A TECHNO-ECONOMIC STUDY ON PAPER INDUSTRY WASTE- HYPO SLUDGE CONCRETE IN RIGID PAVEMENT

JAYESHKUMAR PITRODA[1], L B ZALA[2] & F S UMRIGAR[3]

[1]Assistant Professor & Research Scholar, Civil Engineering Department, BVM Engineering College, Vallabh Vidyanagar, Gujarat, India

[2] Professor & Head, Civil Engineering Department, BVM Engineering College, Vallabh Vidyanagar, Gujarat, India

[3]Principal, BVM Engineering College, Vallabh Vidyanagar, Gujarat, India

ABSTRACT

Worldwide consumption of paper has risen by 400% in the past 40 years, with 35% of harvested trees being used for paper manufacture. Logging of old growth forests accounts for less than 10% of wood pulp, but is one of the most controversial issues. Plantation forest, from where the majority of wood for pulping is obtained, is generally a monoculture and this raises concerns over the ecological effects of the practice. However its utilization in cement concrete as a partial replacement of cement as well as an additive provides an environmentally consistent way of its disposal and reuse. In the present research work, hypo sludgeis used in the design of cement concrete road pavement. Pavement is a specific application of concrete designed which uses its flexural strength.

This research work describes the feasibility of using the paper industry waste in concrete production as partial replacement of cement. The cement has been replaced by hypo sludge accordingly in the range of 0%, 10%, 20%, 30% and 40% by weight of cement for the M-40 mix. Concrete mixtures were produced, tested and compared in terms of flexural strength with the conventional concrete. These tests were carried out to evaluate the mechanical properties for the test results for flexural strength up to 90 days are taken. It is observed that replacement of cement in any proportion lowers the flexural strength of concrete as well as delays its hardening. Using the characteristic flexural strengths of various hypo sludge concretes a section of road pavement is designed. Cost of sections is estimated. The economic analysis shows that replacement up to certain proportion makes the overall design economical. This provides an environmental friendly method of hypo sludge disposal.

KEYWORDS: Hypo Sludge, Rigid Pavement, Flexural Strength, Techno, Economic