CHAPTER XI

SUGGESTION FOR FURTHER RESEARCH

Manifestly, the additional researches are needed to determine the appropriate tunnel, slope and foundation stability here. The complicated pattern of the subsurface layering and intertonguing of several rock types of different engineering properties in Chiew Larn project area must be established to get a clear view of the rock distribution, both vertically and horizontally. Furthermore, there are many parameters which affect the index rock properties. The parameters, e.g. the joints, cleavages, shear zones, artesian pressure, alteration degree, etc., are needded to be studied in the property selected research sites to be fully understood of their characteristics and effects they may have on the future construction sites in the whole project area. This study is not meant to discourage any future investigation, but to suggest that a very careful evaluation of these parameters be made before the definitive constructions are reached.

The further researches which are suggested are as follows.

1. The wide spreading pebbly graywackes occur generally in this project area. These rocks have important influence on the behavior of underground excavations, not only because of the direct effect of the mineral compositions of the rocks, but also because of the discontinuity which controls their mass properties. Possibly the most important further research to be taken into account is the

durability study of these rocks with regard to the weathering degree. Alternatively, there are various forms of slaking tests which involve the long term. Observation of the change in condition from pebbly graywackes to pebbly mudstones and mudshales as a result of the weathering in natural exposures. In such cases the duration of time of the rock excavation faces and the rate of alteration should be determined.

2. The groundwater has an important influence on the underground exoavation stability. It is the groundwater pressure which is the dominating factor of the unstability. The piezometers should thus be installed in the boreholes at the appurtenent sites to measure the pressure distribution and change and so to determine the groundwater flow pattern through the rock mass.

3. It is of a major importance to select the internal friction angles (ϕ) that fit the conditions anticipated at failure. Different ϕ's are normally used for the stability calculations, depending on the presence or absence of an existing shear surface or a precut surface in the test specimens. The most appropriate test program to be used for determining ϕ's should be the triaxial compression tests.

4. Additionally, some direct shear data can not be adequately described by a linear model and, such a model of a modified power curve form should be considered to better estimate the population curve than the aforementioned curve.

5. In order to gain a better understanding of some problems of the stability which may be encountered in the further underground excavations, it is suggested that a research is performed using the finite element computer analyses which give a 3-dimensional view of the rock mass condition.