CHAPTER 5 CONCLUSIONS AND SUGGESTIONS

In this study, use of recycled coarse aggregate to replace natural aggregate (crushed limestone) to produce recycled aggregate concrete having W/B ratios of 0.45, 0.55, and 0.65 were investigated. Ground fluidized bed fly ash and ground bagasse ash were used to replace Portland cement Type I at 20, 35, and 50% by weight of binder in order to improve the mechanical properties and durability of recycled aggregate concrete. The conclusions as well as the suggestions can be drawn as follows:

5.1 Conclusions

5.1.1 Ground fluidized bed fly ash and ground bagasse ash can slightly improve the compressive strength of recycled aggregate concrete. Additionally, the effect of W/B ratio on the compressive strength of recycled aggregate concrete does not differ from its effect on the conventional concrete.

5.1 2 Use of ground fluidized bed fly ash and ground bagasse ash to partially replace cement could not improve the modulus of elasticity of recycled aggregate concrete. At the same compressive strength, the moduli of elasticity of recycled aggregate concrete with and without the ashes were lower than that of conventional concrete about 19%.

5.1.3 To reduce the water permeability coefficient of recycled aggregate concrete, the use of ground fluidized bed fly ash and ground bagasse ash in recycled aggregate concrete were more effective than the reducing of W/B ratio. The water permeability coefficient of recycled aggregate concrete could be lower than those of concretes without the ashes though the compressive strengths of the recycled aggregate concretes were also lower.

5.1.4 Compressive strength had a greater effect on reducing the water permeability coefficient of recycled aggregate concrete without ground fluidized bed fly ash and ground bagasse ash than that of recycled aggregate concrete with both ashes, especially when the compressive strengths of the recycled aggregate concretes were lower than 45 MPa.

5.1.5 Chloride penetration depth of recycled aggregate concrete decreased when ground fluidized bed fly ash and ground bagasse ash were used to partially replace Portland cement. In particular, the chloride penetration resistance of concrete was the greatest when the replacements of the ashes were increased up to 50% by weight of binder.

5.1.6 Expansion of recycled aggregate concrete due to 5% $MgSO_4$ and 5% Na_2SO_4 attacks could be reduced to be lower than that of CON concrete by using ground fluidized bed fly ash and ground bagasse ash to partially replace cement; however the use of ground fly ash and ground bagasse ash at 35 and 50% by weight of binder resulted in some surface damages of the concrete when the concretes were immersed in the sulfate solutions for 24 months.

5.1.7 To improve the compressive strength, water permeability, chloride resistance, and expansion due to sulfate attack of recycled aggregate concrete, the suitable replacement of Portland cement by ground fluidized bed fly ash or ground bagasse ash was recommended to be 20% by weight of binder.

5.2 Suggestions

5.2.1 For further study, the plastic and drying shrinkages of recycled aggregate concrete with and without pozzolanic materials should be studied.

5.2.2 Effect of the old mortar and attached mortar content and the compressive strength of original concrete on the properties of recycled aggregate concrete with and without pozzolanic materials should be studied in order to construct the model for prediction the properties of recycled aggregate concrete when the attached mortar content and the compressive strength of original concrete are known.