

CHAPTER 9

CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

Considering the results obtained from this study, the following conclusions can be drawn:

1. From the data obtained from other researchers and laboratories with various mixture conditions of curing temperature, the model for predicting compressive strength of concrete at any cured age and temperature was proposed by using the 28-day compressive strength model, degree of hydration function, and strength ratio function.

2. The 28-day compressive strength model was determined the effect of unit CaO content, which is considered mainly to affect the compressive strength of concrete. The effect of water to binder and γ were considered as other parameters in the model.

3. The degree of hydration function was determined time(t) as dynamic changing reaction in concrete life, water to cement ratio(w/c) as possibility of reaction to occur and temperature(T) as an accelerator of the reaction.

4. The strength ratio function was determined hydration ratio, w/c and γ as parameters to consider hydration product and pore structure development.

5. The data that obtained from other researchers and laboratories were used to determine the model. The model is controlled under the conditions of temperature (30-60°C), w/c (0.4-0.6), age (less than 365 days) and air content (1%). It is found that the accuracy of the model is approximately 80 percent.

6. The test results reveal that concrete cured at elevated temperature normally develop higher early compressive strength than concrete cured at room temperature, but compressive strengths are generally lower at 28 day and later ages. It is found that these effects happen with the increased-curing temperature.

7. The test results also reveal that the early strength development of fly ash concrete is lower than OPC concrete, but the 20 percentage replacement of fly ash concrete has the tend to develop higher strength in long term.

8. The models for predicting compressive strength of special concretes give satisfactory results.

9.2 Recommendations for Future Study

1. The behavior and reaction of fly ash pozzolan in combination with cement under fluctuating temperatures should be investigated.

2. It is realized that the results were obtained under isothermal conditions. It is necessary to verify the methodology under variable temperature conditions.

3. In order to make the model has more applicable, it is necessary to take into account the effect of high air content.