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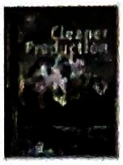

Durability studies on eco-friendly concrete mixes incorporating steel slag as coarse aggregates

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Abstract

The present study discusses the durability performance of alkali activated concrete mixes containing steel slag as coarse aggregates. Steel slag aggregates, a waste product obtained from iron and steel industry are incorporated as coarse aggregates in alkali activated slag concrete (AASC) and alkali activated slag fly ash concrete (AASFC) by replacing traditional natural aggregates. The mix design for AASC and AASFC mixes are optimised to obtain sufficient strength for structural purposes and then steel slag coarse aggregates are incorporated at different replacement levels (0%, 50% and 100% by volume of total coarse aggregate content). Durability properties such as long term ageing performance, water absorption, volume of permeable voids, resistance to sulphuric acid attack and resistance to magnesium sulphate attack are studied in detail and compared with conventional Ordinary Portland Cement Concrete (OPCC). The ecological and economical analysis of concrete mixes is also carried out. It was found that the AASC and AASFC mixes displayed better durability performance as compared to OPCC. The inclusion of steel slag aggregates slightly reduced the durability performance of AASC and AASFC mixes. The AASC and AASFC with steel slag aggregates displayed lower energy requirement and lower production cost as compared to

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EFFECTS ON THE STRENGTH PARAMETERS OF SELF-COMPACTING CONCRETE DUE TO THE ADDITION OF NYLON AND BASALT FIBRES

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ABSTRACT

This paper focuses on the effect of nylon and basalt fibres on the strength parameters of Self Compacting Concrete. The fibres were used separately, varied as 0.3%, 0.4% and 0.5% by weight of cementitious materials. The parameters tested were compressive strength, splitting tensile strength and flexural strength. It was observed that there was an increase in the compression, split tensile and flexural strength due to the addition of nylon and basalt fibres. An optimum dosage of 0.4% was found for nylon and basalt fibres in both compression and split tensile strength. Flexural strength peaked at an optimum dosage of 0.5%.

Key words: Basalt Fibres, Compressive Strength, Flexural Strength, Nylon Fibres, Self Compacting Concrete, Split Tensile Strength.

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ECONOMICAL DESIGN OF A SINGLE SPAN LONG CYLINDRICAL SHELL ROOF WITH EDGE BEAM USING THE SCHORER THEORY

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ABSTRACT

Cylindrical shell roofs are common types of shells used for the structures, which provide large free area without columns. In present work, a single span cylindrical shell (arc of a circle as directrix) with edge beam has been analysed and designed. The Schorer Theory which is extensively used for long shells has been used for the analysis. A program in C language has been developed to analyze the shell and to give the reinforcement details with edge beam and a solid diaphragm traverse. A simple iterative technique is used to get the economical geometry of the shell structure. Economical geometry of the shell with edge beam has been presented for one set of span, radius of the shell and depth of the edge beam which is taken as constants. The thickness, semi-central angle of the shell and width of the edge beam are treated as variable.

Key words: Cylindrical shell, edge beam, C language code, stress resultants, varying semi-central angle, varying edge beam width, shell efficiency, cost of construction.

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1. INTRODUCTION

Owing to the large floor space uninterrupted by columns that it makes possible, and its economy particularly when the shuttering is used repeatedly, the concrete thin shell roof has been finding increasing use. Large roof spans of bus, railroad, and air terminals, sport stadia, aerodrome hangars, textile mills, motor assembly plants and storage buildings have been effectively covered with reinforced concrete shells. The problem of covering large floor spaces using a few supporting members as possible is one which has drawn the attention of engineers for centuries and varying solutions to this problem have produced some of world's

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BUCKLING SAFETY ANALYSIS OF CYLINDRICAL SHELL ROOF WITH EDGE BEAM

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ABSTRACT

Cylindrical shell roofs are usually constructed to cover large column free areas. In the present work, a single span cylindrical shell with edge beam has been analysed and designed. The Schorer Theory for long shells has been used for the analysis. A computer programme using C language is developed for analysis and design. The buckling safety of cylindrical shells is also incorporated in the analysis.

Key words: Cylindrical shell, stress resultants, semi-central angle, buckling of shells, principal tension, elastic stability, crushing strength, shell reinforcement, cost of construction.

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1. INTRODUCTION

The structures with curved shapes can be called shells. The geometry of the shell is defined by the form of the middle surface and the thickness at every point. Shell is one whose thickness is small compared to other dimensions and its radii of curvature. Cylindrical shells are widely constructed due to its economy. Figure 1. shows the classification of Singly Curved Developable Shells[1].