 2023