4 DEFINITION OF THE PROBLEM

The investigation carried out by the author (64, 1965) and as reported by Katti-Sonpal (34, 1967), revealed in the process of consolidation of a distinct entity of pore-pressure characteristics nowhere accounted for (in its electro-viscous state) in any of the theories prevalent to-date (1971).

Consolidation as is defined presently, involves the decrease in volume of the consolidating mass of soil under stress due to the gradual transfer of stress from pore water to mineral skeleton, leading to the drainage of water. The later part of this statement does not seem to occur in all consolidating systems, and instead of release in pore pressures there have been observed building ups of pore pressures during the volume decrease of soil, Whitman et al (78, 1961), Christie (13, 1965), Perloff et al (64, 1965), Katti-Sonpal (34, 1967), Tsytovich-Dalmatov (75, 1969), Zaretsky et al (80, 1969).

Advancement recently achieved in the last decade helped considerably understanding the process of consolidation in a better way than ever before and led to the development of new area — Rheological Analysis of soils. This resulted in having linear rheological

Further modifications and refinements sought for the understanding of consolidation process came from the treatment of non-linear rheological analysis of soils as advanced by Barden (4, 1965), Zaretsky et al (80, 1959).

All the above mentioned theories have made it possible to establish in the process of consolidation, a separate entity of the pore pressure characteristics assumed synonymous in the classical Terzaghi theory.

In the varied disciplines of engineering where non-Newtonian stresses are encountered, extensive researches have been directed towards the material stress response which is also related with the participating fluid. The necessity of extending such an approach to consolidation analysis seems obvious and attempts have been made to explain the mechanism involved in the consolidation of liquid-in-solid systems on the basis of the performance of adsorbed water layers having its bearing on the electro-chemistry of clay fractions and characteristics of participating viscous medium.
The prevalent practice, for the assessment of consolidation characteristics of a system, has in support, for its dissipation characteristics, the records of pore pressures invariably measured at the bottom face. The present investigation incorporates for the first time, data of pore pressure measurements at different depths in the consolidating system so as to achieve true picture of isochrones.

In the light of preceding statements, an attempt is made in this investigation programme to analyse the role of adsorbed water layers in governing the mechanism of consolidation process from the observed records of deformations, pore pressure build ups and dissipation characteristics of varied liquid-in-solid systems. This in turn has helped evolving a physical model for the system, transforming the same into a rheological model and formulating a theory to account for the mechanism involved in the pore pressure characteristics and to assess the time curves of consolidating systems.