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REINFORCED EARTH
AN INVESTIGATIVE MODEL STUDY

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Synopsis

Reinforced earth is a relatively new material which has only being used commercially recently.

The introduction of reinforcing element in the earth changes its character and treated apart from reinforcing concrete. An attempt has been made to study the behaviour of reinforced earth in the laboratory.

A model tank of size 87 cm x 160 cm x 90 cm was fabricated and a 3 mm thick galvanised iron sheet of dimension 87 cm x 83 cm was used as model wall. The wall was made to rotate at the bottom by placing in a pre-made groove in order to assimilate the Rankine condition of rotation about the bottom. A pulling frame device was also fabricated to horizontally pull the wall with aluminium reinforcing strip attached to the wall, buried in the sand. The tensile stresses developed in the reinforcing strip during pull-out test were measured with the help of strain-gauges.

It was found that the wall failed at a load of 110 kg which is close to the designed value of 124 kg. It was observed too, that the failure surface was very different from the Rankine's failure plane. It initially rised at an angle of 63° to horizontal in the lower part compared to 64° as in the case of Rankine but in the upper part, cut vertically at a distance of $0.34H$ from the face of the wall.

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1.0 INTRODUCTION

1.1 GENERAL

Reinforced Earth is a relatively new civil engineering material which has only been used commercially for the past few years. It is a composite construction material in which the strength of engineering fill is enhanced by the addition of strong inextensible tensile reinforcement in the form of strips. It was first developed in France by architect-engineer, Henri Vidal with the aim of improving the mechanical properties of the soil in the direction in which the soil is subject to tensile strain. Its main use has been in the construction of earth retaining structures and bridge abutments but it is now being adopted into the field of foundation stabilisation and its possible future use might even include the strengthening of cuttings.

Reinforced Earth is potentially a very versatile material, however, the vast majority of applications to date involve various types of structures. These structures embody two basic components, namely engineering fill and reinforcement as well as some form of facing which acts as a wall. In analysis of the wall, consideration must be given both to internal and external stability. A Reinforced Earth structure can be engineered to meet any static or dynamic loading requirement and to fulfill a wide range of structural requirements.