

Feasibility Study on the Application of Waste Materials for Production of Sustainable Asphalt Mixtures

Authors : Farzaneh Tahmoorian, Bijan Samali, John Yeaman

Abstract : Road networks are expanding all over the world during the past few decades to meet the increasing freight volumes created by the population growth and industrial development. At the same time, the rate of generation of solid wastes in the society is increasing with the population growth, technological development, and changes in the lifestyle of people. Thus, the management of solid wastes has become an acute problem. Accordingly, there is a need for greater efficiency in the construction and maintenance of road networks, in reducing the overall cost, especially the utilization of natural materials such as aggregates. An efficient means to reduce construction and maintenance costs of road networks is to replace natural (virgin) materials by secondary, recycled materials. Recycling will also help to reduce pressure on landfills and demand for extraction of natural virgin materials thus ensuring sustainability. Application of solid wastes in asphalt layer reduces not only environmental issues associated with waste disposal but also the demand for virgin materials which will subsequently result in sustainability. Therefore, this research aims to investigate the feasibility of the application of some of the waste materials such as glass, construction and demolition wastes, etc. as alternative materials in pavement construction, particularly flexible pavements. To this end, various combination of different waste materials in certain percentages is considered in designing the asphalt mixture. One of the goals of this research is to determine the optimum percentage of all these materials in the mixture. This is done through a series of tests to evaluate the volumetric properties and resilient modulus of the mixture. The information and data collected from these tests are used to select the adequate samples for further assessment through advanced tests such as triaxial dynamic test and fatigue test, in order to investigate the asphalt mixture resistance to permanent deformation and also cracking. This paper presents the results of these investigations on the application of waste materials in asphalt mixture for production of a sustainable asphalt mix.

Keywords : asphalt, glass, pavement, recycled aggregate, sustainability

Conference Title : ICCSEIE 2017 : International Conference on Civil, Structural, Environmental and Infrastructure Engineering

Conference Location : Vancouver, Canada

Conference Dates : August 07-08, 2017