

# Modifikasi bitumen dengan penambahan high density polyethylene hdpe atau polypropylene pp dengan metode hot melt mixing = Modification of bitumen by high density polyethylene hdpe or polypropylene pp with hot melt mixing

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## Abstrak

**ABSTRAK**  
Bitumen merupakan bahan penyusun aspal serta memiliki fungsi sebagai binder pada aspal. Sifat dari bitumen mempengaruhi kinerja dari aspal. Aspal merupakan material yang biasanya digunakan untuk infrastruktur seperti aplikasi pada jalanan. Aspal merupakan material yang relatif murah namun aspal memiliki beberapa kelemahan karena sifat material penyusunya dan kondisi lingkungan sehingga dibutuhkan langkah untuk menangani kelemahan pada aspal tersebut. Salah satu metode yang dapat dilakukan untuk menangani masalah tersebut adalah melakukan pencampuran bitumen (bahan pengikat pada aspal) dengan limbah plastik kresek (high density polyethylene atau polypropylene) untuk membentuk suatu komposit Polymer Modified Bitumen (PMB) sehingga performa dari aspal dapat meningkat dan membuat limbah plastik lebih berguna kembali. Percobaan ini menggunakan 2 buah jenis plastik kresek dan 3 buah variabel berbeda yaitu konsentrasi plastik kresek, waktu, dan temperatur pencampuran. Plastik kresek yang digunakan adalah HDPE dan PP. Konsentrasi High Density Polyethylene (HDPE) yang digunakan adalah 4%, 5%, dan 6%, konsentrasi Polypropylene (PP) yang digunakan adalah 3%, 4%, dan 5%, waktu pencampuran yang digunakan adalah 15, 30, dan 45 menit, dan juga temperatur pencampuran yang digunakan adalah 140oC sampai dengan 200oC. Metode pencampuran basah digunakan untuk mencampurkan kedua material tersebut. Hasil atau kualitas komposit diketahui dengan melakukan investigasi melalui pengujian penetrasi, daktilitas, titik leleh, Scanning Electron Microscope (SEM), Fourier Transform Infrared (FTIR), Thermo Gravimetric Analyzer (TGA), dan Differential Scanning Calorimetry (DSC). Hasil penelitian mengenai PMB menyimpulkan bahwa kompatibilitas antara plastik kresek baik HDPE dan PP kurang baik terhadap bitumen namun penambahan plastik kresek terhadap bitumen meningkatkan sifat mekanik dan kestabilan termal bitumen.

**ABSTRACT**  
Bitumen is a binder and one of constituents of asphalt so the characteristic of bitumen affects asphalt performance. Asphalt is a material that usually used in road application. However, there are also drawbacks of asphalt as material on pathway because of its constituents and environment condition. For the examples, asphalt is brittle in low temperature and will be soften when temperature increase so the action is needed to address this problems. One solution to solve these problems by adding wasted plastic bags made by High Density Polyethylene (HDPE) or Polypropylene (PP) to bitumen so it can increase asphalt efficiency and make wasted plastic bag more useful. This experiment used two type of plastic bags and three variables (concentration of plastic bags, mixing time, and mixing temperature). HDPE concentrations used were 4%, 5%, and 6%, PP concentrations used were 3%, 4%, and 5%, mixing times used were 15, 30, and 45 minutes, and also mixing temperatures were 140oC up to 200oC. Hot melt mixing method was used to mix those material. The quality of mixing material (composite) was tested by some instruments like ductility tester, softening point tester, penetration testing, Scanning Electron Microscope (SEM), Fourier Transform Infrared (FTIR), Thermo Gravimetric Analyzer (TGA) and Differential Scanning

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