

CHAPTER I

INTRODUCTION

Single piles and pile groups are frequently subjected to high lateral forces caused by earthquakes, wave or wind forces or lateral earth pressures. The safety of structures depends on the ability of the supporting piles to resist the resulting lateral forces. Piles supported retaining walls, abutments or lock structures frequently resist high lateral forces. These lateral forces may be caused by lateral earth pressures acting on retaining walls or rigid frame bridges, by differential fluid pressures acting on lock structures or by horizontal thrust loads acting on abutments of fixed or hinged arch bridges.

Purpose of Study

The purpose of this study is to determine

- 1) The ultimate load of the laterally loaded piles.
- 2) The deflection due to the allowable working loads,
and
- 3) The effect of repetition of test loads.

Scope of Test

The study is made on two types of piles which are short and long free headed piles. Four rectangular prestressed concrete piles of 18 x 35 x 350 cm, and two 18 x 18 x 700 cm, prestressed concrete piles are tested. Both types of testing are single pile actions, no consideration is given to the group action and the strata effect of clay. Predictions of the ultimate lateral resistances and lateral deflections of laterally loaded piles have been based primarily on the theory of subgrade reaction (e.g. MATLOCK & REESE, 1961;

BROMS, 1964a, 1964b), however analyses based on elastic theory have been employed for checking (SPILLERS and STOLL, 1964; POULOS, 1971a).