Chapter V

CONCLUSIONS AND RECOMMENDATION

1. Conclusions

The following conclusions can be drawn from the results and discussion presented in Chapter IV.

1.1 The compacted maximum dry density of beach sand is much lower than that of silty sand. The results for stabilized soils also show the similar trend.

1.2 For both silty sand and beach sand, addition of emulsion results in increasing the maximum dry density and decreasing the optimum moisture content. This effect is more pronounced when either 3% lime or 3% cement is used as an additive for soil-emulsion.

1.3 For emulsion-stabilized silty sand, the molding moisture content has great influence on the unconfined compressive strength. The lower the molding moisture content, the higher is the strength. There appears to be no relationship between the dry density and the unconfined compressive strength.

1.4 In the cases of soil-lime-emulsion and soil-cement-emulsion, the unconfined compressive strength increases with decreasing the molding moisture content until a maximum strength is reached. With further reduction in molding moisture content, the

strength will start to decrease. For each mix, the value of molding moisture content which gives maximum strength is apparently on the dry side of the compaction curve.

1.5 Emulsion provides some cohesive strength and reduces the angle of shearing resistance of silty sand. For beach sand, emulsion has very little effect on the parameters Cu and ϕ_u.

1.6 With the same percentage of stabilizer, soil-cement exhibits much higher values of Cu and ϕ_u than soil-lime and soil-emulsion.

1.7 The values of Cu and ϕ_u and also the unconfined compressive strength of soil-emulsion with 3% cement as an additive are greater than those of soil-emulsion, but are smaller than those of 3% cement-treated soil. The use of 3% lime as an additive gives similar trend of results, except that the cohesive strength (Cu) and the unconfined compressive strength of soil-lime-emulsion are higher than those of both soil-emulsion and soil-lime.

1.8 The cohesive strength as well as the unconfined compressive strength of soil-emulsion are slightly dependent on the curing time. For soil-lime-emulsion and soil-cement-emulsion, the effect of curing time is more pronounced.

1.9 In all types of stabilization, the angles of shearing resistance are independent of curing time. The magnitudes of ϕ_u are almost unchanged after an initial curing of one day.

1.10 The curing type has important effect on the unconfined compressive strength and the cohesion intercept of soil-emulsion and soil-lime-emulsion. With the same curing time, the air-dried specimens of soil-emulsion and soil-lime-emulsion give much higher strength than those specimens cured in sealed plastic bags. For soil-cement-emulsion, the strength of air-dried specimens is not much different from that of the specimens cured in sealed plastic bags.

1.11 The air-dried strength for soil-emulsion, soil-lime-emulsion and also soil-cement-emulsion appear to reach maximum values within the curing time of about 7 days, whereas the strength of the specimens cured in sealed plastic bags continue to increase over the long period of curing.

1.12 The air-dried curing type should be recommended for curing the specimens of soil-emulsion and soil-lime-emulsion. The specimens of soil-cement-emulsion should be cured in sealed plastic bags, since by this method the higher strength than that of air-dried specimens could be obtained with only short period of curing.

1.13 For all types of mixes, the angles of shearing resistance are unaffected by the curing type.

1.14 With the same condition of curing, soil-emulsion with 3% cement as an additive gives much higher strength than soil-emulsion with 3% lime.

1.15 With the same type and amount of stabilizers, and also

the same condition, stabilized beach sand gives much lower strength than stabilized silty sand.

2. Recomendation

2.1 Test section should be constructed in the field in order to evaluate the strength characteristics of the stabilized soil under the field condition; and also to investigate the suitable method of performance for emloying with each type of stabilization.

2.2 The cost analysis should be made by comparing the cost of the road having each type of stabilized sandy soils as base courses to that of the road with crushed-stone base.

2.3 The wet and dry test should be carried out in the laboratory in order to evaluate the effect of the changes in moisture on the strength properties of stabilized sandy soils.