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Temasek POLYTECHNIC
CREATING TOMORROW

RECYCLED MIXED POLYMER MODIFIERS IN BITUMINOUS MATERIALS

TECHNOLOGY OVERVIEW

Due to high level of contamination, high cost of sorting and non-homogeneity of feedstock, the usage of recycled plastic wastes has been low both locally and globally. The majority of these wastes would have to be disposed of either through landfilling or incineration. We have developed a technology that transforms as-received municipal solid waste mixed plastics into standardised forms (fibres, aggregates and polymer modifiers) without the need for rigorous waste sorting. These can be used for incorporating into bituminous mixtures for infrastructure uses in construction.

TECHNICAL SPECIFICATIONS

The technology consists of the following proprietary systems:

- Sink-float vessels for high separation efficiency of as-received mixed plastic wastes.
- Calibration library for accurate real-time measurement of as-received mixed plastic waste composition.
- Compositional adjustment/standardisation unit.
- Advanced mechanical recycling (aMR) process line.

UNIQUE VALUE PROPOSITION

Mixed plastic wastes, in their as-received composition and condition, are anticipated to vary drastically from batch to batch, limiting its application.

We have developed a Near Infra-Red (NIR) calibration model via a large database of different plastic signatures and machine learning to characterise mixed plastic wastes, for controlling its composition for consistency.

This technology could enhance numerous technical properties of bituminous mixtures; and offers cost savings of at least 15%-25% compared to conventional/commercial polymer-modified bitumen.

POTENTIAL APPLICATIONS

The potential applications include the following:

- Substitute for commercial polymer-modified bitumen in asphalt road pavements.
- Substitute for commercial polymer modifiers in waterproofing materials.
- Coatings and paints for marine, floating, coastal protection and underground structures.